

Ethiopia Land Administration and Nurture (LAND) Project

ETHIOPIAN LAND ADMINISTRATION
PROFESSIONAL EDUCATIONAL DEMAND ASSESSMENT, AND BASIC CURRICULA
AND INSTITUTIONAL CAPACITY REVIEW
(Revised September 2015)

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List of Acronyms

BDU	Bahir Dar University
CDLANR	College of Dry Land Agriculture and Natural Resources
CORS	Continuous Operating Reference Station
DFID	(UK) Department for International Development
EALAN	Eastern African LA Network
ECSU	Ethiopian Civil Service University
EIS	Environmental Information Systems
ELAP	Ethiopia Land Administration Program
ELTAP	Ethiopia Strengthening Land Tenure and Administration Program
EMA	Ethiopian Mapping Agency
EPLAUA	Environmental Protection, Land Administration and Use Agency
FIS	Federation of International Surveyors
GIS	Graphic Information Systems
GTP	Growth and Transformation Plan
ILA	Institute for Land Administration (Bahir Dar University)
INSA	Information Network Security Agency
ITC	Faculty of Geoscience and Earth Observation (University of Twente)
ITG	Information Technology Group
LA	Land Administration
LAND	Land Administration and Nurture Development
LIFT	Land Investment for Transformation (UK)
LIS	Land Information Systems
LOA	Letter of Authorization
LTPR	Land Tenure and Property Rights
LUP	Land Use Planning
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
MoUDHC	Ministry of Urban Development and Construction
MSU	Michigan State University
PAP	Pastoralists & Agro-pastoralists
REILA	Responsible and Innovative Land Administration in Ethiopia (Finland)
RTK	Real Time Kinematic
SIDA	Swedish International Development Agency
SNNP	Southern Nations, Nationalities, and Peoples
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training
ULA	Urban Land Administration

USAID United States Agency for International Development

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1. Executive Summary

1.1 Background and purpose

Land security is foundational to a functional, peaceful, and prosperous society. An orderly system of land registration and supporting systems of land adjudication and land-use planning are key ingredients to this socio-economic formula for progress. With reason, the government of Ethiopia has made an efficient and effective land administration (LA) system a priority in its national strategic plan, and toward that goal, solicited the assistance of several international aid agencies, including the United States Agency of International Development (USAID).

In line with the purposes of USAID's Land Administration Nurture and Development Project, Michigan State University was contracted from January – December 2014 to conduct an empirical study of the public LA sector labor demand to guide Ethiopian universities and Technical and Vocational Education and Training (TVET) institutions to design and deliver LA training to LA officials and experts, land use planners and private surveyors. The report of the study at hand addresses several issues pertaining to the training need for Ethiopian LA professionals in the near- (5 year), mid- (10 year) and long- (20 year) term, as well as the current institutional capacity to meet this training need, based on current curriculum and capacity constraints.

1.2 Methodology and participants

The study conducted a public LA sector demand assessment carried out via a mixed methods approach: survey questionnaires and in-depth stakeholder interviews. The sample for the interviews and individual surveys were constructed with representatives from three principle stakeholder groups: (1) government LA officials and experts; (2) university administrators, instructors, and students in or related to LA programs; and (3) private sector representatives with vested interests in LA policy and practice. The study included meetings with stakeholders from the majority of Ethiopia's regional states including Afar, Amhara, Harari, Oromia, Somali, Tigray, and Southern Nations, Nationalities, and Peoples (SNNP) as well as from the two city administrations of Addis Ababa and Dire Dawa. In addition to the surveys, semi-structured interviews were conducted with key leaders and experts in the institutions visited. Interviews sought their perceptions of current and future demand for the technical and professional expertise needed in order to implement the land reform efforts, as well as their perceptions about the curricular and training needs and the current education and training system's ability to respond to those needs.

The first round of data collection focused on individual labor demand estimates. In a second round, the nine national regional states were asked to submit labor estimates for each of their respective regions. In addition, further information was sought from the Dire Dawa City Administration as well as the Ministry of Agriculture (MoA), particularly from the Land Administration and Use Department (LAUD), and the Ministry of Urban Development and Construction (MoUDHC) about their programs and plans. The researchers also acquired information from the various international agencies and NGOs working currently in land administration projects. The purpose of these efforts was to gauge the national labor demand for the land administration sector, and also

to analyze the resources currently available in terms of LA personnel, current education and training programs, and as well as training methods and results.

The study also includes a review of curricula submitted by the institutions that have been, are currently, or intend to offer training and education in the various areas of LA programs. These institutions included Bahir Dar University, Haramaya University, Ethiopian Civil Service University, Mekelle University, Hawassa University, Woldia University, and a few TVET colleges. Additionally, in-depth interviews were held with representatives of Bahir Dar University's (BDU) Institute of Land Administration (ILA), Haramaya University (HU), Mekelle University, and the TVET training system in order to analyze the current and future institutional programs and human resources. Conversations with the Academic Vice-President of Woldia University provided information on the curricular harmonization process underway between Bahir Dar University, Haramaya University, and Woldia University.

1.3 Assumptions and limitations

Two assumptions underlying the study warrant mention (a more comprehensive description of these assumptions can be found in section 3.6 of the full report):

- It was assumed that the general trend in modern land registration systems is toward GIS/LIS technologies and that the Ethiopian LA system should pursue these modern techniques and their associated technologies.
- It was assumed that the regions, in making their regional estimates, are aware of and incorporated the labor needs that will be generated by the new LA sector structure.

Several limitations of the study warrant brief mention (a more comprehensive description of the limitations can be found in section 3.6 of the full report):

- Given the study's focus on the public sector, the researchers did not attempt to ascertain an accurate picture of private sector demand.
- Although regional estimates were made by regional authorities in the best position to make those estimates, it was not possible to independently verify those estimates.
- There is not yet a clearly defined methodology for registering pastoralist areas. It is unclear what level of demand this might generate.
- The researchers were unable to generate an accurate estimate of the current turnover and attrition rates in the public LA sector.
- The researchers were unable to investigate the reasons behind the anomaly of a large number of unfilled positions in the public LA sector and the large number of LA academic program graduates unable to find employment.
- The researchers were unable to find accurate information on the number of enrollees and graduates in LA related TVET training courses.

1.4 Findings and conclusions

This study, based on semi-formal interviews with key stakeholders in the LA system, diagnostics submitted by regional land administration authorities, independent city administrations, and

national ministries, in-depth interviews with education and training representatives, 139 individual surveys, and extensive conversations with key internationally funded LA projects has concluded that the short-term national need for LA personnel is approximately 38,764 within five years, an additional 50,023 in ten years, and an additional 57,534 in 20 years. Thus, the study estimates a total of 146,321 additional personnel are needed over the next 20 years in the LA sector for the ten key LA functions listed in the survey instrument (see Table 1). Added to the 8,944 personnel currently working in the public LA sector, the total public LA workforce demand in 20 years will be 155,265 trained professionals and para-professionals.

Consensus exists that demand for LA professionals and technicians far exceeds supply and that this situation will continue in the distant future indefinitely unless immediate action is taken to expand the national institutional training capacity. Various respondents and groups indicated that the LA profession and the related certification activity is a new initiative for Ethiopia. Stakeholders agree that a comprehensive training capacity should be implemented through a multidisciplinary approach using appropriate technologies and incorporating all efforts into a single training and education system.

Based on survey and interview analysis, the report concludes that the need to increase the capacity of the land administration system can be organized into four categories, listed in order of urgency:

- complete the second level land certification process;
- digitize and archive all certifications into a national database based on national inventories;
- begin a long-term process of regular land management and protection activities that will maximize land use, land preservation, and soil conservation;
- and, build the capacity of and regularize the land appraisal, tax collection, and land adjudication structures and processes.

Given these four national priorities, the report identifies the following definable needs based on the estimates given:

- The largest single need is for LA technicians, followed by surveyors, especially those with GIS/LIS capabilities;
- GIS/LIS specialists who are in a position to process the results produced by an increased number of surveyors is also crucial to maintain records, create effective integration between national, regional, and sub-regional land administration units, as well as efficiently and effectively produce reliable and retrievable land certification records;
- A vision and culture of national professional land management needs to become part of the administrative structure of the EPLAUA. This requires advanced skills in land management, LA, land use planning, and land resource. These higher level skills will take longer to develop, but form an important part of the national administrative structure;
- Support structures for the EPLAUA will be needed, including policy, legal, and educational experts. This will require specialized and advanced training in these areas;

- Anticipating the diminished need for personnel at the end of the LA certification process, designing and implementing a post-certification strategy that supports cross-training for personnel could provide viable employment pathways for personnel no longer in the LA sector.

1.5 Recommendations

Based on estimated needs, the report proposes a short-term (five-year) institutional and curricular strategy. Key recommendations include the following:

Institutional recommendations:

- *Incorporate parasurveyor training as the basis of the certification process.*
- *Develop a means to recognize acquired competencies of parasurveyors within the TVET QF system.*
- *Develop stronger articulation and transfer agreements between project training systems, TVETs, and universities.*
- *Increase the number of TVET institutions and QFs to meet the demand of approximately 100,000 TVET trained personnel over the next twenty years.*
- *Improve the quality of existing LA programs and gradually increase the number of institutions offering LA degree programs.*
- *Strengthen existing LA degree granting institutions through cooperative agreements with international universities to fill in gaps in expertise until local experts can be credentialed.*
- *Raise the annual number of Masters graduates to 30.*
- *Immediately identify five potential doctoral students for doctoral study in different needed areas of specialization in LA.*
- *Allocate a percentage of land tax revenues to the development of LA programs.*

Curricular recommendations:

- *Develop clear competencies for parasurveyors and fit the competencies within the Qualifications Framework of the TVET system.*
- *Develop a TVET program for mapping and surveying.*
- *Develop a TVET program for GIS/LIS technicians.*
- *Develop a TVET program for Land Administration Technician.*
- *Develop a specialization in Land Law.*
- *Develop a doctoral program for Land Administration. Implement a four-level training system featuring strategic emphases at the parasurveyor, TVET, undergraduate, and post-graduate levels.*
- *Develop articulation and transfer agreements between these tiers so that trainees can move easily from one level to the next.*

If adequately resourced and implemented, these recommendations will help generate an effective LA system in Ethiopia in the near term, while building the foundations for long-term sustainability and the accomplishment of the objectives for which the LAND program was initiated.

1.6 Validation workshop and next steps

In order to ensure the applicability of the outputs of this research, the study design included a validation workshop. The Tetra Tech Land Administration office organized the workshop in collaboration with the study’s consultants. The workshop occurred in Bishoftu, Ethiopia on June 23 and 24, 2015. The purpose of the workshop was to receive critical feedback on the following aspects of this study: (1) data collection and data analysis methodology for both the demand assessment survey and the curricula & institutional capacity assessment; (2) institutional and curricular recommendations; (3) proposed training strategy and implementation plan. The research team reviewed each point of the workshop feedback. The existing version of the study’s full report incorporates updated data, curricular and institutional assessments based upon more recent curricula, and many of revised data points from the labor demand survey.

The two-day workshop engaged over 30 stakeholders from the Land Administration system in Ethiopia. Participants represented a diversity of sectors from the LA system including the MoA, MoUDHC, city and rural LA systems, TVET institutions, universities, private sector, and international agencies (See Appendix I in the full report for a detailed list of participants and represented agencies, organizations, and institutions). This breadth of diversity was one of the greatest strengths of the workshop, providing robust analysis of the methodology, assessments, and recommendations of this report.



Dr. Aregay, Deputy of Chief of LAND, delivering a welcome speech

The research team designed the sessions of the workshop mindful of adult learning theory and focus group research methodology in order to maximize stakeholder participation. Day 1 included an introduction of participants, presentations from each member of the research team, and

participatory feedback sessions guided by a semi-structured group discussion protocol. Round 1 of stakeholder discussion organized groups according to sectors (e.g. public administration, academic, non-government organizations, etc). Round 2 of stakeholder discussion organized groups across sectors. The various rounds allowed participants to engage and provide ideas from similar and different perspectives as their own. Appendix I includes the workshop program, and semi-structured group discussion protocol.

Overall, the stakeholders expressed strong appreciation for the report. In large part the stakeholders validated the methodology, findings and recommendations. Major ideas and recommendations that stakeholders validated include the following: the need for technical training at lower education levels is critical to finish the credentialing task; toward that end, reliance upon TVET institutions and short courses to develop parasurveyors is a feasible strategy to develop the bulk of the labor demand for credentialing land; designing sandwich programs to develop a PhD program in LA related fields is a key strategy for sustainable management of Ethiopia's LA system. In terms of next steps, stakeholders recommended convening an "endorsement workshop" for responsible parties at ministry, universities, and regional levels to establish a governance structure for oversight of the implementation plan, budget, and a monitoring and evaluation plan.

Table 1: Combined Urban and Rural Sector Demand Estimate

Position	Current Public LA Sector Personnel	5 Year Demand	10 Year Demand	20 Year Demand	Future Demand Totals
Land surveyors (parcel and cadastral surveys)	1,959	7,793	6,932	8,933	23,658
Land/real Estate Appraisers and Tax Specialist	148	2,204	2,980	5,301	10,485
GIS+ Geographic information System with generic spatial analytical functions.	618	3,061	3,790	6,050	12,901
LIS= Land information System including relational data base and cadastral information linkage	195	2,839	3,526	5,918	12,283
Land use Managers (Land Conservation Environmental planners)	677	2,025	2,344	3,344	7,713
Land Use and City Planners	1,344	3,408	3,750	6,562	13,720
Land property Lawyer	364	5,275	9,095	1,323	15,693
Land Administration Technicians if any please specify below	2,680	8,420	13,549	14,592	36,561
Information technology & web site data encoder expert	15	54	44	37	135
Land administration experts(land admin, valuation, registration, investment etc.)	1,170	3,685	4,013	5,474	13,172
Totals	9,170	38,764	50,023	57,534	146,321

2. Introduction

2.1 Purpose and Objectives of LAND Project

USAID's **Land Administration to Nurture Development (LAND; 2013-2018)** project seeks to improve the legal and regulatory framework on land tenure and property rights to promote its goal of increasing economic growth, and improving rural resiliency and governance. The program implements various activities to strengthen the capacity of LA¹ and land use institutions. LAND addresses the assessment of the current institutional training capacity in LA and anticipated demand for LA services in Ethiopia.

According to the official project description, the LAND project builds on two previous USAID/Ethiopia projects - Ethiopia Strengthening Land Tenure and Administration Program (ELTAP; 2005-2008) and the Ethiopia Land Administration Program (ELAP; 2008-2012) – “to improve land governance and LA and strengthen land tenure rights in Ethiopia and thereby promote economic growth, increase agricultural productivity, reduce land-use conflict and resource/environmental degradation, and improve women’s rights to control and manage assets.”²

Project objectives include:

- Support national and regional governments to improve LA and land use laws based on research findings and public needs;
- Improve Government of Ethiopia’s LA institutions efficiency in land use rights certification and transactions through practical trainings provided by higher educational institutions;
- Encourage pastoral communities to introduce certification of communal land use rights and management of natural resources.

2.2 Background and Rationale

Ethiopia’s population for 2014 is projected to be about 88 million,³ which is second only to Nigeria in all of Africa. The Government of Ethiopia’s five-year development plan (2010/11-2014/15), the Growth and Transformation Plan(GTP)⁴, is designed to foster broad-based development in a sustainable manner to achieve the Millennium Development Goals. The World Bank⁵ reports a sustained GDP growth of 10.6% during the period 2004-2013. The GTP envisions not only a major development of the economic structure and income levels but also the level of other social indicators. It is expected that there will be a continued rural to urban migration, posing challenges

¹Following the original TOR, this report uses the term **land administration** to include subjects such as property rights, land policy, land administration and use legislation, land registration and titling, land surveying, land use planning, land management and land valuation. Land use professionals include individuals trained in LA at postgraduate, graduate, diploma and certificate levels. The report substitutes the abbreviation LA in all cases, except where land administration is part of a technical term (e.g., Land Administration Technician), at the beginning of a sentence, or in headings.

² USAID, 2014. Retrieved at <http://usaidlandtenure.net/projects/ethiopia>.

³All statistics in this report are derived from official reports of Ethiopia’s Central Statistical Agency. Reports can be found at http://www.csa.gov.et/images/general/news/pop_pro_wer_2014-2017.

⁴ Federal Democratic Republic of Ethiopia, Ministry of Finance and Economic Development. 2010. Growth and Transformation Plan.

⁵ World Bank (2013), *Doing Business 2014: Ethiopia*. Washington DC: World Bank.

for Addis Ababa with its current estimated 3 million inhabitants, and posing additional need for LA professionals, especially in urban planning and land use in order to stave off shortages of land, infrastructure, key services, food, and water.

The GTP goals, affecting LA job demand, include:

- Preparation of a national master land use plan, nine regional master land use plans; and 3,000 local level land use plans;
- Rapid economic growth, targeted for 11% per year at worst and, at best, to double the size of the economy by 2015, with GDP per capita expected to reach \$698 by 2015;
- Doubling of agricultural production to ensure food, nutrition and environmental security in Ethiopia for the first time;
- An increased contribution from the industrial sector, particularly focused on increased production in sugar, textiles, leather products and cement;
- An increase of the roads network should increase from 49,000 km to 64,500 km by 2015;
- An increase in power generation capacity will from the current 2,000 MW to 8,000 MW, and the number of customers from the current two million to four million by 2015;
- Construction of 2,395 km of railway line which will require large numbers of surveyors and cartographers as well a government implemented program of property valuation and compensation.

More specifically, the GTP (2010) indicates the need to professionally manage 50 million parcels of farm land and at the same time, through MoUDHC to do cadastral surveys, first in 23, and then in an additional 68 of the total 972-1600 cities in a phased approach by strengthening the capacity of Ethiopian universities and vocational schools to train LA and land-use professionals. The premise is that appropriate LA would result in greater care for and investment in land, resulting in enhanced land productivity, leading to improved and efficient sustainable development. LA professionals are tasked to conduct two levels of land registration and certification programs. Level 1 certification covered 96% of households and 250,000 (out of 50 million in the rural sector and a comparable number, if not greater, in the urban sector) parcels and was based primarily on existing field markers and informal information from adjacent landowners. Level 1 certifications were completed in the highland four regions (Amhara, Oromiya, Tigray and SNNP) roughly from 2010-2013. In the coming years, a more advanced Level 2 certification in the rural sector will be implemented with reliance upon:

- aerial photos for small farms;
- satellite images for big farms;
- Total Stations (electronic theodolites⁶ integrated with electronic distance measurements);
- and, the incorporation of DGPS coordinates for larger projects (e.g. irrigation farms).

⁶“A theodolite is a basic surveying instrument of unknown origin but going back to at least the 16th-century English mathematician Leonard Digges; it is used to measure horizontal and vertical angles. In its modern form it consists of a telescope mounted to swivel both horizontally and vertically.” See, “Theodolite,” *Encyclopedia Britannica*. *Encyclopedia Britannica Online*. Encyclopedia Britannica Inc., 2015. Retrieved 10 February, 2015. <<http://www.britannica.com/EBchecked/topic/590605/theodolite>>.

The certification in the urban sector is only in its initial stages. The development priorities established by the GTP highlight the need for the current study.

2.3 Related Studies

Several studies have been conducted recently on human resource development and research needs in Ethiopia's land administration system. Three studies in particular have made a significant contribution and shaped the direction of this current study: Adams, Backstrom and Ali(2010);Ethiopia Ministry of Urban Development, Housing, and Construction (2013); and Zein, Hartfiand Berisso (2013). These three represent the collaborative work of individuals from Ethiopian agencies as well as leading international consultants. The purpose, results, and recommendations of these studies are summarized below in order to show how they informed the study at hand. Also, the limitations of the studies are noted in order to clarify the need and rationale for this current study.

Adams and Backstrom (2010) assessed institutional structure and human resource development needs in the sector of land administration in Ethiopia. The study was conducted in 2009 by ORGUT for SIDA.ORGUT is an independent service provider in international development cooperation based in Sweden with offices in Finland, the UK, Kenya, Ethiopia, Tanzania, South Africa and Vietnam. Adams and Backstrom analyzed the roles and mandates of Government's land administration agencies as well as the training and capacity required for the delivery of Ethiopia's land sector program. The geographic scope included the rural and urban areas of Amhara, Oromiya, Tigray and SNNP Regional States and the City of Addis Ababa. The study proposed a merging of urban and rural land administration and the Land Administration Authority (LAA) under the Federal Government. Such action would parallel patterns in other countries and was suggested to facilitate greater efficiencies by harmonizing different systems. However, this particular recommendation was not implemented. The land administration work is still housed in two different bureaus. Urban LA is under the supervision of the (MUDHCo) and rural LA in the regions is under the supervision of the (MoA). Hence, the need to harmonize various systems remains, and thus is a focal area of the study at hand.

The report gave an excellent overview of the current state of affairs in the LA sector, and gave general personnel demand assessments for the sector. The personnel data was not, however, disaggregated by function, making the number of the specific positions and responsibilities needed unclear. Moreover, the report only contemplated two levels of training – college and university. In this case, college refers to post-secondary vocational training and university refers to four year university degree training. Neither did the report take into account recent developments, especially in the NGO sector, that are contributing to the advance of the national land registration goals. The NGO sector has made a number of important discoveries and introduced a number of innovative training regimes that should be taken into account when estimating the education and training needs of the sector. This report hopes to fill in those gaps.

The Ethiopia Ministry of Urban Development, Housing, and Construction (2013) conducted an extensive nationwide assessment of the training and research needs for land administration. The study was a collaborative venture between Addis Ababa University and the MoUDHC. The

impetus for the study arose from the number of challenges facing the MoUDHC in its renewed efforts to modernize land administration and management systems. One of the most significant challenges was the gap of skills and knowledge between existing workforce training programs and the actual demands for a modern land administration system. Regions and cities are also implementing projects, but often such efforts are uncoordinated. Accordingly, the purpose of this study was to identify the training and research needs in the sector and serve as basis for a comprehensive training program. Two objectives guided the work: (1) To identify and prioritize the training needs of stakeholders to inform the preparation of a comprehensive training plan; (2) To identify the needs for the establishment of a research “centre of excellence” in land administration and management. The study identified “a number of constraints characterized by lack of organizational and system deficiency, logistics, resources and facilities, technology and manpower” (p. 89). The MoUDHC assessment provides a number of unique contributions; two are particularly relevant to this current study. First, Ethiopia Ministry of Urban Development, Housing, and Construction (2013) obtained primary data from stakeholders at national, regional and city levels. Second, their study provides an estimation of workforce needs in various areas of land administration along with curricula for proposed training programs. The curricula address priority areas including technical knowledge, law and policy, economics and valuation, planning and land administration. These data and curricula provide a useful comparative lens for the study at hand. This current study shares a number of similar conclusions with the MoUDHC assessment, especially the recommendation to consolidate and coordinate proposed training programs, which will “require achieving consensus among stake holders and drawing from international experience.” (Ethiopia Ministry of Urban Development, Housing, and Construction, p. 90). The current study extends the MoUDHC assessment by disaggregating anticipated workforce demand for particular positions within the land administration system, and in turn, by recommending a more nuanced training strategy.

This study is an excellent overview of the urban land registration needs, taking into account not only major urban areas, such as Addis Ababa, but also taking into account mid-sized urban areas and smaller urban areas, a few of which have been included in the study in order to estimate broader sectors needs across the regions. In the end, however, it is a study of urban land administration. A comprehensive study that takes into account the urban and rural needs as part of a single LA program is still needed. This study hopes to fill that gap.

Zein, Hartfiel and Berisso (2013) is a working paper prepared for the International Federation of Surveyors (FIG) working week 2013 in Abuja, Nigeria. The paper reports on a 2009 collaborative project between the Addis Ababa City Government and Hansa Luftbild, a German based, geo-information and mapping company, with extensive international experience. The project called for the development of a new real property registration system and a new land information (cadaster) system. The paper gives an overview of the establishing of the new real property and cadaster system, the new addressing system, the updating of the cadastral map and the support, training and consultancy services provided by the company. The project successfully accomplished multiple goals that are intimately related to the objectives of the current study.

The Addis Ababa City Administration in close co-operation with Hansa Luftbild was able to develop a new system for assigning street addresses to existing properties and to working and practical real property registration and land information (cadaster) systems within the confines of the telecommunications infrastructure available. These two systems are being used to support many services and will develop the confidence and trust of the public with regard to legal land use right and ownership of property. During the development period the local staff acquired skills and thus are able to run the systems independently. The two systems are populated with up-to-date cadastral map data produced by Hansa Luftbild and run at the newly established real property registration agency of the city. As well as being specifically tailored to Addis Ababa City Government (AACG) specifications, the two systems were simultaneously developed to comply with international and Open Geospatial Consortium (OGC) standards, thus guaranteeing their transparency and interoperability, locally, regionally and internationally. From this perspective, the solution in Addis Ababa can be seen as a blueprint for Ethiopia's urban areas at a national level and as potentially utilizable throughout the African continent (p. 16). In order to better understand the outcomes of this successful project, we obtained additional data via email with Zein, Hartfiel and Berisso. This additional information included status of the cadastral maps in Addis Ababa, percentages of completed maps at level 2 certification, levels of education and number of hours required to complete various LA tasks. This kind of quantitative, accurate data is critical to design a relevant education and training strategy. The conclusions and recommended strategy of this report are indebted to their generosity and transparency. Specific recommendations, insights, and data from these three studies are discussed in more detail throughout this report.

2.4 Objectives of MSU Study

In line with the purposes of LAND and in accordance with Letter of Authorization (LOA) No. 4, Michigan State University conducted an empirical study to guide Ethiopian universities and TVETs to design and deliver LA training and education that will satisfy current and anticipated market demands by the public, private, and NGO sectors. The report of the study at hand addresses several issues pertaining to the need for Ethiopian LA professionals in the near - (5 year), mid- (10 year), and longer- (20 year) term as well as the current institutional capacity to meet this training need, based on current curriculum and capacity constraints.

2.5 Report Outline

This report is organized in six sections whose purposes are as follows:

1. Executive summary;
2. The **introduction** provides the purpose, background, and rationale for the LAND program as well as the objectives and outline of the MSU report;
3. The **labor demand estimate section** unfolds in three parts in order to:
 - provide an in depth description of the data collection and data analysis methods for both the individual and agency demand assessment surveys and the curricula & institutional capacity assessment as well as the describe the validity and reliability of the data;

- describe the results of two rounds of individual and focus group interviews with key players in the LA sector and the related LA training and education sector;
 - make summary estimates for national labor demand.
4. The **gap analyses section** provides a description of the gap between the existing LA and LA related systems and the projected needs based on the labor demand assessment.
- analyze the current land administration sector and identify gaps between the current structure, organization, and implementation of the LA sector system and the need implied by labor demand estimates.
 - analyze the university and TVET curricular materials and non-curricular capacity to deliver enhanced land management technical and professional programs;
 - and analyze the gaps and weaknesses in the current education and training systems and anticipated problems based on the projected needs detected through the data collection and analysis section with clear explanation of those projections based on the data;
5. The final section provides **strategic solutions and recommendations** by:
- identifying selected universities and TVET institutions that might add to system capacity for delivery of education and training;
 - describing of curricula needed in order to meet the current and projected needs of Ethiopia's land management system in the near and long term, including course descriptions;
 - detailing a 4-tiered training strategy for meeting the system demand in the near-and long term;
 - and establishing an implementation plan for meeting the needs of the land management system.

3. Land Administration Sector Labor Demand Estimates

In this section we provide an in depth description of the data collection and data analysis methods used for both the demand assessment survey and the curricula & institutional capacity assessment. We then give a detailed description of the results of the three data collections we conducted: the individual and focus group interviews, the individual survey applied to LA practitioners, and the regional, national, and federal surveys we applied. We will then present a summary of the data we collected and make LA sector labor demand estimates based on them. We will conclude by identifying the cross-cutting issues coming out of the data collection.

3.1 Methodology

This demand assessment was carried out in two rounds using both quantitative and qualitative methods: in the first round, we applied an individual survey questionnaire and conducted in-depth stakeholder interviews with members of the public and private sector, as well as members of land administration projects sponsored by international funding agencies (see Table 1). In response to the scope of work, the sample for the interviews and surveys was intentionally constructed with representatives from three principle stakeholder groups:

- government LA experts and officials;
- university administrators, instructors, and students, in or related to LA programs;
- and private sector representatives with vested interests in LA policy and practice.

To this was added a review of LA curricular material at leading and representative institutions with the goal of assessing relative quality and capacity of existing program to meet anticipated demand.

Table 2: Data Collection Representative Stakeholder Participants by Sector

Public Administration	Post-secondary Education	Private Sector	International Agency Projects
MoUDHC National Directorate (survey; interview)	Institute for Land Administration, Bahir Dar University (survey; interview)	Geomark Surveying Company(survey; interview)	Responsible and Innovative Land Administration (REILA) Project
MoA TVET training system Director (interview)	Ethiopian Civil Service University (survey; interview)	Sunshine Construction Real Estate Company (survey; interview)	Land Investment for Transformation (LIFT) Project
MoA LAUD Director and Technical Team (survey, interview)	Haramaya University, Land Administration Program (survey; interview)	ENYI Real Estate Company	Hansa Luftbild
Afar Environmental Protection and Rural Land Use and Administration Agency (survey; interview)	Hawassa University(survey; interview)		Chief of Party, USAID Ethiopia Land Project

Amhara environmental protection, land administration and use Bureau (survey; interview)	Hawassa Polytechnic College (survey; interview)		
Harari Regional State and Land Development and Administration (survey)	College of Dry Land Agriculture and Natural Resource, Mekelle University (survey; interview)		
Hawassa Land Administration and Environmental Protection Process under National Resources Management and Environment Protection Agency (survey)	TVET National Directorate (interview)		
Oromiya Bureau of Environmental Protection and Land Administration Land Administration Director and team members	Oromiya Region TVET Commission (survey; interview)		
Southern Nations, Nationalities, and Peoples Region Land Planning Office	Afar Region TVET Agency (survey; interview)		
Tigray Environmental Protection, Land Administration and Use Agency	Mekelle Region TVET Agency (survey; interview)		
Dire Dawa City Administration	Somali Region TVET Agency (survey; interview)		
City of Addis Ababa Land Development and Management Bureau (survey; interview)	SNNP Region TVET Agency (survey; interview)		
Semera-Logia Municipality Administration Office, Afar	Tigray Region TVET College Agency (survey; interview)		
Integrated Land Information Project Office, Mekele			
Jijiga City Administration Municipality Service Office			
Rural Land Administration and			

Utilization Case Team, Jijiga			
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- = National Public Ministries or Directorates
- = Regional Public Authorities
- = Sub-Regional Public Authorities
- = Universities and Colleges
- = National TVET Authorities
- = Sub-National TVET Authorities
- = Private Sector
- = International Agency Projects

After the first round of data collection, however, we felt that the results were not sufficiently reliable to give a solid foundation for an accurate labor demand estimate. Although some valuable data was collected, as we describe below, the ranges and standard deviations of those estimates were too large to be able to say anything definitive about the demand estimate. As a result, we opted to undertake a second data collection.

In the second round of data collection we focused on the regional land administration bureaus, the land administration authorities of the two independent city administrations, as well as those national ministries that were involved in land administration, namely, the MoA TVET training program, the MoA, LAUD, the MoUDHC, and the national TVET program, as well as those universities most involved in the training process, namely, Haramaya University, Bahir Dar University, and Mekelle University. In each of the regions and national ministries consulted, we collected labor demand estimates using disaggregated descriptions of positions/responsibilities. Moreover, we did extensive interviews in order to develop productivity estimates in order to make reasonable projections of the number of personnel needed to complete the most basic land registration tasks of surveying and land registration. We also spent considerable time collecting data on the various LA projects supported by international agencies currently operating in country (e.g., REILA and LIFT). As part of this effort, we contacted the Hansa Luftbild agency that worked closely with the city of Addis Ababa in developing their mapping and land certification capacity. Finally, in this second stage, we explored current curricular and personnel capacity for the major universities offering LA programs. In this way, we were able to fill in many of the gaps in our knowledge and produce more reliable labor demand estimates. In Table 1 we record the visits we made, the data collected, and the instruments used. This report reflects a combining of the best results of the first and second data collections.

This is a demand assessment study, the results of which provided the foundation for the education and training strategy and implementation plan presented in section five of the report. The methods applied in the first round of data collection for the purpose of making this assessment were a demand assessment survey (see Appendix A) and semi-structured interviews (see Appendix B). Both were applied to a select sample of informed experts in several of the professions related to LA in Ethiopia (n = 139). All of the participants were affiliated with the LA sector in some way and were considered to have knowledge of the

sector's needs. The goal of the survey and interviews was to collect and analyze the perceptions of persons in the field who were assumed to have reliable information regarding the current and future needs of the LA system in Ethiopia. The resulting wide disparities in estimates, however, brought into question the validity of this assumption and made these initial surveys of limited use in terms of labor demand estimates.

The interviews provided more reliable information about the sector's needs, but once again represented the opinions of a few and were not structured in such a way to elicit the same information from each interview participant. The result was that the estimates were unreliable. The curricular review consisted of documentary analysis of curricula provided by key institutions currently imparting academic programs in one or more of technical and professional areas related to LA (see Appendix C). The purpose of this latter exercise was to acquire a general sense of current curricular offerings, gaps in curricular offerings, and to project future curricular needs based on these analyses, and recommend an effective training strategy and implementation plan for future education and training of technical and professional experts in the area of LA. In the following sections, we describe in detail the data collection and data analysis methods applied in each instance.

At the end of the first round of data collection and analysis, we felt that there were still large gaps in our knowledge in several important areas. First, we felt that the survey estimates left us with an ambiguous picture since we could not distinguish well-informed estimates from uninformed conjectures. The variance, standard deviations, and certainty levels all told us that there was little certitude around these estimates. Second, we felt that we were not familiar enough with the productivity levels of the survey teams to be able to triangulate the estimates based on quantity of land yet to be certified. We also felt that if we could get a good sense of what the current productivity levels are for the different certification methods and what the remaining land area to be certified was, we could triangulate our estimates against various scenarios, taking into account the different methods currently being applied and also the different training regimes being used. Third, we felt that we needed to look more at specific jurisdictions rather than having respondents make estimates for the system as a whole. For example, it did little good to have employees of the regions estimating the level of demand for national agencies and it did little good for persons from one region to make estimates for another region. In order to accomplish this task, we felt that we needed to get the input of those who were directly involved in the planning for future personnel since they would most probably have thought through the future needs and the available human resources.

During the second stage of data collection, we attempted to strengthen the database by targeting specifically those who were in a position to have comprehensive knowledge of the survey, registration, and certification process, as well as the day to day operations of the competent authorities. These persons were representatives from each one of the nine national regional states. In each of the nine regional states, we solicited from those responsible for the LA implementation what their estimates were for their particular jurisdictions. To these we added, estimates from the independent city Dire Dawa, and from

the two national ministries responsible for rural and urban land certification and registration respectively: the MoA and the MoUDHC. The survey form used to solicit data from the regions, the city of Dire Dawa, and the Ministries was similar in construction to the original individual survey form that was applied, with the exception that estimates were made only for the jurisdiction for which they had responsibility and a few qualitative questions were added regarding specific issues that we wanted to address in the report. The survey instrument can be found in Appendix C.

In addition to these targeted estimate surveys, we interviewed key personnel in several of the institutions that have responsibility either for the certification process, LA planning, or for the education and training components for the LA sector. Mostly, however, we were looking for three things: first, we wanted to know what methods were being used in the certification process. Since there is no standard procedure stipulated for the certification and registration process, this was necessary to get a better sense of the types of training that would be used to prepare those working in the process. Second, we wanted to get a better sense of how the certification efforts were proceeding, how efficient the process was, what remained to be done, and how long they were estimating for completion of the certification process. Again, this was needed to get a better sense of what the current capacity was for generating, archiving, and retrieving registration records. Third, we wanted to get a better sense of what the NGOs operating in the LA sector were doing in the area of education and training. There are several international funding agencies that have been involved in LA reform in Ethiopia. None, however, have been more active than the REILA project, sponsored by the Ministry of Foreign Affairs of Finland, and the LIFT project, sponsored by the Department for International Development of the UK. The REILA project has focused on piloting surveying, registration, and certification processes in several geographical areas. The LIFT program, likewise, has piloted the use of para-surveyors and also is active in several geographical areas. We wanted to make sure that these methods and the accompanying training efforts were taken into consideration and, if to the benefit of a training strategy, incorporate them into a single plan. Finally, we arranged interviews with several representatives of the universities and of the national TVET program that either are currently offering LA academic and training programs or intend to offer them in the near future. We wanted to get a better sense of what was being offered, what the demand was for the program offerings, what human resources were available to deliver those programs, and what was being done to provide for future human resource needs. In the next section, we describe the instruments we used.

Validating results with key stakeholders is an important part of both quantitative and qualitative research methodology, particularly when the research outputs are intended to support national development outcomes. Given the objectives of this research to advance Ethiopia's national development agenda, this study incorporated a validation workshop as part of the research design. See section 5.1 and Appendix I for a detailed description of the workshop agenda and summary of stakeholder feedback.

3.2. Individual Demand Assessment Survey Results

The individual demand assessment survey consisted of eight sections as follows (see Appendix A):

- A. *Individual information*: this section was included for the purposes of determining the geographical distribution of survey participants as well as follow-up information;
- B. *Education information*: this section was included in order to determine the qualifications of the individuals involved in estimating future training needs;
- C. *Employment information*: this section as useful in determining what portion of our sample was currently active in the land management fields as well as to determine their assessment of future needs;
- D. *Demand Estimates*: this section asked respondents to indicate what they felt would be the demand for specific positions within the LA sector in the next five, ten, and twenty years.
- E. *Salaries, Wages, and Benefits*: this section addresses current compensation as well as satisfaction levels with current pay and benefit regimes and was included in order to estimate turnover rates among LA technicians and professionals;
- F. *Job advancement information*: this section was included in order to estimate the rate of job advancement among current employees in LA and thus to estimate potential retention rates among LA technicians and professionals;
- G. *Continuing education information*: this sections highlights current on-going training and education among technicians and professionals working in areas related to LA and is included in order to get a sense of need for continuing education among those working in the field;
- H. *Education quality information*: this section is intended to discern the general perception of quality of education and training among technicians and professionals participating in the education system.

3.2.1 Sample

A convenience sampling method was employed. The survey was applied to 139 respondents geographically located across nine regions (Tigray, Amhara, Addis Ababa, Somali, Oromiya, Dire Dawa, Afar, SNNP, and Harari) in the proportions seen in table 2, representing the three stakeholder groups mentioned above.

Table 3: Number and percentage of survey participants by region

	REGION									Total
	Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
No.	15	29	30	18	9	9	6	19	4	139
%	10.8%	20.9%	21.6%	12.9%	6.5%	6.5%	4.3%	13.7%	2.9%	100.0%

Representatives were selected by the LAND project's in-country regional focal persons. Individual survey questionnaire were distributed in advance and also made available to those present at the meetings, presumably selected by institutional leadership, which may have introduced an element of selection bias in the survey. Most surveys were administered in person, a few were completed and collected later. An in-country consultant compiled the data.

Although the educational background of the respondents was varied and not necessarily in areas related to LA (34% of respondents were trained in fields unrelated to land management), only 5% were currently working in positions that were not directly related to LA in some way. Forty-four percent had a college degree and 42.1% had an advanced degree. In addition, 97.8 % of the survey respondents were employed. Eight percent were female.

3.2.2 Individual Information

The overwhelming consensus among those surveyed and interviewed is that demand for LA professionals and technicians far exceeds supply and that this situation will continue indefinitely into the distant future unless drastic action is taken to expand the national institutional training capacity. Different respondents and groups indicated that the LA profession and related certification activity is a new subject for Ethiopia and comprehensive training capacity has to be implemented through a multidisciplinary approach using appropriate technologies.

3.2.3 Educational Information

An effective LA capacity is required to facilitate sustainable economic development, including the long-term capacity to finance the institutional development needed to carry out these critical functions. This will require a sufficient number of qualified professionals in several disciplines and/or sub-professions of LA. As has been already discussed above, the educational backgrounds are rather diverse with near full employment of those surveyed, indicating a shortage of available specialist (Appendix E: Tables B2, B3 and C01). They span a wide spectrum of (informal) job classifications and employment situations (Appendix E: C02 – 08).

3.2.4 Employment Information

This section solicited current employment information. As noted above, more than 97% of respondents are currently employed. Although it is somewhat difficult to discern simply by position title whether a job is directly related to LA, at most, only five percent of respondents are, potentially, in unrelated fields. In other words, respondents are overwhelmingly employed and are working in positions that are directly related to LA. This section also solicited information as to perceived future employment needs of the LA system in the near-term (5 years) and the long term (20 years). The disciplines and sub-professions needed in order to effectively implement a national LA system are listed below and the data pertaining to estimates regarding each area are discussed.

3.2.5 Demand Assessment

This section of the survey asked the respondents to give their best estimate of the demand for ten specific positions in the LA sector over the next twenty years. The results of that survey are included in the following section.

3.2.5.1 Land/Cadastral Surveying

Surveying is an essential basic technical expertise for LA. It is generally recognized that lack of (cadastral) surveyors is a crucial bottleneck in the LA sector, as was mentioned repeatedly by respondents (Appendix E: Table C 14.1.1). Other important reasons for the need of land/cadastral surveying are: to facilitate land tenure security, registration, compensation, valuation and certification; and the need for urban land-use planning and urban expansion (Appendix E: Table C14.1.1). Seventy-three percent of respondents felt that there would be a high level of demand for surveyors in the next five years and another 22% felt that there would be medium demand. Only 5% felt that demand would be low (Appendix E: C14.2). When projecting out to 20 years, 34% felt that demand would remain high in the long-term and another 50% felt that demand would be medium. Only 16% felt that demand would be low. In order to respond to these needs, new training programs will have to be put in place and educational institutions will need to increase the number of well-trained, practically-oriented instructors and professionals in LA significantly if the market demand for these positions is to be met.

3.2.5.2 Land /Real Estate Appraisers and Tax Specialists

Ethiopia's socio-economic development depends on a strong and stable public sector. The provision of basic services is the platform on which economic progress is built.⁷ Foreign direct investment (FDI) brings much needed infusions of capital into local economies but is difficult to attract FDI where property rights are not clear and predictable and transparent adjudication systems are not in place to handle disputes. The development of a professional class of appraisers and tax specialists are essential to developing a fair and equitable valuation and taxation system. Among the reasons cited by respondents to explain increasing demand are the expansion of real estate development and the current lack of specialists in this area, the need:

- for land valuation, registration, and certification as prerequisite for proper tax collection;
- for accurate valuation of land resources;
- to enhance the tax administration system;
- to manage land resources properly, and the critical need for the orderly transfer of property (Appendix E: Table C14.1.2).

⁷ ORGUT (2014), *Study On Institutional Structure and Human Resource Development Needs in the Sector of Land Administration in Ethiopia: Final Report*, Stockholm: ORGUT Consulting AB; Tengnäs, Myles, Alffram & Lundberg(2010), *Mapping and Review of SIDA's Assistance to Land Policy Reform, Land Administration and Land Governance*, Stockholm: Swedish International Development Agency; USAID & ARD (2004), *Ethiopia Land Policy and Administration Assessment*, Washington DC: USAID and ARD.

The majority of respondents estimated that demand for appraisers and tax specialists would be high (51%) to medium (35%) in the next five years with long-term demand holding steady (50% high and 38% medium).

3.2.5.3. GIS/LIS Specialists

Several of the respondents mentioned the government's shift from level-one to level-two certification for cadastral records (Appendix E: Table C14.1.3) as the primary reason for increased demand for GIS/LIS specialists. First-level certification involves the identification, adjudication, and registration of land holding rights at the local (*Kebele*) level and the issuing of certificates at the *Woreda* level based primarily on physical descriptions of properties. Such descriptions can be ambiguous, however, given the interpretation of certain descriptions and the tendency of physical characteristics of a property to change with time. This can lead to lengthy and unnecessary disputes over properties. Second-level registration, on the other hand, involves the surveying of individual land parcels and the digitalization of land registration records and can, therefore, create circumstances in which property dimensions are clear, eliminating many disputes.⁸ The shift from first level certification to second level will strengthen LA in Ethiopia,⁹ but will put stress on the already over-taxed survey teams by requiring a rapid training of new professionals in LA with GIS/LIS specialization. There was nearly unanimous agreement among respondents that the short-term demand for GIS/LIS specialists will be very high (81%), while a majority (55%) said that the demand would remain high over the next 20 years.

3.2.5.4 Land Use Management/Managers

The role of land use managers is pivotal to the efficient and responsible use of Ethiopia's large and diverse reserve of natural resources.¹⁰ Qualified land use managers contribute to improvement of land use especially during times of climate change. As urbanization trends continue and even accelerate into the next century, the need to adopt new land use planning and climate change with the growing urbanization has become urgent.¹¹ Land use managers currently working in the urban sector need advanced training due to the unique challenges presented associated with urban development and real estate markets. Rural land use planners play a pivotal role in environmental sustainability and land rehabilitation.¹² This urgency was reflected in the responses given as to the reason why this particular position would be in demand in the coming years. A large proportion of the responses suggest that this profession is in high demand in order to:

⁸Caprano & IFAD (2011), *Strengthening Women's Access to Land: Experiences from the Field*. Rome: IFAD; ORGUT (2014); Tengnäs et al. (2010).

⁹Deninger, Ali & Alemu (2009), *Impacts of Land Certification on Tenure Security, Investment, and Land Markets: Evidence from Ethiopia*. Gothenberg: Environment for Development; USAID & ARD (2004).

¹⁰ Van Dijk & Fransen (2008). *Managing Ethiopian Cities in an Era of Rapid Urbanisation*. Delft: Eburon Academic Publishers; Byamugisha, F.F.K (2013), *Securing Africa's Land for Shared Prosperity: A Program to Scale Up Reforms and Investments*, Africa Development Forum Series, Washington DC: World Bank.

¹¹Schmidt & Kedir (2009), *Urbanization and Spatial Connectivity in Ethiopia: Urban Growth Analysis Using GIS*, Ethiopia Strategy Support Program 2 Discussion Papers, Washington DC: International Food Policy Research Institute.

¹² Byamugisha (2013).

- conserve natural resources and promote sustainable development for land use planning which is a prerequisite for LA;
- alleviate environmental degradation;
- prepare rural land planning, to meet the demands of the rapidly growing urban sector, real estate and modern farms;
- and meet the need for city and land use planners at the *Woreda* and *Kebele* levels.

Over 90% of respondents thought that demand would be high (63%) or medium (31%) in the next five years with high demand diminishing little (53%) and medium demand increasing (35%) over the next 20 years. (Appendix Table C14.1.4).

3.2.5.5 Land Use and City Planners

This professional area is closely related to the previous but with special emphasis on urban planning. These professionals are needed for a number of reasons, according to respondents, including effective land use, sustainable city and land development in all *Woredas*, *Kebeles* and towns, as well as for effective responses to growth in urban centers and increasing land shortages (Appendix E, Table C14.1.5). The few existing planners are in dire need of advanced training and are in high demand by both the private and public sectors. Estimates for demand are high for the next five years (65%) and will remain high (52%) into the long-term. (Appendix E: Table C14.4.5; C14.5.5).

3.2.5.6 Land Policy Specialists

The demand for land policy experts is perhaps not as intuitive. Policy usually plays in the background and only becomes an issue when problems arise. The need for policy experts that can predict and anticipate problems before they occur, while perhaps underestimated, is nonetheless essential for orderly migration and land use (USAID, 2004). Among the cited reasons for demand of land policy specialists are to:

- implement the new LA programs;
- solve problems related to tenure and environmental insecurity;
- meet the high demand for effective land policy in many regions,
- facilitate the implementation of land use and rehabilitation projects;
- make the case for effective land management by demonstrating the type and rate of land use change;
- conduct policy analysis and interpretation of land-related laws;
- and facilitate the design and implementation of urban policies (Appendix E: Table C14.1.6).

The perceived demand for these positions is medium (33%) to high (48%) in the short-term and remaining at more or less the same levels in the long-term (high 38%, medium 53%). (Appendix E: Tables C14.4.6; C14.5.6).

3.2.5.7 University and College Instructors

Instructors in all areas of LA related subject matter are needed to responsibly produce practically-oriented professionals in LALU. The shortage of properly credentialed personnel is, however, acute and compounded by low salaries and loss of human capital to the private and NGO sectors.¹³ Among the reasons for demand cited among respondents were to:

- solve the shortage of trained instructors specializing in real estate valuation;
- staff the newly established training institutions in LA;
- address instructional vacancy rates caused by high turnover and mobility of staff;
- provide proper training and satisfy the market demand;
- contribute to enhancing capacity for land registration, compensation and certification;
- and produce an adequate number of professionals for new LA program (Appendix C, Table C14.1.7).

Estimates for demand are medium (22%) to high (67%) in the short term and somewhat lower in the long term (40% medium to 48% high).

3.2.5.8 Land Administration Specialists

Land administration typically is distinguished from land management as a higher order, macro-level task. It involves the land use and landholding, including land demarcation, registration, taxation, valuation, overseeing land transactions, compensation, and certification. Land management, on the other hand involves land utilization and planning.¹⁴ Needless to say, these professionals also are instrumental to a fully functioning system and, as in the cases above, in short supply.¹⁵ According to respondents, the demand for LA professionals is driven by scarce supply, the need for timely land transactions, compensation, certification and taxation, the urgent need for a well-defined and well-planned LA system and use, and the need for highly skilled land specialists in this area (Appendix E, Table C14.1.8). According to estimates the short-term demand is very high (77%) while long-term high demand will taper (52%).

3.2.5.9 Land Property Lawyers

Real estate and property rights expertise and training is essential in LA. Country-wide training has been provided to lawyers at the district court level in order to facilitate the implementation of new land policies,¹⁶ but many more well-trained legal professionals are still needed. Respondents give the following reasons for increasing demand to:

- ameliorate land disputes, litigation and land related conflicts;

¹³ Groenendijk, Hagenimana, Lengoiboni, Hussen, Musinguzi, Ndjovu & Wayumba (2013), Land Administration Academic Education in East Africa. Paper presented at the FIG Working Week: Environment for Sustainability, Abuja, Nigeria, 6 – 10 May, 2013.

¹⁴ Van Dijk and Fransen (2009), p. 4.

¹⁵ORGUT (2014); Tegnäs et al. (2010); USAID & ARD (2004).

¹⁶Hailu & Backstrom (2006), Land Administration in Ethiopia. *GIM Mapping the World*, vol. 20:2.

- meet the high demand for land property lawyers;
- help in property valuation, compensation, certification and taxation;
- and meet the demand for real estate property lawyers in all regions (Appendix E, Table C14.1.9).

The need for property lawyers is considered high (54%) to medium (37%) in the short term and less urgent in the long term (43% high demand and 41% medium demand).

3.2.5.10 Land Administration Technicians

Land administration at the technical level is in need of a series of technicians with specific skills in order to support various critical aspects of a LA program. According to respondents, technicians are needed to:

- support GIS experts who provide technical support to land managers and administrators;
- meet the high demand for land technicians at the *Woreda* and *Kebele* levels,
- solve land-related disputes by conducting accurate measurement of land plots/parcels, and to manage city land;
- support surveying and registration at *Kebele* and *Woreda* levels;
- technically support surveying and use of GIS/LIS technologies;
- and manage the use of urban land (Appendix E, table C14.1.10).

Short term demand is considered high by most (65%) but tapering in the long term (50%).

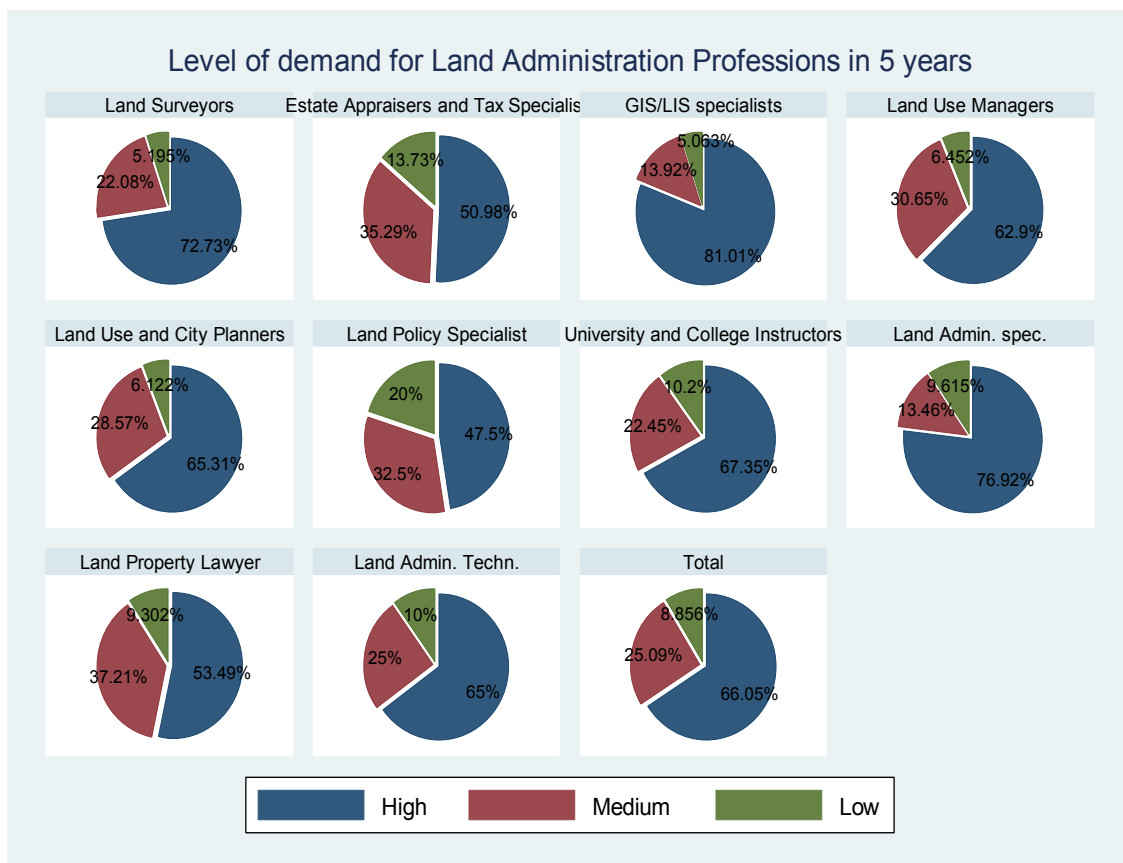
3.2.6 Summary Short- and Long-term Demand for Land Administration Professionals According to First Round Data Analysis.

All respondents indicate that key professions identified are in high of demand in the next five years. It should be noted, however, that although demand may be high in terms of urgency, that does not always mean that demand is high in terms of numbers, as the second round of data collection made clear. In the next twenty years the demand for land surveyors and land policy specialists is defined as medium level (presumably reaching a medium level of saturation when 5-year vacancy demand has been met). While the numerical estimates offered by the regions and national ministries confirms less demand for the position of land policy specialists, the numbers calculated in the second round show that the demand for surveyors will remain high. Demand for real estate appraisers and tax specialists, GIS/LIS trained technicians, land use managers, land use and city planners, university and college instructors, LA specialists, land property lawyers is consistently identified, long-term as high (see Figure 1, Appendix E: Tables C14.2 and C14.3). In relation to the long-term training demand for the key professions, almost 72% indicated that no adequate training is currently available. Based on survey responses, the training most highly needed is policy related, followed by traditional law and land reform, and GIS application knowledge in development and resource management (Appendix E: Table C17.1) About half of the respondents mentioned that the available training programs are not directly available to meet professional needs (Appendix E: Table C18).

3.2.7 Wages and Benefits

In the following section of the survey, respondents were asked how they accessed vacancy information related to their current job. Most of the respondents indicated their training institution as their source of information followed by friends and the actual vacancy announcement, in that order (Appendix E: Table C20). On the average, it took about seven months to get the job in the profession for which they trained (Appendix E: Table C21). Seventy-five percent of the respondents also indicated that the professionals are mainly employed in the public sector (Appendix E: Table C23A). The three professions with the highest placement rate in the private sector are GIS/Remote sensing, land use and city planning, and land surveying, in that order (Appendix E: Table C22B). For public employers, the first three major professional categories in declining rank order, are land surveyors, GIS and land information, LA and urban planning and administration (Appendix E: Table C23B).

Figure 1: Relative need for Land Administration Professionals over the next 5-year period as identified by various representative stakeholder groups.



Employer satisfaction with professionals employed for LA jobs was explored as well. The majority (above 60%) of the employers was not satisfied (Appendix E: Table C24A). The main reason for the dissatisfaction of the employers is related to poor or less than adequate employee training and lack of specialized skills with (Appendix E: Table C24B).

Incentives and (re)training are important factors in retaining workers and enhance work efficiency. Land tenure professionals were asked whether they are satisfied with salaries. While 8.2% of the respondent indicated that they are satisfied, and 15.3 % indicated that they are somewhat satisfied; the remainder (76.5%) said that they are not satisfied (Appendix E: Table DO4e.1). This level of dissatisfaction triggers frequent turnover of specialists, as some move to other private firms, NGOs, or even other public sector jobs for a better pay. The need to (re)train staff has also been observed during focus group discussion participants and during interviews. In Bahir Dar, LA services at *Kebele* and *Woreda* level are provided by diploma holders who have graduated from vocational training colleges in non-LA programs with similar or indirectly related subject matter. In order to address this problem, technical workers in some regional administration agencies, are provided with short-term training for 4-15 days and assigned work at *Woreda* and *Kebele* level if they lack performance.

Satisfaction of the professionals with the work environment in which they are engaged was explored. We found that a considerable proportion (44.6 %) of the professionals are somewhat satisfied, while 20% and 24% of the respondents are dissatisfied and somewhat dissatisfied, respectively (Appendix E: Table DO4b.1). This implies that improving working conditions, upgrading computer equipment, providing adequate budgetary support, making workload adjustment, making the division of labor clear, providing ongoing training, and the provision of additional incentives must be considered if retention of employees in the public sector is to be achieved.

With regard to opportunities to refresh skill training and job promotion, 28% and 24% of respondents indicated that they are not satisfied and more or less dissatisfied, respectively, while 19% of them mentioned that they are satisfied with training opportunity. The high level of dissatisfaction may have many sources, including poor information flow regarding potential opportunities and nepotism in the allocation of those opportunities (Appendix E: Table DO4f.1).

3.2.8 Job Advancement Information and Continuing Education

The respondents were also asked if they had changed position or received a promotion. Accordingly, 70.7% of the survey respondents indicated that they have not received a promotion, while 28.4% of them mentioned that they obtained a better position (Appendix E: Table EO2). Wage increases had been received by 29.7%, while 69.4% of the professionals surveyed indicated that they had not received any salary increment (Appendix E: Table EO3). Regarding promotion, 35.2 % of the respondents mentioned that they have begun or completed continuing training (MA/M.Sc., certificate and diploma programs, short term training) to secure promotion, while 63.9% mentioned that they have

never attempted to enroll in training program on their own initiative (Appendix E: Table EO5).

3.2.9 Education Quality Information

As indicated above, the professionals interviewed participated in training at different educational levels. The role and quality of training was evaluated. Over 21 % of the respondent indicated that a training institution's staff did not work in a supportive way to address specific obstacles, while the remainder agreed to various degrees about the sufficiency of staff support. Similarly, 25 % of respondents disagree that training institutions gave them the needed training and assistance to develop specific job skills, while the remaining respondents agreed, partially. Also, 23.7 % of the respondents disagree that training program met their goals, while the remaining indicated that they partially agreed (Appendix E: Table GO1).

The most useful and helpful training topics identified were GIS, as one of the most important survey tools, remote sensing (18.2 %), land use planning (10.7%), and an LA specialization (9.9%) (Appendix E: Table GO2). The training identified as the least helpful in meeting needs was the LA technician training (Appendix E: Table EO3).

Respondents made a number of suggestions to improve the educational programs. The major suggestions were:

- providing financial and material support for training and field work;
- making the training more practically-oriented activities;
- providing accommodation and transportation facilities trainees who have to travel to receive training;
- providing highly skilled instructors;
- include land surveying and GIS knowledge and skills across the training programs;
- and promote post-graduate training to enhance discipline knowledge and skills in LA.

3.3 Individual and Focus Group Interviews

In addition to the written individual surveys, the assessors spent time interviewing key stakeholders both individually and in focus groups. The results of these conversations are recorded below. The interviews are broken up into three subsections: 1) interviews with public LA officials, 2) interviews with educational institutions, 3) interviews with private sector firms, and 4) interviews with representatives of LA projects funded by international agencies.

3.3.1 Interviews with Public Sector LA Officials

There were several recurring themes in our interviews with public land administration officials working at the national and regional level. The *first* and most common theme is the *increased demand for trained professionals in the surveying and registering of properties* due to the national development goal of registering all properties by 2020.

Both of these functions require some familiarity with GIS/LIS technical equipment and software. Whatever training system is finally implemented should contain these elements from the most basic levels to the advanced levels. Digitization of property registration systems is an inevitable process.

Another cross-cutting theme is the need for greater specialization among LA personnel. Not all survey techniques and technical equipment are the same. Some simple surveying techniques used for urban plots and smaller rural parcels are not time or cost effective for larger parcels, where aerial photography or satellite imagery might be preferred. At some point, specialization would have to occur. Whatever training and education strategy is finally implemented will have to take into account these various needs.

A third recurring theme is the need to prepare trained personnel in the area of record entry, record storage, and record retrieval. This will require both para-training and TVET QFs dedicated to this area of LA. In relation to this is the need for a shared, standardized national software, processes, and data base so that all records are entered in the same way, using the same software, archived in the same way, accessible to all, and retrieved in the same way.

Fourth, the need for a strategy for registering the properties used communally by pastoralist communities was also a recurring theme. At present there are discussions underway regarding how best to recognize the property rights of the pastoralist communities and what survey strategies to use. Pastoralists do not adhere to strict property boundaries, moving instead with the seasons and rainfall. Unless an effective strategy is developed to deal with the unique nature of pastoralist land use, the migrating communities' use of land could potentially lead to conflict in the future.

A fifth common concern has been the difficulty recruiting and retaining LA personnel. Among the reasons cited were low salaries, lack of qualified candidates, heavy workloads, and competition from other sectors. Of these, the question of low salaries is perhaps the hardest to resolve. There may be no other option than to increase the budget of the LA sector in order to meet the increasing demand for an up-to-date land registry.

A sixth theme that appeared in several of the conversations is the need for qualified property valuers and appraisers. Some of this can be handled by the private sector, no doubt, but the shocking fact that there are only three certified appraisers currently working in Ethiopia puts this in stark perspective.

Finally, as noted by those interviewed but also implied by the above, these demands on the LA system also put a severe strain on the education and training system. There is already a lack of qualified instructors for some key sector needs, such as surveyors, for example. Any proposed education and training strategy must take this into account and put special emphasis on recruiting and/or training instructors as well.

3.3.1.1 Interview with the Director of the Federal Land and Land Related Property Registry and Information Agency's of MoUDHC

The Ministry gives oversight to the cities, who are themselves responsible for the surveying and registration process. The Ministry, working together with ECSU did a demand estimate as they prepared for the introduction of their various programs in land administration and land use. An external consultant was hired in order to do the assessment. ECSU now offers several LALU QF programs under the Urban Development Department, namely:

- Urban Development;
- Tax and Customs;
- Public Management and Development;
- Federalism and Law (several LL.M. programs under this title);
- MA Diplomacy and International Relations;
- MA Public Policy Studies;
- MA Leadership and Good Governance;
- PHD Public Financial Management;
- PHD Public Management;
- PHD Urban Planning and Development.

The data collection process consists of three phases, each of which needs its own trained personnel:

- Parcelization;
- Registration;
- Land transactions.

Once the process of land registration is complete, the Ministry has plans to turn over all surveying to the private sector. The Ministry has set a goal to survey an area containing 10 sub-cities, 60 thousand parcels (5-6,000 parcels per *Woreda* and 10-11 *Woredas* or five to six sections consisting of 1000 parcels per section which contains five sub-sections consisting of 200 parcels each) in 3-5 years. One subsection consisting of 200 parcels takes approximately five months from survey to registration. Each survey team consists of 6-7 people among whom are:

- 1 fully trained surveyor (cadastral trained, TVET level);
- 2 assistants (cadastral trained, TVET level);
- 1 coordinator (land admin trained, land law trained, TVET level);
- 1 rights person (land admin trained, land law trained, TVET level);
- 1-2 community representatives.

Once surveys have been completed, the records are brought to the registry office.

The current GTP has manpower estimates. The matrix section of the GTP lists the following targets:

Table 4: MoUDHC GTP Matrix Trained Professionals Targets¹⁷

Trained Personnel Needed	Baseline	2010	2011	2012	2013	2014	2015
Number of trainees trained in land certification/registration information systems	50	64	120	400	800	1600	
Number of trained professionals in land management and administration	0	1000	1500	2000	2500	3000	
Number of trainees trained from government organizations on plan preparation	200	200	200	200	200	200	
Number of trainees trained from private consultants trained on urban plan	10	50	70	100	150	200	

The numbers contained in this list refer to personnel at the Ministry itself, which means that positions related to surveys and mapping are not included. As can be seen from the targets, there are two areas of increasing demand, namely, those trained in certification and registration systems, and those trained in land management. The first is driven by the goal of creating a national land registry. The second reflects the ministries supervisory role over urban areas.

3.3.1.2 Interview with Technical Division of MoA LAUD

The Ministry does not currently have labor demand estimates for the regions. There are severe constraints on the types of technologies needed: orthophoto quads, for larger parcels potential use of satellite imagery, and hand-held GPS, for small agricultural parcels and irrigated land total station surveying. There is a strong need for financial support for level two certification. Once the level two surveying process has been completed, there remains the challenge managing the resulting data bases. For that there is an immediate need to develop LIS management capacity and LIS policy work as well as standardized practices for record production, archiving, and retrieval. There are

¹⁷ Ministry of Finance and Economic Development (2010). *Growth and Transformation Plan 2010/11-2014/15*. Vol. II: *Policy Matrix*. Addis Ababa: Federal Democratic Republic of Ethiopia, p. 31.

currently data base management issues, including specifications on lifetime use rights, rents, leases, and defining inheritance property rights and gifting for family members and others. On average, nationally, there is only one surveyor per *Woreda*. Currently there are 670 *Woredas* nationally and an additional 10 urban *Woredas*, or 680 *Woredas* in all. In rural areas, there are, then, approximately 670 surveyors nationally under the supervision of the MoA. LAUD does its own training of surveyors.

LAUD is supporting pilot programs with both REILA and LIFT who are working in the highlands to advance the certification process. Between them they are estimated to complete approximately 10 million parcels over the next five years. Which means that the remaining 40,000,000 will have to be covered by other means. The LIFT pilot consists of five parasurveyors teams. Teams are composed of one team leader, two parasurveyors, two data recorders, and one or more *Kebele* LALU committee members. The LIFT project expects to cover about 140 *Woredas* in 3-5 years. The REILA pilot showed that survey teams are able to cover approximately 40 to 150 parcels a day. The 150 parcels are in flat areas of high visibility. The 40 parcels are in difficult terrain. Each survey team consists of one parasurveyor, one registrar, one encoder (digital encoding of survey results), and at least one local LALU committee member (usually more than one). In the field, 10% of surveys are selected for quality assurance review. In the office, however, 100% of surveys are checked for accuracy. Those working on quality assurance teams will need advanced training. Once a *Kebele* is completed, there is a public hearing at which property holders are able to register disagreements regarding the survey results. The entire survey team participates in the public hearing as well as a regional representative. There is a shortage of land valuers. Currently, valuers are only used when compensation is in play. They may later be used to develop a more comprehensive land taxation system.

He also noted a strong need for compensation and valuation expertise, as well as land use planning expertise. The development of a master land use plans at the federal and regional levels is also of paramount importance. Currently, there is a strong push for the need to optimize land management for development. This will require good governance, surveyors, as well as efficient and accurate cadastral information management.

3.3.1.3 Afar Environmental Protection and Rural Land Use & Administration Agency

The assessor met with the head of the Agency and other officials. According to the participants in the interview, total land area of the Afar region is 9,562,347 hectares. The population is 1,411,092, consisting of pastoralists (86%), agro-pastoralist (9%), private (3%) and urban and resettlement land (2%). As long as the majority of the population live in traditional settlements and depend on a livestock economy, it is difficult to implement the LA program. An effective strategy will require a mix of pastoral and agricultural development. In order to implement the program, the government introduced a program to resettle 34,000 households in four resettlement zones. It was said that only the Amibara resettlement site has been successfully implemented, due to poor mechanisms and methods for persuading community members to move to the resettlement sites. As a

result only 5,000 households in 12 out of 32 *Woredas*, especially in some resettlement sites, obtained 1st level certificates. The main reasons include:

- grazing land and traditional rural land use;
- management were not taken into consideration by the LA and resettlement program;
- lack of trained professionals or the necessary training equipment;
- inadequate land and livestock compensation policies;
- and inadequate strategies for raising awareness.

The last of these is essential. Awareness of land rights and obligations and active participation in land administration processes, such as adjudication and registration, as well as in land use planning will be of paramount importance.

3.3.1.4 Amhara Region Environmental Protection, Land Administration and Use Authority

The assessor met officials and experts of the regional (Amhara) Bureau of Environmental Protection, Land Administration and Use (BoEPLAU). The focus of the conversation was on perceived demand with some discussion of perceived curriculum/specialization needs.

According to the participants, it is generally difficult to fill staff positions, resulting in about 25% vacancies at the local government level and 28% at the regional level. Another complicating factor is the high annual staff turnover rate at EPLAUA, which they estimated to be between 5-10%, with a constant vacancy rate of about 3%. They conjectured that low wages and benefits and high work pressure are major contributing factors.

In addition, it is estimated that about 80% of the LA staff currently employed, possess only general agricultural, forestry, and land management fields rather than LA specializations, posing operational and efficiency concerns. According to respondents, there is a need to move from the basic work in land certification to a cadastral information system (LIS) to facilitate a transition to a valuation and taxation system that will help finance infrastructural and public service development and improve land and soil productivity.

Participants identified the primary programmatic needs as being:

- 1) Development of a national rural cadastral information system;
- 2) and development of a National Land Information System that links and manages land data at the local and regional levels.

It was noted that there are still many cases where only one hardcopy of a land certificate is on file, posing significant risk in case of fire or natural disaster and pests. Resolution of land conflicts is a significant institutional responsibility with about 10% of the cases solved by elder councils at the community level. However, about 90% of land conflicts, litigation

resulting primarily from conflicting hereditary claims, end up in civic court procedures, taking an average of two to three month to resolve.

3.3.1.5 Harari Regional State Land Development and Administration

The assessor met with the Head of the Harari Regional State Land Development and Administration. According to the participants, the office faces major challenges meeting current land registration demand, having only five survey units available. Theodolites are about 25 years outdated. To be efficient, accurate, and compatible with digital LIS based on coordinate systems (the goal of Ethiopia LA), laser-based, GPS-enabled, calibrated devices are not only necessary, but indispensable. Today, most modern technology includes a combination of optics to roughly orient the device, dual selectable lasers, memory to record tens of thousands of measurements and dozens of jobs simultaneously, and response times of calculations in less than a half second and with extremely high accuracy. Affordable units can measure accurately to less than 2 parts per million (PPM). Multiple synchronized lasers capable of 3-dimensional full 360-degree measurements can perform and record a number of operations simultaneously, literally at the push of a button.

The office is currently in the process of digitizing paper property (descriptive) records using a single scanner. One person can do up to 8 files a day containing sometimes as much as 40 pages. They have been working on this for years now and have completed only about 8,000 files, while the total requirement at this time exceeds 40,000. To move the current system to a cadastral land information system with parcel surveys will take many years with the current staff and equipment constraints, and will still require the addition of geographic coordinates (to be obtained as a separate exercise).

3.3.1.6 Hawassa Land Administration and Environment Protection Process

Meetings were held with the Director and other experts of the Land Administration/Land-Use and Environment Protection Process, under National Resources Management and Environment Protection Authority in Hawassa (SNNP). According to the participants, between 2005 and 2014, 10,035,000 (out of 12 million) parcels were surveyed and measured. About 99% of households in 136 *Woredas* received 1st level certificates. 83 households in selected pilot *Woredas* have obtained 2nd level certificates. Uniformly, expertise is still needed in LA and use planning, certification, compensation and registration. The most important inputs needed in order to successfully implement LA policy include skilled professionals in LA, equipment (e.g. total stations, advanced GPS, aerial photos, and corresponding satellite images) and financial resources. High priority should be given to areas with agricultural potential and secondary priority to the areas that have a high number of disputes.

3.3.1.7 Oromiya Region Land Administration and Environmental Protection Bureau

The assessor also met with the Process Owner of Land Administration and an LA expert for the Oromiya Bureau of Environmental Protection and Land Administration. They noted that the original National Strategy document indicates that LA activities should be completed in 10 years but that this had been recently revised to seven years. They expressed

the need to develop a sustained capacity. Their estimates of staffing needs were a minimum of five experts per region (excluding land conflict experts and enforcement officers), times 265 *Woreda*, or a national total of 2,670. For the *Kebele* /village cluster level in Oromiya region alone, they estimated 6,400 (for a total of 6,889 *Kebeles*). This includes a minimum of one expert per *Kebele* but does not include land use expertise. There are 18 zonal offices in the Oromiya region. They estimate a need of three experts per office for a total 54. There currently are only seven experts working in the Oromiya region. For the near future, they estimate that there will be a need of minimum of 7,840 trained technicians and professionals working in the three largest regions (to complete the work within 7 years). This excludes the number of contractual experts needed which would be around 300 per region. In addition, approximately 288 lawyers needed per region.

The Oromiya region has completed 98% of the level one certification in its region (25 *Woredas*, 13,000,000 parcels, and 3.7 million households). The certification records are kept at the *Woreda* level. Currently there is no QF focused exclusively on record entry, archiving and retrieval. There is also no national standard for how this process should take place. They currently offer their own courses to their personnel for record keeping and retrieval. There is, however, a pressing need for data management training to be included in LA training programs, which would imply that general ICT training also must be included. The technical team asserted that there should be at least one university trained land administrator/manager per *Woreda* (265 university trained administrators for the region of Oromiya). There should also be at least one TVET-trained data manager at the *Kebele* level, which for Oromiya region would imply 6,490 TVET trained data managers. They also agreed that there should also be at least one trained property valuator at the *Woreda* level. The greatest challenged faced by the Authority is that there is high turnover in LA positions in the region. There is an acute shortage of GIS experts in the region as well. Since policy is written at the regional level as well as the national level, there should be at least on policy expert in each region. There should also be at least one land lawyer on staff with special training in each region. That is not to say that there should not be more in the private sector.

These estimates exclude land use planning experts, appraisers, and land policy analysts. It also excludes any turnover rate or increased demand from other agencies, which accounted for the loss of approximately 300 experts over the last year (including land surveyors and registrars). They also need experts in land evaluation, land dispute resolution, land lease experts, to deal with the increased demand with more development, land regulation, land use, continuous regulation activities (including valuation for compensation as part of local committee at the *Woreda* level). When second level certification is taken into account one additional expert (registrars) would be added at the *Kebele* level. This would equate to more than 20,000 additional positions nation-wide. These estimates are remarkably close to the five year estimates based on survey results of the four regions and two national ministries (see Table 23).

When asked about the quality of graduates, they responded that the lack of basic computer knowledge by surveyors meant that additional training was needed when working with total stations. There is also a lack of knowledge of regional and federal laws. Other needed training is in the area of the special circumstances in rural conditions, such as dividing irrigation land in accordance with existing regulations and guidelines. For this there is a need for the ability to interpret updated legal articles which require a combination of theory and practice, for example, knowledge of use rights, range ecology, and land management in pastoralist areas. Generally speaking there is a great need for much more exposure to field work and practical exercises.

3.3.1.8 Tigray Region EPLAUA

The assessor also held a meeting with the Director and other officials of the Tigray EPLAUA. According to the participants in the interview, about 4.2 million parcels were available in the region. First-level certification was carried out in 1998 and up to now, about 99% of the total 670,000 households residing in the rural areas have obtained 1st level certificates. Eight percent of these have also obtained 2nd-level certificates in 16 *Woredas* using hand-held GPS and a large-scale map (1:2000) produced from aerial photo.

In order to distribute the first level certificates to the households, every parcel was measured or demarcated by selected community members, *Kebele*, and *Woreda* officials. In some areas, hand-held GPS units were used. If a household has one or more parcels, the household obtained one certificate. During the implementation of the first-level land certification, the agency faced legislative, institutional, technical, and financial challenges. In particular, these specific challenges emerged: the lack of adequate surveying and mapping infrastructure, a master land use plan, and a rural land information system.

Unlike the 1st-level certificate, the 2nd-level certificate is based on individual parcel measurement using Aerial Photo/orthophoto or advanced GPS, or total station. If a person has one or several parcels, he or she gets one or several certificates. The 2nd-level measurement system is relatively accurate and is supposed to alleviate border and land use conflict. The interviewees also contended that the 2nd level certification is appropriate to implement registration, compensation, and taxation systems.

The participants also indicated that the main constraints to professional LA include lack of highly skilled professionals in cadastral survey, map reading (geo-reference), photogrammetric techniques, and in handling equipment such as large-scale GPS. By far the great majority of professionally-qualified staff are land use planners. However, it appeared that land use planners are interested in learning about LA. Adding to the complex human resource challenge, professionals (B.Sc. and Diploma holders in drafting and surveying) often move to MoUDHC, Road Transport Authority, or private firms in search of better pay. Professionals in the private sector are attracted by higher wages (sometime 50-60% more) and better benefits than the public sector jobs.

3.3.1.9 Ministry of Urban Development, Housing, and Construction (Addis Ababa)

Meetings were also held with the Director General of the Federal Urban Land and Land-related Property Registry and Information Agency of MoUDHC in Addis Ababa. According to the director, a new land registration system is being developed – for urban and rural areas – starting in Addis (3.2 million). This will be extended to 23 major cities with over 100,000 people and, later, to 68 cities with populations of more than 20,000. The GTP articulates a new LA initiative. It involves regularization of property titles for people residing in place for more than 5 years and coordinates these activities with the urban development plan. It also calls for demarcation and education (outreach). According to the Director, the city will be taking a systematic approach to the provision of title security for the whole city in the next five years, consequently raising the demand for surveyors and experts estimated at 7-13 per sub-city for a total of about 1,000 positions, plus another 6,000 for adjudication. The total estimate was 11,830 surveyors, land lawyers, and IT experts. This estimate excludes appraisers.

The Director also indicated that there is a need to expand training programs. These efforts are impeded by the lack of qualified instructors. The Director expressed a need for some form of qualifying exam and certification. The plan is to have five training centers established to work with Land Equity International and the Regional Center for Mapping and Remote Sensing in Nairobi. Support is to be provided by the Central Statistical Agency of Ethiopia with a role for Hawassa University and other regional universities. The Director also noted that occupational standards need to be developed in these areas in accordance with the QF of the Ethiopian as described in the TVET system.

In addition, an interview was held with the Manager of Modernized Property Tax System Project Office regarding the need for property appraisers. At this time only three “certified” appraisers work in Ethiopia even though property valuation is perceived as critically important for taxation, bank loans, infrastructural development, legal disputes, and compensation issues. The need is not limited to urban areas but extends into the non-pastoralist rural areas. The needs are two-fold: land/property appraisals as well as more advanced appraisals for industrial and commercial properties. In addition, there is a need for knowledge and skills to provide realistic appraisals based on replacement costs.

There is a gap not only in the supply of professionals, but also in the institutional ability to provide quality training and certified appraisers. Improved instruction is needed at the undergraduate and graduate level. An agreement has been signed with Addis Ababa University to develop the institutional capacity to meet this need. However, there is a very limited number of qualified instructors available.

The Director estimated that in order for urban areas to deal successfully with property taxation and base valuation issues for the 20 cities of over 200,000 inhabitants, there would have to be 20 basic appraisers, and 10 advanced appraisers per city for a total of 600 technical experts for these urban areas alone. This number is significantly lower, however, than the estimate made by the Directorate of the Ministry which called for 2,205 taxation

and valuation experts in the next five years, with that number increasing by an additional 2,980 in ten years, and again by 5,301 in twenty years. There is, however, an absence of current course offerings in this area and some of the taxation courses offered do not touch on property taxation. The Manager stressed the need for “vocational level, practical training” – including, basic data acquisition, property surveying, and graduate level training, such as applied information system development.

3.3.1.10 City of Addis Ababa

The assessor met with the Head of the Land Development and Management Bureau of the Addis Ababa City Administration and discussed the need for LA support. He said that the need for LA was a critical issue in land development and administration since there are many people working in the field without a related professional or academic credential causing performance concerns. He also noted that the turnover rate is high due to low salaries. There are a total of seven departments trying to administer the land in Addis Ababa and they are in serious need of training. However, there is inadequate training capacity in Ethiopia resulting in a large gap between the need for training and the capacity for training. This is exacerbated by the fact that some of those with the proper credentials to train are working in other areas due to higher wages and/or better benefits.

3.3.1.11 Integrated Land Information Project Office, Mekelle

The assessor met with the project director of the Integrated Land Information Project in Mekelle. According to the Director, the towns of Mekelle, Shire, Axum, and Adigrat, the four largest municipalities in the Tigray region, were on the 2nd plan phase in LA. In order to introduce a modern property tax system in the region, two surveyors per municipality (72 municipalities x 2=144 surveyors) were immediately needed. The assessor also learned from the project director that professional stability is too low. Professionals often move to the private sector for better payment. Hence, establishing a more conducive environment, such as providing on-going training for professional development, and other types of incentives are important if stability is to be secured for professionals. Furthermore, LA requires more emphasis on practically - rather than theoretically-oriented training. To implement the LA program successfully, readiness to translate recommendations into practice and political commitment are indispensable. Structural design, regulators, and other skilled staff are the requirements for successful implementation of the LA program. In order to implement the program as planned, Orthophoto, cadastral surveyors, survey equipment (e.g. plotter, digitizer, GIS, GPS and total station), property value appraiser, and land property taxation system are crucial both in the rural and urban sectors. As for the urban sector in the Tigray region, no professionally-trained land administrators are available. There are physical and urban planners, architects and planners, but no land administrators.

3.3.1.12 Rural Land Administration and Utilization Case Team, Jijiga

The assessor met with the Director and other officials of the Rural Land Administration and Utilization case team, which is under the Livestock, Crop, and Rural Development Bureau in the capital of Somali Regional State. According to the interview participants, the

administrative structure is divided into 9 Zones and 68 *Woredas*. The land-use is divided into pastoral land (85%), agro-pastoral land (10%), and 5% is designed for investment and resettlement. Two LA professionals per *Woreda* are needed in the region totaling 136 professionals (68 x 2= 136). Since the majority of the population are pastoralists and live in scattered settlement sites, it is difficult to implement the LA program as planned. Most of the respondents indicate that they had little information and knowledge of what LA involved. It is therefore vital to acquire basic capacity building for LA and develop strategies for assigning land rights among these pastoralist communities.

Major challenges include lack of LA instructors, social and physical infrastructure, skilled manpower, a knowledge upgrading and experience-sharing program. Apart from lack of trained staff the main challenge was considered to be the budgetary constraints at all levels. They suggest that pastoralists can be convinced to be part of the program by creating more awareness, improving sustainable land, range ecology, and livestock management, and implementing compensation and regulation systems. The successful implementation of the program could encourage capacity building; create communal land linkages to markets; regulate land rents; lead to natural resources conservation and land productivity; alleviate land-use conflict, as well as food, nutrition, and environmental insecurity problems facing the region today.

3.3.1.13 Jijiga City Administration, Municipality Service Office

The assessor also conducted meetings with the Director and officials of Jijiga City Administration. According to participants, due to the absence of GIS specialists in the region, the office sends trainees to Addis and in other universities for training purpose. There is need for qualified staff in land use management, research, needs assessment, and creating awareness.

3.3.2 Education and Training Institutions

Perhaps the most important theme in the interview with the Education and TVET officials is that there is *no national registry of the TVET courses currently being offered in the country*. While the number of students is reported annually by the Ministry of Education, the actual QF being offered by region is unavailable, making it difficult to know whether TVET QFs in the LA sector are well or unevenly distributed. The MoA was aware of 25 TVET centers devoted exclusively to agriculture, five of which were under the control of the MoA, but was otherwise was unaware of what QFs were being offered in those centers or whether LA was part of the course offerings.

Second, there appears to be a *dearth of LA QFs being offered nationally*. The MoA has its own QF for surveying, but only one TVET center, in the Afar region, was currently offering this Level III QF in surveying. One can only wonder why, given the pressing need for LA personnel there is not greater demand for the available LA positions or why there is not greater demand for LA related TVET QFs. Other TVET centers, both public and private, offer some QFs in the LA area, but since the development and opening of TVET QFs

depends on demand, it seems evident that the demand is not yet there. This is an issue worth examining.

There is also a *lack of basic equipment and qualified instructors for LA related QFs*. Given that all LA training involves some knowledge of surveying and mapping, the need for a basic set of up-to-date surveying equipment is an imperative. The lack of instructors is also a difficult issue. It is unclear whether this shortage is due to lack of interest or lack of qualified instructors. The ideal TVET instructor is one with extensive experience in the area in which he or she is facilitating the learning. It seems that, given the number of experienced surveyors and LA technicians currently working in Ethiopia, the lack of instructors is probably due to factors other than qualification, such as lack of financial incentive to leave better remunerating activities in order to train new technicians.

When looking at the university training in LA, it is clear that *Ethiopia has a great resource in ILA*. The Institute has the potential to provide all of Ethiopia's need for qualified instructors at the undergraduate level. *The diversity of undergraduate programs is precisely the type of specializations that the LA sector currently needs*. As Ethiopia looks to the future, however, the question of quality graduate education (Masters and PhD) will require *a larger PhD contingent* in order to deliver graduate education. Currently, only ILA is in a position to offer graduate training in LA. This may be sufficient for the near term, but in the long term, *it would be in the best interest of Ethiopia to have its graduate education diversified in terms of disciplines (more PhDs in the various areas of specialization represented by LA) and in terms of geography (graduate programs available at various institutions, rather than just one)*.

Fourth, although not articulated by all, it is evident from the conversations below *that there needs to be greater integration of short courses, QFs, and university training*. These three levels of education and training should complement one another and should allow for movement between them. The lack of articulation mechanisms in the education and training system creates inefficiencies that encumber the swift generation of trained professionals in key LA areas.

Fifth, although there seems to be good coverage in the education and training system for the area of land policy and law, the need for trained land lawyers will be far from met if the estimates given below are accurate. *There will have to be some provision made to bring the existing legal core up to date in land policy and land law*. This may require a two pronged approach. On the one hand, it would be good to have a number of experts in the area of land policy and land law. This specialization could be written into existing training programs for lawyers. On the other hand, it could be met by developing short programs, certificate level programs, for trained lawyers that could be given on an annual basis in the area of land policy and law. In this way, the existing legal sector could be trained in the specializations of land law without having to repeat a full, university level legal training.

Finally, from the information gathered from the various education and training programs, there appears to be good coverage of the various needs described in the labor demand estimate detailed below. Recent efforts to write new and update old QFs in order to meet the sector need has delivered up-to-date training programs that will go a long way toward meeting sector needs. As was mentioned above, however, in order for these newly designed QFs to deliver the needed professionals, it would be important to develop a national database on which QFs are being offered where, the number of students enrolled in each QF, and the number of “graduates” from each of the qualifying levels are being produced each year. In this way, accurate forecasts could be made of where QFs and instructors are needed in order to meet the needs of the entire LA sector. This is true of the university system as well. ILA is capable of producing experts in the various areas of LA. The list of areas soon to be added, however, demonstrates how well and how quickly the educational institutions are responding to the education and training needs of the sector. Among the programs recently or soon to be opened are:

Masters Level Programs

- Masters of Arts in Urban Management (ECSU)
- Masters of Science in Urban Planning and Development (ECSU)
- Masters of Arts in Urban Land Development and Management (ECSU)
- Masters of Arts in Urban Environment and Climate Change (ECSU)
- Masters of Arts in Urban Infrastructure Provision and Management (ECSU)
- Masters of Science in Agricultural Economics (Haramaya)
- Masters of Science in Agricultural Economics and Rural Development (Haramaya)
- Environmental Sciences and Management (Haramaya)
- Masters of Science in Land Administration (ILA)
- Masters of Science in Rural Development (Mekelle)
- Masters of Science in Land Administration (Mekelle)
- Masters of Science in Geoinformatics (Mekelle)
- Masters of Science in Urban Planning and Development (Mekelle)

PhD Level Programs

- PhD in Soil Sciences and Climate Change (Mekelle)
- PhD in Rural Development (Mekelle)

To this could be added a much longer list of undergraduate programs and TVET QFs (see, for example, Figure 2). In short, the sector is developing the training and education platforms to meet the demand of the sector.

3.3.2.1 Interview with Officials at the National TVET Offices

The assessors met with representatives of the Ethiopian national TVET system. The national TVET system has over 600 Qualification Frameworks (QF). Before a QF can be

Figure 2: Organization and Structure of Urban Land Development QFs



accepted and offered as a training program, those who propose it must first do a market study and demand assessment. The demand assessments are done in accordance with certain methods that are contained in a manual published by the TVET authority. As with all QFs, a demand assessment was done for the Land Administration QF before it opened. There was no immediate knowledge by the TVET authorities of how many TVET QFs had been established with an LA component nor on how many students might be enrolled in those QFs.

3.3.2.2 Interview with Director of TVET Training at the MoA

A far ranging discussion was held with the director of MoA training programs. The discussion focused on the training efforts of the Ministry itself within the TVET framework. The Director reported that there are currently a total of 25 agricultural TVETs in Ethiopia, five of which are administered by the MoA. The other 20 are under the supervision of universities and are local TVET training centers. The MoA currently has one Qualification Framework (QF) which it uses to train its own personnel in surveying. It is a QF level III and is part of the Natural Resource Development Subsector. It is currently offered only in the Afar region. The MoA has jointly with REILA developed a Land Administration and Land Use (LALU) QF which focuses more on cadastral surveying. MoA with the technical and financial support of the REILA has begun offering the course

in Benishangule region with 75 students. There is currently no training for land appraisers or valuers. Such training would be under the MoUDHC. The MoA is usually facing a shortage of qualified instructors for their training programs. It currently takes about two years to complete the level III QF in LALU. The current LALU QF will no longer be offered. It will be replaced by the new QF developed by REILA.

3.3.2.3 Bahir Dar University, Institute for Land Administration (ILA)

ILA, at Bahir Dar University, is the first center in Ethiopia dealing with a broad approach to LA, including parcel surveys, land registration, land and property law, land valuation, and land planning and use. A B.Sc. in Land Administration program was started in 2006, reflecting the first initiative in land certification started in Amhara in 2002. The assessor met with the Director of the Institute, together with four staff members, to discuss the Institute's programs and plans. Most of the discussion revolved around ILA's current capacity and programs. These will be discussed further in the section regarding curricular and institutional capacity.

According to participants, the main objective of establishing ILA was to alleviate the shortage of trained national LA staff. Ethiopian *rural* LA institutions were established in the 1990s with the adoption of the Rural Land Administration Proclamation in 1989. *Urban* LA, focusing on municipal centers, was established earlier, although staffed primarily by non-professional "experts" with non-LA academic backgrounds. This translated into a high level of tenure insecurity in rural areas and inefficiency in urban LA.

ILA's program seeks to address basic LA needs and equip trainees with multidisciplinary knowledge common in many developed countries. For this reason, a curriculum was designed that includes courses on LA principles, legal and economic aspects of LA, and surveying using (geodetic and GIS) technologies. The goal is to develop land administrators and managers with a holistic understanding of the nature and importance of land property rights and administration. So far, the Institute has graduated about 300 students. ILA also started a M.Sc. program in Land Administration and Management in 2012. Overall, ILA was presented as a well-established program developed primarily with support from the Swedish Royal Institute of Technology (KTH), which was financed through SIDA. The first group of B.Sc. students graduated in 2010 with a total of 250 graduates in 2013 (ILA, 2013). It also offers a Master program.

They have written undergraduate programs for Urban and Regional Development, Geoinformatics, and Real Estate Valuation and Management. The Geoinformatics program has both GIS and survey components. The Land Administration undergraduate programs had, at the time, the following enrollments:

- ***Weekend program = 229***
- ***Summer program = 60***
- ***Distance program = 469***
- ***Regular program = 285***

The Land Administration Masters program has the following current enrollments:

- ***Regular program = 25***
- ***Summer program = 81***

Last year the Masters program admitted 60 new students. The program boasts a less than 5% attrition rate which means that 95% of these students will reach the labor force upon completion of their programs.

They have conducted a study of the first graduating class. Among the graduated students of the program, 70-80% were working in the LA sector. According to the study, employers were pleased with the knowledge, skills, and attitudes of graduates. Graduates, however, pointed out that there is discrimination in pay scales in public employment. Land Administration graduates do not receive the same expert compensation as other types of expertise. All employed graduates are in the public sector. The program maintains annual visits with stakeholders to get feedback on curriculum and quality of graduates. They have sufficient academic staff for the time being to staff their existing programs. The current staff breakdown is as follows:

- PhDs
 - 2 more PhDs coming in December and next year;
 - PhDs are in:
 - Land Law and Land Policy;
 - Land Economics;
 - Land Administration (2);
 - Information Systems.

In this past academic year, ILA graduated 53 undergraduates and 11 Masters students, of which, at the time of this interview, 9 had completed their thesis.

3.3.2.4 Haramaya University, Land Administration Program

The assessor met with representatives from Haramaya University's Land Administration Program in the Chiro College of Agro- Industry and Land Resources. The college was established in 2009/10 based on the expansion of the ATVET college. This new program in LA was based on a needs assessment conducted in early 2013 as part of the development of a qualifications framework (QF). It covered two Federal Ministries (MoA and MoUDHC), four regional states (Oromiya, Amhara, Southern People Nation and Nationality, and Harari), and Addis Ababa City. Two Regional LA programs existed at that time, including Bahir Dar University, the Institute of Land Administration, and Woldia University. The LA program at Woldia University was started in 2012. Even though the department provides training, it still encounters a lack of appropriate training equipment as well as qualified instructors with both theoretical and applied expertise. The new department of LA started to function in the 2013/14 academic year.

According to the interview participants, the department faces major challenges including:

- Lack of a well elaborated staff development program that trains theoretically and practically-oriented, instructors and researchers in LA;
- Lack of the necessary equipment and training materials (i.e. hand held and Leica GPS, total station, soft-ware, literature etc.);
- Absence of short-term training for 3-6 months in the areas of GIS and remote sensing, cadastral surveying, land information system, property valuation, land registration, land use planning, land law, property law, and urban planning;
- Absence of long-term training in LA on M.Sc. & Ph.D. level;
- Visiting sites and sharing experiences to establish linkages and cooperation.

There is currently one undergraduate program with a total of 45 students studying LA, but the program has capacity for up to 100 students. The program practices selective admissions, admitting only those students who meet the qualifications. The LA undergraduate program has the following breakdown:

- 12 courses that are specifically for land administration;
- 5 courses are common core courses;
- The rest are Bachelors related courses.

Most of their instructors are graduates of the ILA Masters program, but there is still a need for instructors in the area of LIS, land law, and land economics. The University is working to meet this demand. The university does not have any two year programs but are working with the TVET system to develop the right QFs. None of the proposed QFs, however, will be offered under the university's auspices.

3.3.2.5 Mekelle University.

Mekelle is located in the northern Tigray region. The campus system hosts some 30,000 students in undergraduate and graduate programs. The university currently offers a Masters of Science in Rural Development and plans to open a Masters of Science in Land Administration in the near future. Other related fields include a PhD in soil sciences and climate change, and a PhD in rural development, a Masters of Science in Geoinformatics and a Masters of Science in Urban Planning and Development. The university has a validation processes in place to accredit certain TVET training and experiences. The validation results in the exemption of some class work. The Ministry of Education has just published a framework for validation of prior training and work experiences but we were unable to acquire a copy at the writing of this report.

3.3.2.6 Ethiopian Civil Service University

The assessor met with the Program Director and the Head of the Department of Urban Planning, a Lecturer in Property Law, the Head Urban Land Management and Information Systems, and other staff members and students. The program is severely affected by

equipment shortages. Students are typically civil servants who are on government salary while taking courses.

Informal feedback given by the interview participants indicated that it is difficult to meet the demand for LA professionals in the public sector because public service jobs, while offering job security and some benefits, pay substantially less (sometime 50% less) than private sector jobs. In addition, there appear to be substantial budgetary and staffing challenges in this program while the teaching and laboratory/practicum facilities seem wholly inadequate.

Currently, four “Departments” exist: older programs in Urban Planning and Urban Engineering, and two very new programs in Urban Land Management and Information Systems (begun in 2013) and Surveying and Mapping (begun in 2012). In concert with the new Urban Land Management and Information Systems program initiative, a more comprehensive and substantial LA program may emerge. This can only be expected if adequate resources are made available to meet staffing, infrastructural, and equipment requirements.

3.3.2.7 College of Dry Land Agriculture and Natural Resource, Mekelle University

The assessor met with the college Dean, lecturers and other staff in the College of Dry Land Agriculture and Natural Resources (CDLANR) of Mekelle University in Tigray. Currently four “Departments” exist: two older programs in Urban Planning and Urban Engineering, and two new programs in Urban Land Management and Information Systems (begun in 2013) and Surveying and Mapping (begun in 2012). In concert with the initiative to launch the new Urban Land Management and Information Systems program initiative, a more comprehensive and substantial Land Administration Program may emerge. According to the participants, currently there are no training activities in LA. However, they feel they have qualified instructors, equipment, and a training programs to prepare qualified professionals at the B.Sc. & M.Sc. level in LA by the end of the 2014/2015 academic year.

3.3.2.8 Oromiya Region TVET Commission

A meeting was held with the Head Commissioner of the Oromiya Region TVET Commission and one of his senior advisors. The TVET Regional Commission provides oversight on vocational training programs. LAND project supports one TVET college per region (6 regions). The strategy is to link with existing universities. Referring to National Strategy and Quality Standards, they noted that training needs to be based on professional standards at the national level. They were not, however, sure whether there are any gaps between quality standards and the current curricula or institutional capacity. They do not yet offer curricula in LA except for in surveying. Currently, a QF only exist for urban land management. The plan is to review needs for rural land management as well in order to establish a modern LA system in Oromiya within the next 10 years. The training for the first level parcel survey course without geo-graphic coordinate is almost completed. Training for second level certification is yet to start since it requires higher accuracy with

coordinates permitting implementation of LIS. They noted that vocational training programs are developed based on demand, but that there is more demand being generated recently by the increase in infrastructural projects being carried out by the GOE.

3.3.2.9 Mekelle TVET Institution

Meetings were also held with the director and lecturers of a TVET institution in Mekelle. The director indicated that the vocational and training college in Tigray was established in 2004. Now other training centers exist in 27 *Woredas*. Although they have a general strategic plan, they are not able to provide training in LA due to a lack of qualified instructors, equipment, and other basic materials. The only trained staff (who obtained training for 4-15 days) in LA are five persons. The director indicated that the institution's strategic plan can be implemented only if adequate resources are made available to meet staffing and equipment requirements.

3.3.2.10 Hawassa Polytechnic College

Meetings were held with the college Dean, lecturers and other staff. According to the participants, the college offers courses and a diploma in land surveying. Although some of the graduates work at the *Kebele and Woreda* levels, most of them are now working in private firms. The latter do not have a high profile, but attract trained professionals who graduate from their college. For example, a graduate with Diploma level 3 earns 8,000 Birr/month in the private sector, whereas a comparable government position pays only 1,700 birr/month in Hawassa.

3.3.3 Private Sector Firms

Conversations with private sector firms were limited, but even with these three conversations there were a couple of themes that were common to them all. *First*, it was clear in all three conversations that *there is an important element of demand that is not LA sector related, pays better than the LA sector, and is difficult to quantify*. For these estimates a more thorough analysis of the market would be required. Such activities as road and infrastructure construction pull technicians who might otherwise work in the LA sector into other sectors instead, usually working with private companies. Thus also, the real estate sector has its own demand for trained personnel, especially in the areas of land law, surveying, cadastral mapping, and property valuation. The companies interviewed do market estimates based on known price points, but would be better served by valuations that are technically generated.

Second, graduates coming out of LA sector training and education programs, whether at the TVET level or at the university level, *do not typically have the required skills to perform well on the job*. Graduates have often been trained on outdated equipment, have not been introduced to current systems such as Arc-GIS/LIS, or have received no urban training, where most of the real estate market activities take place. The companies found it necessary to do their own training instead of or in addition to the training previously received.

Third, there are a couple of key areas that are currently underserved. One is the area of land law. Most of the private firms use lawyers who have been generally trained but have no specialization in land law. With the constantly evolving national laws and policies on property in Ethiopia, having lawyers specially trained in the area of land policy and land law would save firms time and money. The other is the area of data entry and retrieval. It is difficult to find trained personnel who understand GIS/LIS and are able to upload and store digitally generated cadastral records.

3.3.3.1 Sunshine Construction Real Estate Company

The assessor met with the Manager of the Building and Construction Department of Sunshine Construction, one of the larger urban developers. The conversation revolved around how private companies go about real estate development and what obstacles they face. Typical processes involve bidding on a land leases and starting construction after the winning bid. Prices for land (land leases) have risen rapidly, especially in the center of Addis, with building emphasis on higher priced properties. Government public housing addresses primarily the needs of the low and middle-income categories. Survey participants said that it is hard to estimate job demand in LA because the work of developers is basically with real estate allocated for construction while the government provides the development of infrastructure (primarily roads and utilities), which frequently lags behind real estate construction. According to the participants, the needs are best estimated professional at the municipal level. The developers employ various professionals in LA categories.

3.3.3.2 Geomark

The assessor also met with the Technical Director and the Head of Application Development for Geomark, a private sector surveying firm. The discussion focused primarily on the quality of graduates. They noted that there is limited capacity nationwide. As a result, they intend to develop their own training capacity because university programs are too limited and lack field-based practical training. They mentioned that there are a total of nine companies under the Information Technology Group (ITG) umbrella, a firm that works on spatial data acquisition. They do contract work with 23 urban areas, involving GIS and LIS expertise as well as LA. They have about 200 employees, 75% of whom also work with government training programs. They noted that there is a lack of capacity at educational institutions. Some instructors need to be brought abreast of changes in the field and brought up-to-date in available technology and methods. In addition, few graduates specialize in urban areas, where the vast majority of the real estate market takes place. In addition, in order to meet rapidly increasing demand, they suggest using a “Train the Trainer Model.” This would require training approximately 100 trainers nationally to be sent to the regions to do additional training.

They noted that recent hires have lacked the qualifications and practical skills necessary to do the work effectively. Most of them lack exposure to Arc-GIS. A donor has offered to provide site licenses to various universities free of charge: which amounts to a value of approximately \$300,000. This may be an offer worth pursuing at the government level. When asked what advanced professions were in highest demand, they mentioned data

managers, GIS specialist, digital image processors, web-based developers, surveyors, and policy experts. Their perspective on the quality of the various university programs offered was that the new programs of Mekelle University and the Ethiopian Civil Service University are still evolving. They do, however, have an urban focus.

3.3.3.3 Interview with ENYI Private Real Estate Agency

The assessor agreed that it would be best to pursue further questions with representatives of the private sector. A wide ranging conversation ensued in which we discovered that all real estate transactions require not only private surveyors, but also government surveyors. As far as ENYI is concerned, they have their own in house surveyors who survey hundreds of parcels each year. They have many more surveyors, however, involved in their road construction company. They keep 3-4 surveyors on retainer at any given time, but only one of them is actually on salary. The market for qualified surveyors remains tight and competitive. They hire archivists with GIS/LIS training. These qualifications are mentioned in the public call for applications and the application form asks for this qualification. This is true for most real estate firms. They do not retain a property valuator. Rather, they do informal market surveys before setting prices and then adjust them for demand.

Their greatest need in the private sector, according to these representatives, is for civil engineers. They expect the real estate market to explode once certification process is completed. Graduates from land administration programs tend to lack practical skills. There is ongoing demand for land lawyers but currently there are few land lawyers who have formal training. Most of those working with land legal issues are general litigators who do land work in addition to their other clients.

3.3.4 Projects Funded by International Agencies

The interviews with LA projects funded by international agencies also generated a couple of common themes. *First*, it is clear that *high quality second level certification is possible with short term training*. For both of the international projects interviewed, training times were approximately two weeks and accuracy was very high. In the LIFT project, field survey accuracy was 95% and office reviews achieved 100% accuracy (REILA did not provide accuracy percentages). Although the accuracy levels are comparable to more extensively trained TVET graduates, there is no doubt that the training times (two weeks versus two to three years) is an important advantage when trying to meet the 2020 completion goal.

Second, there is a *shortage of trained professionals in the surveying, registering, and archiving* areas of the certification process. Although the surveying and registering are being handled by the training carried out in the projects, a long-term plan for retaining and maintaining land registration records require another level of effort that is not currently being met. Once again, the need for a nationally standardized software, processes and data base is evident. If coordinated with the Ethiopian Mapping Agency (EMA), such a data

base would save countless hours of redundant effort and would make the national mapping effort that much more efficient.

3.3.4.1 Interview with the Program Vice Director for REILA Project

We also discussed with the Program Director for the Responsible and Innovative Land Administration in Ethiopia project (REILA), financed by the Finland's Ministry of Foreign Affairs, the current situation in the LA sector and its own role in LA sector reform. According to the Program Director, the only existing demand estimate for the LA sector was published by ORGUT in 2007. The ORGUT study is good as far as it goes, but the estimates are too general to be of much value. REILA has worked with LAUD and with the MoUDHC to develop a new QF for the TVET system which combines the rural and urban land administration needs, especially in the areas of cadastral surveying and registration (see Figure 2). The new curriculum uses the old urban training as the base and adds rural components. There is, however, a shortage of qualified instructors. The TVET system is looking to recruit from the new graduates from ILA, which offers both undergraduate and graduate LA programs. There are currently over 50 million parcels still unsurveyed in the highlands region of the country not taking into account the pastoralist areas and lowlands. This corresponds to the information shared by the technical team of LAUD.

REILA is using a 15 day parasurveyor training that was used by DFID in Rwanda. The parasurveyors still need supervisors for their work, however. REILA has compiled data on productivity in the four regions where they are working (see Table 18; Figures 3 and 4, pp., 78-79). The productivity estimates are averages. There are mitigating factors in calculating productivity: topography, accessibility, visibility, urgency, length of work day, and the like. Productivity estimates are also available for Rwanda, where a similar national land registration process took place. There a survey team consisting of two parasurveyors was able to survey an average of 50 parcels per day.¹⁸

Once surveys have been completed, the records are brought to the registry office. The current filing system retains both a hard copy file and an electronic copy. The archiving is done at the *Woreda* and the regional offices, since no national database currently exists.

3.3.4.2 Interview with LIFT Technical Team

Given that several of the regions are working closely with the Land Investment for Transformation (LIFT) project, financed by the UK's Department for International Development (DFID), we felt it was important also to spend some time with the technical team to understand their current and potential contribution to the national education and training strategy. The objective of the LIFT program is to improve the incomes of the rural poor and vulnerable groups in Ethiopia and enhance economic growth, through second-level land certification, and improved rural land administration. For that reason their efforts are focused on rural areas. The program team works with the GoE to "improve the

¹⁸Government of Rwanda, Ministry of Natural Resources and Mining (2009). *Strategic Road Map for Land Tenure Reform: Summary Presentation*. Kigali: Ministry of Natural Resources.

effectiveness of the rural land sector through increased security of land rights and to enhance the productivity and incomes of the farmers, especially women and vulnerable groups.”¹⁹ The LIFT program was first conceived in response to a World Bank study. The GoE did not take a World Bank loan for this project, however, but instead sought bilateral agreements with international funding agencies, to which DFID responded. The project is focused on rural land certification. It works closely with government entities both on the federal level and the regional level in order that its efforts meet the standards established by the various governing entities responsible for LA. The project goal is to fully complete the land certification process at the second level in 140 of the nation’s 770 rural (670) and urban (100) *Woredas* within five years, or approximately 21% of the rural total or 18% of the urban and rural total. The project is focused on four regional states only: Oromiya, SNNP, Tigray, and Amhara.

The program supports the recruitment and deployment by *Woredas* of field teams made up of a team leader, two parasurveyors and two field data recorders. These teams carry out the field demarcation activities the results of which are taken to LIFT technical support teams that digitize the spatial and enter the textual data. There are 12 field teams deployed in each *Woreda* during certification.

The LIFT program trains the field teams with the *Woreda* and regional staff and has given training of training to selected regional staff. Each of the trainings lasts approximately two weeks. Agreements have been signed with the GoE acknowledging the validity of the certificates that are generated by the project.

The project goal is to complete the certification process for one *Woreda* every nine months, which, in order to complete the 140 *Woredas* in five years. To achieve this the program has started in 8 *Woredas* and will move up to working in 21, each of which having 12 field teams. The training done in each region are for parasurveyors, registrars, and rural LA administrators. Parasurveyors and field data recorders are trained in the necessary skills to carry out their field responsibilities.

Staff in the *Woreda* land administration office receive on the job training on the computerized post certification land administration system including the maintenance, storage, and retrieval of records. Land administrators are trained in quality review procedures and transaction processing.

The nine month completion cycle for each *Woreda* consists of a public awareness effort in which the local community is informed of the details of the certification process, surveying of the land using orthophoto methods, registration of the generated survey records, and the production of second level certificates. The four regions were chosen based on return on investment studies. The methodology used by LIFT was first piloted in Ethiopia by REILA. LIFT is scaling the method up to the regional level. In addition to the training efforts, LIFT is providing equipment for the regions and *Woredas* to ensure sustainability of the system.

¹⁹DAI (2014) “Land Investment for Transformation.” Silver Springs, MD: DAI. Retrieved from <http://dai.com/our-work/projects/ethiopia%E2%80%94land-investment-transformation-lift-0>.

LIFT uses the recently completed national land certification process in Rwanda, where 10 million parcels were surveyed in three years, and 7.9 million certificate collected by farmers in two years. The Rwandan experience resulted in several key “lessons learned”:²⁰

- *the need for strong political support*

Rwanda was able successfully to integrate the land certification process into its national development plans. Organizing the survey process from the national, to the district, to the sector, and to the “cell” level enabled the Rwandan government to seamlessly move records up and down the information chain.

- *the need to shore up the registration process;*

In Rwanda a serious gap developed between the survey process and the registration process. Serious backlogs of surveyed but unregistered land developed that delayed the full implementation of the certification process.

Trainers trained by the LIFT project are part of the governing land authorities and will be part of the government effort to complete the certification process. The initial LIFT pilot will encompass eight *Woredas*. According to the LIFT technical team, there are seven approved land administration positions per *Woreda*, depending on the region, but most of them are vacant at the time. The technical team suggested that the qualifications for regional LA staff positions are too high and therefore positions are difficult to fill. They also noted that LA staff are not given priority in hiring processes at the regional level. In the broader national picture, rural areas are unable to compete with urban and private sector hiring as well as with public works projects like road construction, which tend to offer higher salaries.

3.3.5 Summary of Individual and Focus Group Interviews

In summary, the following recurring themes are found in the interviews with individuals and group representatives from the public sector, private sector, and international agencies.

3.3.5.1 Need for more qualified instructors

Appearing in almost all the sectors was the need for more qualified instructors. The lack of qualified instructors at the para-training level, the TVET level, and the university level is taking the shape of a bottle neck that impedes a timely response to the needs of the LA sector for more trained personnel. Whatever strategy is adopted to improve the LA sector in Ethiopia, it cannot neglect this fundamentally important step.

3.3.5.2 Immediate need for trained personnel in the surveying, registering and archiving of land registration data.

As was noted by several of the sectors, the most pressing demand in the sector is for surveyors, but just as important is the need for trained personnel to process and archive the records. As the Director of REILA pointed out, in other countries where a similar process

²⁰ Government of Rwanda, Ministry of Natural Resources and Mining (2009).

took place, the emphasis on recruiting and training surveyors took priority, leading to a lengthy backlog in unprocessed records. In order to avoid this problem, it would be incumbent upon the education and training strategy to view these as two parallel needs and to address them at the same time.

3.3.5.3 The need for higher wages and intentional and proactive retention policies

All of the sectors mentioned the low pay and high turnover in the public LA sector. The public sector continues to lose its more qualified personnel to other public ministries as well as the private sector. It is hard to know what solution, if any, there can be if more funds are not devoted to the recruiting, training, and retention of public LA personnel. Without retention, the recruiting and training will be wasted effort.

3.3.5.4. The need to take advantage of short term training programs and integrate them into a broader education and training strategy

There was agreement among the public, private, and international project sectors that there needs to be greater use of short-term training strategies, not only in the surveying and registering of properties, but in other areas of land administration as well, such as land lawyers and evaluators. These short-term strategies already exist, but are not yet integrated into a single system which allows the short-term training to be absorbed by and to build upon existing education and training platforms.

3.3.5.5 The need to up-date equipment and training strategies

Both the public and the private sector complained of a lack of adequate training equipment, as well as instructors in a position to use them in training. Generally speaking, the sector needs to update both its equipment and training methods to reflect the state-of-the-art technology available in the LA sector.

3.3.5.6 The need for standardization and a national data base

The lack of standardization threatens to create large inefficiencies in the LA registration system, for example, having to enter registration records more than once due to the use of multiple software processing systems, the difficult in sharing records across jurisdictions, the need to work through several jurisdictions in order to locate and extract the proper records, and the like. In order to avoid these inefficiencies it makes sense for the GoE to develop a standardized process for creating, entering, and extracting land registration records.

3.4 Regional, Federal, and National Demand Estimates

As was noted in the executive summary, although the first stage of data collection had elicited some valuable information, we felt that the national estimates were not reliable enough to base reasonable estimates on them. In order to shore up the estimates, we decided to do more targeted data collection as well as a series of interviews to fill in some questions and gaps in knowledge that we had after the first data collection focusing especially on the four key regions and two federal ministries. For this we sent a survey to each one of the regional authorities responsible for the LA sector and to the two federal ministries involved

in LA. In the following sections we include the results of the second stage of data collection.

3.4.1 Data Collection Instruments

In the second round of data collection we applied a restructured version of the initial individual survey that had been applied in the first round of data collection. The survey was restructured in order to apply it to a targeted sample of LA professionals who would be in a position to estimate with some accuracy the number of professionals needed in their own jurisdiction rather than more broadly to those working in the sector. The research team felt that limiting the survey to the jurisdictions for which those surveyed were responding would give us a clearer picture of the actual labor demand in the sector. The revised survey had the following sections:

- *Numerical estimates* for 5 years, 10 years, and 20 years, disaggregated by skill type and educational level;
- *Rationale* for estimates;
- Estimate of *daily office transactions* at *Woreda* level;
- *Surveyor team productivity* estimates;
- *Unsurveyed land* estimates;
- Description of *registration process*;
- *Major skills and knowledge gaps*

The protocol was designed to solicit specific information that would assist us in triangulating the data that we had received. First, the numerical estimate were intended to give us an expert's insight into the number of positions that would be needed in each area. The rationale section was a form of validity testing for the form whereby we sought to discern how respondents understood each one of the positions described and also why they felt that the position, as described would be in demand in the coming years. The estimate of the daily transactions at current public offices was to give us a sense of what the post-certification demand for public LA services might be, given that the current demand is temporarily inflated due to the certification and registration process. Once this temporary demand is met via the certification and registration process, we would expect the number of transactions passing through the office to decrease to a certain extent. This, then, too serves as a form of triangulation of long-term estimates. The survey team productivity is intended to give us basic information on how that survey process works. By using these numbers together with the unsurveyed land estimates, we are able to triangulate demand estimates using simple mathematical formulas. This also gives us the advantage of being able to construct various time scenarios based on the number of surveyors in the field. Finally, the information about major skills and training gaps allows us to formulate training and education strategies that respond to the actual need in the field.

In the second stage data collection we targeted officials in several of the provincial offices who were in positions of authority in either the land administration or land use and land planning areas of the agencies for which they worked. The purpose of this targeting was to

get more reliable estimates by working directly with those who would be in a position to have insight into the needs of the sector. In each instance we asked these experts to make an estimate for their particular jurisdiction in order to avoid having them speculate on regions or systems with which they might not be familiar. By compiling this data, we have a better sense of types of needs that are arising in the various jurisdictions. At the end of this section and in the summary of the second stage data collection, we use these estimates to make projections across the regions and jurisdictions for the purpose of developing a national demand estimate.

3.4.2 Survey Results

In this part of the report we describe and analyze the results of the survey applied to the representative authorities of the all nine regions of Ethiopia, one of the two independent city administrations (Dire Dawa) and two national ministries (MoA and MoUDHC). The only region missing from these estimates is the city of Addis Ababa, although its demand is also captured in the estimates made by the MoUDHC. The primary focus of this section is to develop an informed estimate of the total rural LA professional needs (as represented by the nine regions and the MoA) as well as the total urban LA professional needs (as represented by the MoUDHC and Dire Dawa). Surveys were circulated among representatives of the LA authorities in each of the above mentioned jurisdictions. The surveys asked for five year, ten year, and twenty year estimates of labor demand in the LA sector based on a list of ten different LA positions. The surveys were sent to the representatives of each jurisdiction who then, usually in groups, discussed the document and gave their best estimates as to what their future needs might be. The results of this survey process are described and analyzed below.

3.4.2.1 Demand Estimates for the Afar Region

According to the Ethiopian Central Statistical Agency, based on the 2007 census, the total population of the Afar region 1,390,273, of which 775,117 were male and 615,156 were female. The total urban population was 185,135 or 13.32% of the population. Afar is unique in that it has a large pastoralist population which constitutes 409,123, or 29.43% off the total population. Total land area for the Afar region is estimated at 94,760km² (27,820 mi²) or 9,706,000 hectares. The region has an estimated density of 22 people per square kilometer (58 mi²). The LA labor demand estimates are displayed in Table 5.

As can be seen from the table, the demand for LA professionals in the region is quite low compared to other regions. The greatest anticipated growth in LA labor demand in the region is in the area of LA technicians, followed by land use managers and LA experts. This is perhaps reflective of the unique challenges that pastoralists areas present for land registration.²¹ Another, perhaps surprising, outcome is the anticipated demand for land experts. Other regions estimated this number to be quite low. It is unclear why the Afar region felt that such a high number of experts would be needed. Perhaps, again, due to the

²¹K.T. Reda (2014). Formal and informal land tenure systems in Afar region, Ethiopia: Perceptions, attitudes and implications for land use disputes. *African Journal on Conflict Resolution*, 14(2), 41-62.

Table 5: Afar Region Labor Demand Estimate

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	33	0	33	0	1	1	0	0	32	22	30	14
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	1	0	1	0	1	0	1	0	0	10	15	7
4	LIS = Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	0	10	15	7
5	Land Use Managers (Land Conservation, Environmental Planners)	5	0	5	0	1	0	1	0	4	80	120	58
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	0	0	0	0	0	0	0	0	0	2	0	0
8	Land Administration Technicians	0	0	0	0	0	0	0	0	0	0	200	250
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	2	0	0
10	Land administration experts(land admin, valuation, registration, investment etc)	65	0	65	0	18	0	18	0	47	60	78	100

unique challenges that pastoralist areas present and the tendency to overgraze, causing detrimental environmental consequences, is behind this estimate.²²

3.4.2.1.1 Rationale for Estimates

In the explanation of the demand estimate, Afar regional LA authorities cited the pressing need for surveyors and others who are trained in GIS/LIS to do “mass registration of pastoralists settled in the villagization program. The referred to program was initiated by the Ethiopian government in 2010 in order to guarantee basic services to the traditionally nomadic populations of the pastoralist areas. Although the program has its international critics, the intent of the program was to eradicate the deep-rooted challenges and problems as stated in its rural development policy by settling “the transhumant and ‘mobile’ tribal groups in centralized villages in order to provide for them the essential socio-economic infrastructure and services, as well as to ensure food security, sustainable peace and good governance.”²³ This has led, however, to an urgent need for the regularization of land leases. Part of this process is the adjudication of the holdings of semi-pastoralists, thus the need for land lawyers. This need is compounded by the fact that the villagization of the nomadic peoples has led to the potential development of farm lands through private investment. Land lawyers are needed to help clan leaders formalize equitable lease agreements in order to avoid unscrupulous private parties taking advantage of local clans. The high number of land experts is also justified by the new land investments taking place. The experts are needed in order to identify lands that are suitable for investment, initiate the land certification and registration process, oversee land transactions and guarantee that land use is consistent with the needs and wellbeing of the pastoralist communities.

3.4.2.1.2 Daily Office Transactions at the Woreda Level and Surveyor Team Productivity Estimates

The Afar region has not yet begun providing land administration services and, therefore, does not keep records on the number of office visits. In addition, there are as of yet no estimates of the number of parcels/unsurveyed parcels in the region at this time.

3.4.2.2 Demand Estimates for the Amhara Region

According to the Ethiopian Central Statistical Agency, based on the 2007 census, the total population of the Amhara region was 17,221,976, of which 8,641,580 were male and 8,580,396 were female. The total urban population was 2,112,595, consisting of 1,024,580 males and 1,088,015 females. The rural population was surveyed at 15,109,381 of which

²² B. G. J. S. Sonneveld, S. Panda, K. Georgis, M. A. Keyzer, A. S. Ali, & A. Takele, (2010). Land degradation and overgrazing in the Afar region, Ethiopia: a spatial analysis. In *Land Degradation and Desertification: Assessment, Mitigation and Remediation* (pp. 97-109). Springer Netherlands.

²³ Ethiopian Human Rights Commission (2012). The status of human rights in Ethiopian villagization programs. Addis Ababa: Ethiopian Human Rights Commission, pp. iii, iv.

Table 6: Amhara Region Labor Demand Estimate²⁴

	Professions	No. of Posts permitted	Educational level required			Posts filled	Educational level required			Gap	Future additional demands: (note: this is in addition to the existing personnel)			Remark
			Diploma	BSc/BA	MSc/MA		Diploma	BSc/BA	MSc/MA		5 yr	10 yr	20 yr	
1	Land surveyors(parcel &cadastral surveys)	299	287	10	2	120	167	10	2	179	900	500	200	
2	Land /real estate Appraisers and Tax specialist	131	0	129	2	64	0	62	2	67	100	350	700	
3	GIS=Geographic Information System with generic spatial analytical functions	134	2	130	2	31	1	28	2	103	250	400	500	
4	LIS=Land Information System including relational data base and cadastral information linkage	139	139	0	0	57	57	0	0	82	100	260	500	
5	Land use managers (land Conservation , Environmental Planners)	972	0	903	69	399	0	366	33	573	660	1000	1450	Multi-disciplinary team composition
6	Land Use and City planners	0	0	0	0	0	0	0	0	0	0	0	0	
7	Land Property Lawyer	270	0	258	12	111	0	101	10	159	300	700	1200	
8	Land Administration Technicians	3117	3117	0	0	2645	2645	0	0	472	2000	2500	2700	
9	information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	0	0	0	
10	Land Administration experts (valuation, conflict etc.)	310	0	143	167	207	0	79	128	103	200	300	350	

²⁴The following methods have been applied in order to generate this estimate: 1) The sample data concerning the filled posts is taken from 33 *Woredas* and 6 zonal departments and generalized at the regional level; 2) Almost all posts are filled by non-professionals so there is a need to have a short term training arrangement in order to capacitate them; 3) The positions at the regional and zonal levels will support the *Woredas* staff so most of the positions need to be at MSc/MA level demanding long-term training in order to upgrade the level of education of the existing personnel. This training program should also include all process owners at all levels of administration; 4) The figure put in 10yr and 20yr show the *cumulative* needs within the respective years.

7,617,000 were males and 7,492,381 were females. Total land area for the Amhara region is estimated at 154,709 km² (59,733 mi²) or 15,470,900 hectares rendering a population density of 110/km² (290/sq. mi). According to Amhara regional officials, the estimates for Land Administration technicians and professionals is as displayed in Table 6.

There are a number of important issues to note in this Table. *First*, there is a critical shortage of surveyors. The current gap between permitted posts and filled posts is 179. Even if sufficient personnel were trained to fill the 900 posts that are projected to be needed in the next five years in order to complete the certification regimen, the gap between allotted and filled posts can only be exacerbated unless measures are taken discover reasons for the gap and remedy those reasons. *Second*, the gap between needed posts and filled posts for those trained in GIS applications is even more critical. Only 31 of 134 posts are filled. Clearly there is a supply issue for these positions. We will take this up again when we propose our training and education strategies. *Third*, perhaps surprisingly, the number of persons with BSc/BA or MSc/MA degrees working as land administrators is at approximately the same proportion as positions requiring less education. This can perhaps be explained by higher compensation levels for these positions. *Fourth*, urban planners were omitted from this list, most probably because they are under a different jurisdiction (municipal authorities). *Fifth*, the number of land administration technician posts filled is quite high compared to the other diploma level positions. It would be worth determining why there is greater success recruiting and retaining staff for these positions than there is for the other diploma level positions.

3.4.2.2.1 Rationale for Estimates

In the rationale section the respondents explained that the number of surveyors needed for land transactions would continue to increase but that the burden would eventually shift to the private sector as the certification process comes to its end. The dramatic increase in valuation and tax experts is also seen as increasingly driven by the private sector response to changing market conditions, as the “buying” and “selling” of land leases becomes more secure under the new system. As seen from the accelerated decrease in land surveyors after five years, it is anticipated that the number of land transactions will stabilize at a much lower rate once the certification process is completed. The number of LIS qualified land registrars and office clerks will increase given that much of the land administration activity will move from the field to the archives. These persons will be needed for the processing of documents related to land transactions. The number of land use managers will also increase, according to the officials, because the existing land use planning efforts are focused on the watershed management and the existing posts are organized in the way to do watershed management. In the future, however, the demand for property planning activity will shift from watershed management to urbanization management. The increase in the number of lawyers will also reflect the changing face of the sector, as energies shift from the certification process to the land lease markets. As with the surveyors, land administration technicians will also increase in the near term and taper off after that due to the change from the public certification process to the private sector land lease market. The number of land administration experts is expected to remain low and then increase only slightly as the land certification process comes to a close. The reason for this, according to

region officials is that the real need for these officials will come after the certification process is complete, but that the demand is not expected to increase significantly.

3.4.2.2.2 Daily Office Transactions at the Woreda Level.

The number of daily transaction was included in this survey to get a sense of what current traffic is in the public land administration offices. The survey lists 20 daily transactions for each of the *Woreda* offices. The Amhara region has 129 *Woreda* offices, which would translate to a total of 2,580 daily transactions in the region. It has been shown that the number of land transactions will increase once the land certification process is complete,²⁵ although the actual percentages of increase are unknown. In one study, sampling randomly assigned communities real estate transactions increased by over 100%.²⁶ It is uncertain what effect the formalizing of land leases through the certification process might have, but it is almost certain to increase the daily traffic in the *Woreda* offices by a significant amount. In the same report, however, the amount of time required per transaction of the newly digitized records was also reduced by 92%, meaning that, although there may be an increase in the number of transactions at local offices, there may actually be a reduction in the needed number of personnel to service those transactions.

3.4.2.2.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

According to the regional authority, average surveying productivity per day is 15 hectares or approximately 40 parcels per day. That means, given the number of level 2 unsurveyed hectares in the region, which is 5 million, according to Authority estimates, it would take 256 survey teams, surveying approximately 15 hectares per day, working 260 days a year (= 5/7 of 365) approximately 5 years to survey those 5 million unsurveyed hectares. Assuming that each team consists of 5 persons, this would translate to 1,282 surveyors to complete the process in five years. As can be seen from the numerical estimates for the Amhara region found in Table 5, this triangulates roughly with the estimate of 900 surveyors in the next five years for the Amhara region. Using a similar formula based on parcels per day, it would take 338 teams surveying approximately 40 parcels per day, working 260 days a year approximately 5 years to survey the 13.8 million unsurveyed parcels in the region. Assuming again that each team consists of 5 persons. That would amount to 1,692 surveyors to complete the task.

3.4.2.3 Demand Estimates for the Benishangule-Gumuz Region

The Benishangule-Gumuz region has a total population of 784,345, of which 398,655 are male and 385,690 are female, according to the 2007 census. The urban population was 105,926 or 13.51% of the total population, of which 53,968 were males and 51,958 were females. The rural population stood at 678,419, of which 344,687 were male and 333,732

²⁵S. T. Holden, K. Deininger, and Hosaena Ghebru (2007). *Impact of Land Certification on Land Rental Market Participation in Tigray Region, Northern Ethiopia*. MPRA Paper No. 5211. Oslo: Norwegian University of Life Sciences.

²⁶World Bank (2011). *Land Tenure Policy: Securing Rights to Reduce Poverty and Promote Rural Growth*. Paris: The World Bank.

were female. The land area for the region is estimated at 50,699 km² (19,575 mi²) or 5,069,900 hectares, which renders a population density of 15.5 persons per km² (40/mi²). The labor demand estimate recorded in Table 7 shows a strong demand for surveyors. As can be seen, there is a currently a large gap between the number of surveyors needed and the number of posts filled (42 vs 2), leaving a large employment deficiency in this area. Also, the degree level required for the position is quite high, a minimum of a Bachelors degree. Understandably, the projection of personnel needs includes a large number of surveyors in the first five years as the region begins to set in motion its land registration process. In spite of the large number of land use managers already employed by the region (47 of 51), there is strong continuing demand over the next twenty years, with the demand being strongest in the first five years (98). This is also true of the LA experts. Although 48 of 55 posts are currently filled, there is a projected need of an additional 55, 55, and 29 LA experts in five, ten, and twenty years respectively. By far and away the largest demand, however, will be in the area of LA technicians, with a projected need for 475 technicians in the next five years. Also notable is the demand for both GIS and LIS technicians.

3.4.2.3.1 Rationale for the Estimates

According to the responding representatives for the Benishangule-Gumuz region, the region's plan in the coming five years is to adjudicate, register and issue first level certification for 1 million parcels and cover 25% of the parcels in second level certification. In this connection land administration experts, surveyors, GIS experts are the top priority needs of the regions. The region has also a great deal of potential for private agricultural investment, which makes the presence of land experts to determine appropriate properties for lease and to advise on the most effective and efficient use of lands another top priority. Land use managers are a second priority in order to realize the immense land use potential of the region while land information experts are equally important in systematically organize the parcels information for updating and other related purposes. Although the numbers are not large, according to the estimates, land lawyers are needed to make farmers and investors aware on their rights and responsibilities in using the lands. In the longer-term, when the duties of land administration and land use are moved down to the *Kebele* level they are needed to provide technical assistances and facilitate transaction requests while website developers are needed to popularize the success stories registered in due course of implementing the land administration system in the region.

3.4.2.3.2 Daily Office Transactions at the Woreda Level

According to the representatives of the Benishangule-Gumuz region, the number of office transactions currently taking place at the Woreda level is 10 per day. This translates to approximately 200 transactions daily in the region. Given that the majority Of these transactions most probably deal with either cadastral records or disputes, the number of LIS technicians and land lawyers is probably low for the region, as is attested also by the gap between number of post open and number of posts filled (a gap of 14 posts for LIS trained technicians and a cap of 13 posts for land lawyers).

Table 7: Demand Estimates Benishangule-Gumuz Region

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	42	0	42	0	2	0	2	0	39	98	0	0
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	2	0	2	0	1	0	0	1	2	15	18	15
4	LIS = Land Information System including relational data base and cadastral information linkage	24	0	24	0	10	0	10	0	14	20	20	0
5	Land Use Managers (Land Conservation, Environmental Planners)	51	0	51	0	47	0	47	0	4	93	40	40
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	21	0	21	0	8	0	8	0	13	17	20	0
8	Land Administration Technicians	0	0	0	0	0	0	0	0	0	475	0	0
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	2	0	0
10	Land administration experts(land admin, valuation, registration, investment etc.)	55	0	55	0	48	0	48	0	27	55	55	29

3.4.2.3.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

According to regional representatives, the number of unsurveyed parcels in the region is 985,000 out of a total of 1,000,000 parcels. That means that, to date, only 15,000 parcels have been completed. They also indicated that survey teams currently are able to generate 40 cadastral surveys per day, on average. Assuming a survey team of five persons (one surveyor, one encoder, one registrar, and two community representatives), it would take 19 survey teams a total of 5 years to complete the remaining 985,000 parcels. That is a total of 19 surveyors devoted exclusively to the task of level two certificate generation, 19 encoders with GIS training able to translate field surveys into digital records, 19 registrars capable of moving the digital field records into an archival database, and 38 community representatives to oversee the work and settle disputes. Current estimates given for the region are in line with those numbers. The region is anticipating a demand of 98 surveyors in the next five years, 15 GIS trained technicians, 20 LIS trained technicians, and 93 land use managers who would be in a position to work with communities to do planning and provide community representatives for the survey process. If the certification process extends to ten years, the numbers would be halved (only 10 teams needed), and if the process extends to twenty years, that number could be halved again (five teams).

3.4.2.4 Demand Estimate for the Gambella Region

According to the 2007 census, the Gambella Region has total population of 307,096, consisting of 159,787 men and 147,309 women; the urban population numbers 77,925, or 25.37% of the population, of which 40,934 were male and 36,991 were female. With an estimated area of 34,065 square kilometers (21,167 mi²) this region has an estimated density of 9 people per square kilometer (14.5/mi²). Labor estimates for the Gambella region show four areas of emphasis, the most important of which are the land administration technicians. These are generally trained professionals who are able to take on a wide variety of LA tasks. The estimates are that the demand will arise in the ten to twenty year range, a result of the completion of the certification process. The total demand for the next twenty years is 244, but the demand is not immediate. Three other noteworthy areas of demand are those of surveyor (63 additional in twenty years), land use managers (74 additional in twenty years), and land administration experts (also 74 additional in twenty years).

3.4.2.4.1 Rationale for Estimates

As the regional representatives describe it, the structure of the labor demand seen in Table 8 is driven by the unique demands on the region. The immense potential for foreign and domestic private investment in the rich arable lands of the Gambella region has attracted much attention from investors. The region is currently under intense pressure by investors to open the land to agricultural investment. Although the region is supported by the technical expertise of the MoA, there are still wide gaps in its capacity to properly identify, record, and open land for investment. Thus, the region urgently needs skilled surveyors and GIS experts.

Table 8: Demand Estimate for Gambella Region

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	40	10	25	5	1	0	0	1	39	21	28	28
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	10	0	8	2	1	0	0	1	9	15	20	18
4	LIS = Land Information System including relational data base and cadastral information linkage	25	0	20	5	0	0	0	0	25	20	20	17
5	Land Use Managers (Land Conservation, Environmental Planners)	55	1	50	4	0	0	0	0	55	38	26	66
6	Land Use and City Planners	0	0			0	0	0	0		0	0	0
7	Land Property Lawyer	20	0	15	5	1	1	0	0	19	20	25	48
8	Land Administration Technicians	0	0	0	0	0	0	0	0	0	24	55	21
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	0	0	0
10	Land administration experts(land admin, valuation, registration, investment etc.)	7	5	1	1	7	5	1	1	0	19	23	32

In Gambella, to some extent, investment lands have been illegally taken by individuals, which has resulted in complicated efforts to verify property rights, investments, and to regularize leases in a way that is equitable and complies with the laws. For that reason, the region is in dire need of lawyers trained in land law. Land use managers are the second most important priority for the region in order to give technical assistance for the region in identifying suitable land for agricultural development and prevent environmental degradation. To facilitate transactions and to follow up on investment lands, land administration experts are also equally needed in the region. As the implementation of the land administration system reached its advanced stages, land administration technicians will be needed meet the daily LA demands of the region and, then, to serve each of the 144 regional *Kebeles*.

3.4.2.4.2 Daily Office Transactions at the Woreda Level

Current transaction levels stand at an average of 5 transactions per day per *Woreda* on a regional level. This translates to 65 transactions per day in the region based on the 13 *Woredas* in the region. Given the pressures on the region to develop its agricultural lands, the current regional staff of 13 is woefully short of current need. The demand for surveyors, GIS and LIS technicians, land use managers and experts, and land lawyers is urgent.

3.4.2.4.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

Current productivity rates are quite low compared to other regions at 10 to 15 parcels per day. The total land area is estimated at 3,406,500 hectares. There is a large national park that occupies a large portion of the region (over 15% of total land area), but currently there is no record of the number of parcels nor of the number of unsurveyed parcels in the region, making the situation that much more urgent as investors move in.

3.4.2.5 Demand Estimates for the Harari

Harari has a total population of 183,415, of whom 92,316 were male and 91,099 were female. The urban population of the region is 99,368, or 54.18%, of which 49,747 were male and 49,641 were female according to the 2007 census, all of them living in the one urban area in the region, the ancient city of Harar. Harari has an estimated total land area of 343.21 square kilometers (213.26 mi²), this region has an estimated density of 534.41 people per square kilometer (860 mi²), giving it the highest population density of any region (excluding the two independent cities of Addis Ababa and Dire Dawa). Given the size of the region, it is understandable that the labor demands are quite low. As can be seen in Table 9, the largest demand will be for land managers (in the short term), land administration experts (in the short and long term), and land administration technicians (in the long term).

3.4.2.5.1 Rationale for Estimates

The Harari region has a unique history in terms of the ownership of rural lands, according to the surveyed representatives of the region. The rural lands were originally owned by members of the Harari ethnic group. As their Harari owners migrated to the urban commercial center of Harar to pursue business opportunities, the lands were transferred

Table 9: Demand Estimate for Harari Region

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	0	0	0	0	0	0	0	0	0	2	0	0
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	1	0	1	0	0	0	0	0	1	1	2	1
4	LIS = Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	0	1	2	1
5	Land Use Managers (Land Conservation, Environmental Planners)	2	0	2	0	2	0	2	0	0	10	0	6
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	0	0	0	0	0	0	0	0	0	1	2	2
8	Land Administration Technicians	0	0	0	0	0	0	0	0	0	0	0	17
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	1	3	0
10	Land administration experts(land admin, valuation, registration, investment etc)	2		2		2	0	2		0	7	6	6

to tenants of Oromo ethnicity, with the agreement that the tenants would share the crops produced with the original owners. Although these arrangements have been in place for decades, and in some cases centuries, the current tenants are claiming full rights for their holdings. The region is planning to adjudicate the existing holdings and issue first level certification in the coming years. As a result, land administration experts are the first priority for the region in to provide solutions for the persistent problem of contested land rights. Land use managers are also the immediately needed in the region in order to address the proper allocation of land in the face of rapid urban expansion. Once the property rights issue has been resolved through the issuance of level one certification, the region plans to do commence the mass registration process at level two. At that time surveyors, GIS technicians, and land lawyers will be critical needs in the region. The land administration technicians will be important to maintain the 17 *Kebele* level offices in order to facilitate transactions and other related services once the region's LA plan is fully implemented.

3.4.2.5.2 Daily Office Transactions at the Woreda Level and Survey Team Productivity

Given the size of the Harari region, there are no Woreda, per se, but rather the region is divided into 19 urban *Kebele* and 17 rural *Kebele*. The demand for services at the regional level is approximately 3 transactions per day. As has been noted before, this will almost certainly rise once the certification process is underway and will rise dramatically once the certification process is complete. Under the circumstances, both the current limited staff and the 5-20 year projections are warranted. There are a total of approximately 150,000 parcels in the region, none of which have been surveyed to date. Since the certification process in the region has not yet begun, there are as yet no experience regarding the number of parcels that can be surveyed per day and, therefore, it is not possible to make productivity estimates for the region.

3.4.2.6 Demand Estimates for the Oromiya Region

According to the Ethiopian Central Statistical Agency, based on the 2007 census, the total population of the Oromiya region was 26,993,933, of which 13,398,927 were male and 13,595,006 were female. The total urban population was 3,317,460, consisting of 1,679,153 males and 1,638,307 females. The rural population was surveyed at 23,676,473 of which 11,915,853 were males and 11,760,620 were females. Total land area for the Oromiya region is estimated at 284,538 km² (109,861 sq. mi) or 28,453,800 hectares rendering a population density of 95/km² (250/sq. mi). According to Officials at the Oromiya region Environmental Protection, Land Administration and Land Use Authority, the estimates for Land Administration technicians and professionals is as displayed in Table 10. In analyzing the data, we find the following notable entries. The number of surveyors estimated for this region is well below the estimates for the Amhara region. The number of permitted posts for surveyors in Oromiya is only 122, whereas in Amhara, it is 299. Thus also for the other posts listed in the Oromiya report. According to the officials in the Oromiya region, this is due to the fact that Oromiya has large pastoralist areas and therefore needs fewer surveyors to maintain the daily transaction rate for the region. It is also worth noting that the Oromiya region has no positions budgeted for land appraisers and tax specialists, for LIS technicians, or for land use and city planners. This is something that will have to be corrected in the

short run in order to complete the certification process. Once the certification process is complete, then the region can return to maintenance levels of employment again. This is, in fact the way that the region has structured its estimate.

3.4.2.6.1 Rationale for Estimates

According to the data collected from the Oromiya region estimate that the demand for surveyors will remain “very high” for the next ten years, but taper off after the ten year mark and reach a maintenance level of 180 by the 20th year. They also noted that GIS trained cadasters would be essential for completing the certification process for the region. They estimate that GIS experts at the *Woreda* level will be very crucial over the next 5 years, and that the needed number of GIS trained cadasters will increase toward the ten year mark in order to reach the unsurveyed *Woredas*. Between the next ten and twenty years the number of GIS experts needed will decline to some extent as the certification process comes to an end. Although there are no current budgetary provision for LIS trained technicians, in order for the region to complete the certification process, LIS trained technicians will most probably be necessary, especially if a national data base is developed in which LIS based records become the national standard. The estimates in Table 10 have taken this need into account. As officials in the region stated in their survey responses, the region has planned to establish LIS first at regional and *Woreda* level, where the land related records are kept. These units will play a vital role, especially where land transactions are taking place and where there is frequent updating of data.

The officials also noted that there are few experts currently working in land use planning and use and that most of the work has been outsourced to private firms under the supervision of regional employees. It is hard to know, however, how land use master planning could be accomplished anywhere other than in the public sector. The largest single increase proposed in the demand estimate is that of land lawyers. The officials reasoned that as land owners become aware of their rights, land transactions would increase dramatically in order to accommodate the need to transfer ownership rights, pass on land as inheritance, and provide adequate compensation in cases of expropriation.

Combined with the current dearth of lawyers trained in land issues and the increase in need, a large increase in land lawyers will be needed in order to accommodate the post-certification reality. This demand will not diminish with time. In explaining the high number of land administration technicians included in the estimate, the regional officials pointed out that the number of land administration experts are not sufficient to meet even the current demand, given that many of those experts lack the necessary training to execute the work effectively. They described the need for technicians as “urgent” in the next five to ten years. After the ten year mark, however, the need for additional technicians will not increase. Finally, the need for land administration experts follows the same pattern as that of land administration technicians. There is a spike in demand up until the ten year mark. After that, demand diminishes as the region enters into a mode after the completion of the certification process.

Table 10: Oromiya Region Labor Demand Estimate

No	Professions	No. of posts permitted	Education level required			Post filled	Education level required			Gap	Future additional demands in:(note : this is in additional to the existing personnel)			Remarks
			Diploma	BSc/BA	MSc		Diploma	BSC/BA	MSc/MA		5yr	10yr	20yr	
1	Land surveyors(parcel &cadastral surveys)	122	27	95		105	45	60	0	17	208	350	180	LA and LU
2	Land/Real Estate Appraisers and tax specialist	0	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS=Geographic Information System with generic spatial analytical functions	50	15	35		40	10	30	-	10	204	208	130	LA and LU
4	LIS=Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	0	22	68	68	So far not assigned
5	Land use managers (land Conservation , Environmental Planners)	274	90	100	84	180	50	86	44	94	190	90	74	
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0	
7	Land Property Lawyer	283	0	278	5	216	0	213	3	67	200	150	15	
8	Land Administration Technicians	91	91			35	35	0	0	56	280	350	200	
9	Information technology & web site encoder expert	0	0	0	0	0	0	0	0	0	0	0	0	
10	Land administration experts(compensation, conflict resolution, investment etc.)	632	0	595	37	485	0	435	50	147	630	650	367	

In summary, the demand for LA professionals in the Oromiya region is driven by the completion of the certification process. The regional officials see demand as increasing across the board up to the ten year mark, after which all categories will increase at a much slower rate. Even at its peak in ten years, however, the Oromiya region will only require a fraction of the number of officials needed in the Amhara region. The estimated demand is little more than ten percent of the demand in the Amhara region, even at its peak.

3.4.2.6.2 Daily Office transactions at the Woreda level.

Regional officials in the Oromiya region estimate that daily traffic at *Woreda* level offices number between 15 and 20 per day. This number is based on current traffic flows and does not reflect the anticipated demand at the completion of the certification process in the *Woredas*. Given that Oromiya region consists of 265 *Woredas*, one can assume that the number would amount to between 3,975 and 5,300 daily transactions in the region.

3.4.2.6.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

First Level Rural land Registration and Certification operation was started in 2005, in the Region. Out of the estimated 2.71 million land holders in the region, of 2.7 million farmers' holdings had been measured and registered (Almost 100 %) and 2.52 (92.8 %) million households had been given land holding certificate. The second level certification program which was undertaken by USAID supported program ELTAP operated in 6 *Woredas* from 2005 to 2008 and then ELAP extended from 2008 and operated in 2 *Woredas* as a pilot program. Based on the activities and the positive lessons learnt from the above mentioned projects, the regional government scaled-up these second level certification program by the year 2010. To date with the regional government supported budget and with different projects it's implemented in 83 *Woredas* and a total of 2,160,751 Parcels surveyed and registered, of which 741,208 parcels were certified and issued to the households. According to the regional officials in the Oromiya region, using current survey practices, surveyors can complete surveys for approximately 20 hectares per day. The amount of remaining land to be surveyed in the region is approximately 22,900,000 hectares. Using the same formula as we did for calculating the estimated need for surveyors in the Amhara region, we find that it would take 881 survey teams working 260 days a year with an average survey productivity rate of 20 hectares per day to complete the survey process for the region of Oromiya in five years. If we assume, once again, that the mean size of the survey team is five persons, then it would require a total of 4,403 surveyor team members, with a minimum of 881 surveyors, to complete the survey task in five years. The estimates recorded for the region, however, call for only 208 surveyors in the first five years with a current surveyor staff of 105. How might we explain this discrepancy? According to regional officials, this is due to the fact that large parts of Oromiya region are pastoral lands which will require different survey methods than those currently being used for the certification process of individually help parcels. The amount of land held by the pastoralists is very large, almost 61% of total land holdings in Ethiopia, according to some estimates.²⁷ USAID's LAND project is in the process of assisting Oromiya in developing

²⁷Jaspreet Kendra, Integrated Regional Information Network (2014). ETHIOPIA: Land of warm milk and no rain. New York: IRIN. Retrieved from <http://www.irinnews.org/report/89317/ethiopia-land-of-warm-milk-and-no-rain>.

a legal framework for recognizing communally held pastoral lands and to prevent such lands from falling into the hands of a third party. Nevertheless, to date, no certification process for the region's pastoral lands has been established nor has the certification of pastoral lands begun.²⁸ It is unknown, at this point, how long it will take or with what level of manpower the task can be accomplished. As a result, it is a little difficult to make estimates. For the sake of consistency, we will apply the same 31% deviation to these estimates as we did to those of the Amhara region.

3.4.2.7 Demand Estimate for the Somali Region

According to the 2007 census, the region has a total population of 4,445,219, consisting of 2,472,490 men and 1,972,729 women. The urban population was 623,004, or 14.02% of the total population, of which 340,457 were male and 282,547 were female. Although, of the total population, 1,687,858, or 37.97%, were pastoralists, more than 85% of the land total is pastoral. The region has an estimated total land area of approximately 350,000 square kilometers (217,480 mi²), which means that upward of 297,500 km² are pastoral lands. The region has an estimated density of 12.7 people per square kilometer (20.43/mi²). As can be seen from the limited information provided by regional authorities, there is currently a great shortage of personnel in the region. Only two posts are currently filled.

3.4.2.7.1 Rationale for Estimates

The Somali region has not yet begun the certification process. As was noted above, the process is complicated by the large number of pastoral lands which have communal ownership and ill-defined boundaries. To begin demarcation and registration of both communal and private holdings, surveyors and GIS experts are the first priority. A concomitant and equally important stage will be the proper and systematic organization of the land records generated by the certification process, necessitating LIS experts. A second priority, but equally important, is the need for property evaluators to manage the valuation of communal lands for private investment. As has been noted, the process of private investment is fraught with potential difficulties given the information asymmetries between private investors and clan leaders.²⁹ Ensuring just compensation for the pastoral peoples is a high priority necessitating adequate LA staff. The remainder of the projections listed here represent the day to day needs of the region as the implementation of the decentralized LA system is put in place. As can be seen from Table 11, the demand is most important in the short term, but remains strong toward the 20 year mark. Having these professions in place will be vital to maintaining an efficient land administration and land use planning system.

3.4.2.7.2 Daily Office Transactions at the Woreda Level and Survey Team Productivity

The LA system has not yet been implemented in the Somali region. Therefore, there is no accurate estimate, to date, for the number of parcels in the region, no firm knowledge of the productivity rates of survey teams, making it difficult to estimate accurately the number of teams and/or years that would be needed in order to complete the certification process.

²⁸ PFE, IIRR and DF. (2010). Pastoralism and Land: Land tenure, administration and use in pastoral areas of Ethiopia. Nairobi, Kenya: PFE, IIRR, DF.

²⁹ James Keeley, Wondwosen Michago Seide, Abdurehman Eid & AdmasuLokaley Kidewa (2014) *Large-scale land deals in Ethiopia: Scale, trends, features and outcomes to date* London: IDRC and IIED.

Table 11: Demand Estimate for the Somali Region

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA	5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	0	0	0	0	0	0	0	0	68	50	65
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	0	0	0	0	0	0	0	0	68	42	77
4	LIS = Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	68	50	65
5	Land Use Managers (Land Conservation, Environmental Planners)	0	0	0	0	0	0	0	0	68	50	65
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	0	0	0	0	0	0	0	0	30	20	18
8	Land Administration Technicians	0	0	0	0	0	0	0	0	68	50	0
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	0	0
10	Land administration experts (land admin, valuation, registration, investment etc.)	0	0	0	0	2	0	0	0	68	50	18

3.4.2.8 Demand Estimate for the Southern Nationalities, Nations, and Peoples Region.

Based on the 2007 Census conducted by the Central Statistical Agency, the SNNP region has an estimated total population of 14,929,548, of whom 7,425,918 were men and 7,503,630 women. The rural population was estimated at 13,433,991 or 89.98%, of which 6,653,633 were male and 6,780,358 were female, while 1,495,557 or 10.02% are urban (772,285 males and 723,272 women); this makes the SNNP region Ethiopia's most rural region. With an estimated area of 105,887.18 square kilometers (40,883.27 sq. mi), this region has an estimated density of 141 people per square kilometer or 370 per square mile. The estimates given by the officials of the SNNP region are included in Table 12. The most notable cipher here is the high estimate for surveyors, even higher than those of the Amhara region. There is also a dramatic jump between year 5 and 10 in terms of the number of LA technicians needed (from 0 to 3,579). As with the Oromiya estimates, the LA positions increase from the present to the ten year mark, and then begin to decline again. As with the Oromiya region, appraisers and land use planners are absent from these estimates. We will discuss this further below. The number of land lawyers is negligible, as is the number of LA technicians with GIS capability. It is not clear whether the region can successfully complete the certification process without a large number of such skilled positions.

3.4.2.8.1 Rationale for Estimates

The officials from the SNNP region did not comment on specific positions in giving their rationale for the estimates they made, but rather gave a general justification based on trends within the LA sector. It seems evident from the data that is included in the survey that the regional officials are making estimates only for the EPLALUA and not for all sectors. According to officials, the estimates are based on a number of trends as follows:

- They have attempted to capture in these numbers changes in development that will lead to a rise and decline in the demand for the professions affiliated with the LA sector. As can be seen from the estimates, the regional officials expect a steep rise in the next five years, after which there will be a decrease in demand at the ten year mark and a further decrease in twenty years.
- The regional officials also explained that changes in technology would affect the demand for skilled professions. Although they did not explain this further, one might assume that this reference is to the steep decline in demand for surveyors from the five year (2,253) to the ten year mark (771).
- A third rationale for the estimates is the change in the value of land. The assumption is that as the land certification process is completed, the activity in the sector will shift from the basic work of registering parcels to handling land transactions. This may be behind the number of LA technicians listed at the ten year mark (3,579), since the officials also mentioned specifically that the completion of the surveying process would lead to a decline in the number of surveyors and a rise in the number of registrars. It is uncertain, however, whether the regional officials considered registrars to fall under the rubric of the LIS information technicians or whether they considered them to be LA technicians. It is questionable, however, under the circumstances, whether a single land lawyer will be sufficient for an invigorated land lease market.

Table 12: SNNP Region Labor Demand Estimate

No	Professions	No. of posts permitted	Education level required			Post filled	Education level required			Gap	Future additional demands in		
			Diploma	BSc /BA	MSc./MA		Diploma	BSc/BA	MSc./MA		5yr	10yr	20yr
1	Land surveyor	137	0	0	0	55	9	46	0	82	2253	771	0
2	Land / Real estate appraisers and tax specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	3	0	0	0	2	0	2	0	1	12	4	0
4	LIS = Land Information System including relational data base and cadastral information linkage	151	0	0	0	102	12	90	0	49	149	50	0
5	Land Use Managers (Land Conservation, Environmental Planners)	158	0	0	0	26	10	12	4	132	132	0	0
6	Land use & city planner	0	0	0	0	0	0	0	0	0	0	0	0
7	Land property lawyer	1	0	0	0	0	0	0	0	1	13	0	0
8	Land administration technicians	0	0	0	0	0	0	0	0	0	0	3579	0
9	information technology	0	0	0	0	0	0	0	0	0	11	4	0
10	Land administration experts(land administration, valuation, registration, investment)	457	0	0	0	221	16	201	4	236	435	146	0

Finally, the regional officials noted that land use, environmental planning and rehabilitation/conservation would continue to be needed beyond the certification process and, in a certain sense, depend on its completion.

3.4.2.8.2 Daily Office Transactions at the Woreda Level

Regional officials estimate that between 7 and 9 transactions are required at the *Woreda* level in the SNNP region. This is significantly lower than the other regions. Given that SNNP consists of 135 rural *Woredas*, one would expect that on a daily basis between 945 and 1,215 transactions take place on an average day in the region.

3.4.2.8.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

Using orthophoto survey technology, a survey team can complete approximately 25 to 30 hectares per day, according to regional officials. Given that approximately 9.8 hectares remain unsurveyed in the region, the region would need to employ approximately 274 survey teams in order to complete the survey portion of the certification process. Assuming that each survey team consists of an average of 5 persons, as we did with previous estimates, that total number of surveyor team members needed in the next five years would be approximately 1,371 surveyor team members. This is significantly less than the 2,253 projected in the regional estimate at the five year mark.

3.4.2.9 Demand Estimate for Tigray Region

According to the 2007 Census conducted by the Central Statistical Agency, the Tigray region has an estimated total population of 4,316,988, of whom 2,126,465 are men and 2,190,523 women; urban inhabitants number 844,040 or 19.55% of the population, of which 398,795 are male and 445,245 are female. The land area is estimated at 41,409.95 km² (15,988.47 sq. mi) which means that there is a population density of approximately 100 people per km² or 270 per square mile. The estimates given by the officials of the Tigray region are included in Table 13. As with the SNNP region and the Oromiya region, the estimates are quite modest. As can be seen in the Table, the number of surveyors is quite high: an additional 740 posts will be needed in five years, 874 more in ten years, and 874 additional posts in 20 years. That is a total of only 321 posts over the next 20 years, assuming zero attrition. This is very low compared to the estimates in Amhara region. It is, however, in line with estimates in the Oromiya region. Other estimates are quite high. For example, the estimate contemplates 324 GIS trained technicians, 210 LIS trained technician, but only 48 land use managers. Oddly enough, the estimate calls for 48 land lawyers. This seems to be an accurate reflection of the need, but compared to some of the other estimates for the Tigray region, it seems higher than the others. The demand for information technicians, although high, seems to be more accurate than some of the other regions, given the shift to digital land records.

3.4.2.9.1 Rationale for Estimates

According to the officials in the Tigray region, the demand for LA personnel will rise in the coming years but then decline again as the certification process comes to an end. There will be an ongoing need for land use planning and environmental protection sections, however, in the regional environmental agency so that they can provide on-going studies,

planning and sustainable management of land resources for the indefinite future. An increase might also be a result of the upgrading of the regional authority to a bureau. An improvement in salary and working conditions in the sector could also dramatically change the number of professionals working in the sector as well as the economic development of the regional.

3.4.2.9.2 Daily Office Transactions at the Woreda Level

Officials in the Tigray region supplied detailed accounts of daily regional and *Woreda* land transactions in the region. At the regional level, 353 land conflict resolutions cases were adjudicated in 2006 E.C. (twelve month period ending September 10, 2014), which constitutes an average of approximately two customers per day. They also noted that this figure a decrease in the number of cases handled previous years. In addition, land lease transaction applicants, requesting maps and certificates of their land holding, numbered 1,918 over the same period of time, which represents about 6 customers per day. At the *Woreda* level, 2,885 cases of land conflict resolution were adjudicated, representing an average of 10 customers per day. In addition, reports from 31 of the 35 *Woredas* indicate that the number of customers is decreasing. At the *Kebele* level the number of cases of land conflict resolution were 7,329, constituting about 24 customers per day. In all the above cases, it appears that the advanced stages of the first level land certification process has already effectively reduced the number of land disputes.

3.4.2.9.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

According to officials in the Tigray region, a single surveyor, working alone, can survey up to 60 parcels a day, which translates to 30 hectares. Because quality assurance detected errors at this level of productivity, current productivity rates have been reduced to 40 parcels per day, or 20 hectares. Using orthophoto techniques, however, it has been shown that surveyors can survey up to 80 parcels, or 40 hectares, per day with relatively high quality. Although the certification process is ongoing, estimates are that only about 237,085 hectares of land has been surveyed using hand-held GPS and 114,000 hectares of investment properties have been surveyed using total station, which together represents about 6.55% of the total land area in the region, leaving more than five million hectare of land unsurveyed. Taking this number as the target, 96 surveyors, working alone, at a rate of 40 hectares per day, which would be the high end of the estimate, using orthophoto techniques, would be able to survey the remaining unsurveyed land area in five years. If we take the lower productivity rates (20 hectares per day), the number would double to 192 surveyors. This is less than the estimate given for the region, but the number of members on a survey team may vary according to the type of survey being done.

Table 13: Tigray Region Labor Demand Estimate

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/BA	MSc/MA		Diploma	BSc/BA	MSc/MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	140	136	3	0	74	71	3	0	66	740	874	874
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	3	0	1	2	2	0	3	0	1	108	108	108
4	LIS = Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	0	70	70	70
5	Land Use Managers (Land Conservation, Environmental Planners)	12	0	10	2	9	0	8	2	3	14	17	17
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
8	Land Property Lawyer	13	0	13	0	7	0	1	0	6	39	39	39
9	Land Administration Technicians	0	0	0	0	0	0	0	0	0	680	680	680
11	information technology & web site data encoder expert	37	0	37	0	15	0	15	0	22	37	37	37
12	Land administration experts (land admin, valuation, registration, investment etc.)	196	0	196	0	170	0	171	0	26	199	199	199

3.4.2.10 Demand Estimate for the Independent City Administration of Dire Dawa

Dire Dawa is one of two independent city administrations in Ethiopia (Addis Ababa is the other). It is divided into two *Woredas*: the urban *Woreda* of the city and a rural *Woreda* called Gurgura. Estimates included here are for the rural *Woreda*. According to the 2007 census, Dire Dawa has a population of 341,834, of whom 171,461 are males and 170,461 females. The urban population constitutes 68.23% of the total population, or 233,224 inhabitants, of which 116,232 were males and 116,992 were females. The rural population was 55,229 male and 53,381 female. In analyzing the demand estimate for the city administration it is evident that there is an immediate need for surveyors, land use managers, and land administration experts and a less urgent but significant demand for land administration technicians.

3.4.2.10.1 Rationale for Estimates

As with most urban areas in Ethiopia, the city of Dire Dawa is undergoing rapid expansion. The key priority at the current time is the completion of the certification process in the 38 rural *Kebeles*, hence the need for surveyors and GIS experts to demarcate and register properties and the need for land lawyers to legitimize the holdings rights created due to urban expansion. One can only presume that these lawyers are intended to come from the private sector since they are not listed as a priority in the labor demand estimate. A second priority is land information experts in order to properly capture and organize the land information, thus also necessitating the LIS experts for data entry and retrieval. Land administration experts will be needed to provide continuous services for customers on land transactions while land use managers are to provide technical services for the communities in optimal use of their lands.

3.4.2.10.2 Daily Office Transactions at the Woreda Level

The current LA services offered in Dire Dawa are handling approximately 3 transactions daily at the *Woreda* level, or six transactions daily between the urban and rural *Woredas*. This demand for services will no doubt increase as the land certification process is completed and as the urban population expands. The city administration currently has 8 of 12 posts filled but much of the LA transactions currently taking place are “off the books,” so to speak, since clear leases are not yet available. A projection of 49 additional staff in the next five years to complete the certification process and to handle the increased LA traffic does not seem unreasonable.

3.4.2.10.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

There are 35,000 total parcels estimated for the city administration. The land certification process has not yet begun in the region. The city administration projects that it is capable of producing seven parcel records per day. Given that there are 35,000 parcels in the jurisdiction, it would take approximately four survey teams, consisting of five people, five years, working 260 days per year, to complete the certification of all 35,000 parcels. Assuming that each survey team consist of five personnel, to survey, encode, register, and verify the records for each parcel, the total personnel needed to complete the certification process alone (not taking into account the need for other LA transactions)

Table 14: Demand Estimate for Dire Dawa Independent City Administration

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (note: this is in addition to existing personnel)		
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	1	1	0	0	0	0	0	0	1	15	0	0
2	Land / Real Estate Appraisers and Tax Specialist	0	0	0	0	0	0	0	0	0	0	0	0
3	GIS = Geographic Information System with generic spatial analytical functions,	0	0	0	0	0	0	0	0	0	2	4	0
4	LIS = Land Information System including relational data base and cadastral information linkage	0	0	0	0	0	0	0	0	0	6	4	0
5	Land Use Managers (Land Conservation, Environmental Planners)	7	0	7	0	6	0	6	0	1	13	0	0
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	0	0	0	0	0	0	0	0	0	2	0	0
8	Land Administration Technicians	0	0	0	0	0	0	0	0	0	0	18	20
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	1	0	0
10	Land administration experts(land admin, valuation, registration, investment etc.)	4	2	2	0	2	0	2	0	2	10	5	0

would be a total of 20 additional staff. This is in line with the city administration’s estimates for surveyors (10), GIS technicians (6), and LIS technicians (5).

3.4.2.5 Demand Estimate of the National Urban Land Administration Sector

In addition to regional surveys, and the city administration of Dire Dawa, the second data collection produced a demand estimate from the National Urban Land Administration under MoUDHC. The Ministry focuses on infrastructural development and service delivery systems. Job creation for urban residents is among the highest priorities for this development and the land certification process is intended to produce the confidence in land security and property ownership necessary to create a favorable economic climate. The Ministry aspires to create a transparent system of land administration that prepares and supplies land for private lease in order to meet the demand for commercial and social services. The system is based on land certification processes that “guarantee citizens’ right to own, sell, exchange, and transfer to others”³⁰the properties in their possession. The Ministry is in the process of implementing a modern cadaster land management system in order to establish land ownership and use, thus encouraging private home

Table 15: Number of Cities over 20,000 and 50,000 in Census Years³¹

Region	Cities in 1984*		Cities in 1994		Cities in 2007		Cities Currently on MoUDHC Web Site with Own Administration ³²
	Over 20,000	Over 50,000	Over 20,000	Over 50,000	Over 20,000	Over 50,000	
Tigray	1	1	5	1	10	3	12
Oromiya	7	3	17	4	32	8	36
Amhara	5	3	7	3	18	7	13
SNNPR	4	0	7	1	18	5	19
Gambella	0	0	0	0	1	0	1
Benishangule - Gumuz	0	0	0	0	1	0	6
Harari	1	1	1	1	1	1	1
Dire Dawa	1	1	1	1	1	1	1

³⁰Ministry of Urban Development, Housing & Construction (2014). Retrieved from http://www.mwud.gov.et/web/guest/home?p_p_id=56_INSTANCE_Dq58&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_pos=2&p_p_col_count=4&page=3 on December 31, 2014. Current web site numbers have been added.

³¹Schmidt, E., Kedir, M. (2010). *Urbanization and Spatial Connectivity in Ethiopia: Urban Growth Analysis Using GIS*. Addis Ababa: Development Strategy and Governance Division, International Food Policy Research Institute – Ethiopia Strategy Support Program 2.

³²Ministry of Urban Development, Housing & Construction (2014). Retrieved from http://www.mwud.gov.et/web/guest/home?p_p_id=56_INSTANCE_Dq58&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_pos=2&p_p_col_count=4&page=3 on December 31, 2014. Current web site numbers have been added.

Addis Ababa	1	1	1	1	1	1	1
Somali	1	0	4	1	5	1	5
Afar	0	0	0	0	0	0	1
Total	21	10	43	13	88	27	96
* In 1984, Ethiopia considered Eritrea as a region of Ethiopia and reported Asmara (total population 281,110), Keren (26,339) and Assab (32,457) as Ethiopian cities over 20,000 population. We do not include those cities in this table.							

ownership. The Ministry gives oversight to the certification of all urban areas in Ethiopia, consisting of 20,000 inhabitants or more, as well as a number of smaller urban villages, and Addis Ababa’s ten sub-cities.³³ Table 15 shows the growth in the number of urban areas since 1984 through the latest census (2007). In Table 16, the estimate by officials at the Ministry are listed.

3.4.2.5.1 Rationale for Estimates

The numbers contained in the Table refer to the labor demand needed for the national effort to certify urban parcels under the supervision of the MoUDHC. Although these are federal estimates, the actual task of surveying and certifying parcels is the responsibility of the respective city administrations. Some urban areas are further ahead than others in this effort. As of the writing of this report, for example, officials at the city government of Addis Ababa, the largest Ethiopian urban area, stated that “Certificates are not yet produced. The adjudication program for 20,000 parcels, which are distributed over the city, is [in] a stage of boundary demarcation. The Agency has already planned to produce 60,000 certificate [by] July, 2015.”³⁴ Likewise, city administration officials at Dire Dawa indicated that the certification process had not yet begun in their city. One can only assume that the process is equally not started in the smaller urban areas. According to MoUDHC officials, the steadily increasing number of professionals from the five year to the twenty year mark is a function of the rise in the rate of urbanization, which is forecast to grow from the current 18% of the total population to a total of 30% by the year 2025. The officials also pointed out that there are clear gaps between labor supply and demand around several of the key LA professional positions. The current GTP (GTP-II) calls for the modernization LA services in 91 large- and medium-sized cities. The numbers included in this estimate are an attempt to take into account the anticipated workload associated with the GTP. The numbers were generated as part of a process to identify the required investment needed in technical and vocational training schools to meet the anticipated demand as a result of a contract between MoUDHC and ECSU for a land sector human resource requirement assessment and curricular development. The estimates for the coming 10 years and 20 years are projected based on extending the land administration modernization service to and 400 cities that are projected to grow to more than 10,000 in the next 10 year, and an additional 1,020 that will reach that benchmark in the next 20 years.

³³Ethiopia Ministry of Urban Development, Housing & Construction (2014). *Second Urban Local Government Development Program 2014/15 To 2018/19: Program Operations Manual*. Volume I. Addis Ababa: Ministry of Urban Development, Housing & Construction

³⁴Correspondence dated November 13, 2014, with representatives in the Integrated Land Information Management Systems Development Project Coordination Office, City Government of Addis Ababa.

Table 16: MoUDHC National Labor Demand Estimate for Urban Certification

	Professions	No. of Posts Permitted	Education Level Required			No. of Posts Filled	Education Level Required			Gap	Future additional demands in: (note: this is in addition to existing personnel)			Total
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yrs	10 yrs	20 yrs	
1	Land surveyors (parcel and cadastral surveys)	2923	874	749	1300	1600	48%	46%	59%	1323	3461	4326	7570	15,357
2	Land/real Estate Appraisers and Tax Specialist	886	120	295	471	83	79%	18%	3%	303	2103	2628	4599	9,330
3	GIS+ Geographic information System with generic spatial analytical functions.	1445	395	580	470	538	24%	67%	9%	609	2374	2967	5192	10,533
4	LIS= Land information System including relational data base and cadastral information linkage	931	285	356	290	25	27%	60%	13%	906	2372	2965	5188	10,525
5	Land use Managers (Land Conservation Environmental planners)	273	74	97	102	0	67%	23%	-	273	716	989	1566	3,271
6	Land Use and City Planners	2490	0	1055	1435	1344	0	88%	12%	1146	3408	3750	6562	13,720
7	Land property Lawyer	1441	164	590	687	20	47%	6%	1421	3720	4650	8137	12,787	
8	Land Administration Technicians if any please specify below	1869	1869	0	0	0	0	0	0	1869	4893	6117	10704	21,714
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Land Administration expert	763	763	0	0	0	71%	29%	0	763	1999	2498	4372	8,869
	Total													106,106

Table 17: Ethiopia Population Estimates 2015, 2020, 2025, 2035³⁵

Year	Population	Yearly % Change	Yearly Change	Migrants (net)	Median Age	Fertility Rate	Density (P/Km ²)	Urban Pop %	Urban Population	Country's Share of World Pop	World Population	Global Rank
2015	98,942,102	2.58%	2,369,364	-12,000	18.6	4.59	90	18%	17,872,901	1.35%	7,324,782,225	13
2020	111,521,378	2.42%	2,515,855	-12,000	19.9	4.01	101	20%	21,931,794	1.45%	7,716,749,042	12
2025	124,536,983	2.23%	2,603,121	-12,000	21.4	3.52	113	22%	26,904,970	1.54%	8,083,412,759	11
2035	150,731,402	1.83%	2,612,339	-12,000	24.3	2.85	136	27%	40,052,348	1.72%	8,743,446,952	9

³⁵Based on United Nations Department of Economic and Social Affairs, Population Division estimates found

3.4.2.5.2 Daily Office Transactions at the Woreda Level

According to officials at the Ministry, while the land property adjudication process is underway, urban centers with population size of 10,000 or more can expect to handle a minimum of 50 to 100 cases a day. Once the land property right adjudication process is completed and property residents hold a land tenure certificate, the normal service on property transaction for cities of 10,000 is expected to be to 10 – 20 clients per day. This does not include building permits, however, which accounts for most of the office traffic in urban center

3.4.2.5.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

Ministry representatives estimated that one surveying crew (consisting of four crew members) can survey twelve parcels per day. For the city of Addis Ababa, for example, with a total of 359,897 parcels according to the latest update of the statistical cadastral records,³⁶ it would take 23 survey crews five years to complete the survey of the city of Addis Ababa. If each team consists of four persons, as they suggest, that would imply a total of 92 surveyor team personnel for the city of Addis Ababa or 23 surveyors, 23 encoders, 23 registrars, and 23 of a fourth function that was not identified. It is unknown how many urban parcels there are on the national level. We could, perhaps, make rough estimates based on the number of persons per parcel in Addis Ababa and then extrapolate those ratios to the national level. Thus, for example, using data and projections from the United Nations Department of Economic and Social Affairs, Population Division (UNDESAPD),³⁷ we can estimate the urban population over the next five years (see Table 17), and then use those numbers to estimate the number of parcels and, accordingly, the number of survey teams and personnel needed in order to complete the certification process. Using these estimates to develop population to parcel ratios, we can project the following estimated survey labor demand based on survey productivity estimates (see Table 18). According to UNDESAPD, the current population of Addis Ababa is 2,929,626. Dividing this number by the number of known parcels renders a population density of 8.1 persons per parcel.³⁸ Although this might seem high in a purely residential context, it should be remembered that the number includes multi-family dwellings. Likewise, we know, for example, that Dire Dawa had a total population of 341,834 living on 35,000 parcels of land. This renders a density of 9.7 person per parcel. Assuming that Addis Ababa and Dire Dawa are representative of person to parcel ratios in the rest of Ethiopia's urban areas, that the average survey team consists of four persons, that average team productivity

³⁶Zein, T., Hartfiel, P., & Berisso, A. Z. (2012). *Addis Ababa: The Road Map to Progress through Securing Property Rights with Real Property Registration System*. Washington DC, April 23-26: World Bank Annual Conference on Land and Poverty. Washington DC, April 23-26.

³⁷Worldmeters (2014). "Population." Retrieved from <http://www.worldometers.info/world-population/ethiopia-population/>.

³⁸This number is comparable to data available from Rwanda's persons to parcel ratio in the city of Kigali, which is 5.6. Rwanda, however, has fewer multifamily dwellings than Addis Ababa, as is reflected in differences in population density as well (5,165/1,600 km²Addis Ababa/Kigali). Sagashya, D., & English, C. (2009, March). Designing and establishing a land administration system for Rwanda: Technical and economic analysis. In *Proceedings: Land governance in support of the Millennium Development Goals: Responding to new challenges*. Washington. FIIG–World Bank Conference (pp. 9-51).

is 12 parcels per day, and that UNDESAPD population estimates are accurate, we get the following results for surveyors needed for the urban sector:

Table 18: Number of Survey Teams and Surveyors Needed to Complete Urban Parcel Surveys Based on UN Population Estimates

Year	Urban Population Estimate	Percentage of Total Population	Parcel Estimate (based on Addis Ababa/Dire Dawa ratios)	Survey Team Estimate for Five Year Survey Completion	Total Number of Surveyor Team Members for Urban Certification Estimate
2015	17,872,901	18%	2,008,191	129	515
2020	21,931,794	20%	2,464,246	158	632
2025	26,904,970	22%	3,023,030	193	775
2035	40,052,348	27%	4,500,264	288	1,154

These numbers are significantly lower than the estimates provided by the Ministry. For example, at the five year mark, the Ministry estimates a total of 3,461 in addition to the existing 1,323 already employed. This would mean that the Ministry estimates a total labor demand for 4,784 at the national level in the next five years. It must be remembered, however, that the Ministry’s estimates take into account all services provided by the urban LA agencies and not just the certification process. For that reason, the numbers provided by the Ministry are naturally larger than those based on survey productivity estimates alone.

3.4.2.6 Demand Estimate of the National Ministry of Agriculture

The final demand estimate received as part of the second data collection effort was from the MoA, LAUD officials. This Department has oversight responsibility for administration and use of rural land in Ethiopia. The conversations with the department revolved around labor needs and we were able to glean much useful information. The department itself does not do labor estimates for the regions. The estimates included below represent only the demand within of the MoA, LAUD. The responsibility for generating regional estimates falls to the regions themselves. There is not much notable about these estimates, except that they are very limited in comparison with regional needs. The Department does not itself retain many surveyors. There is currently only one surveyor on payroll at the department, and that need will increase to only six in year five, nine in year ten, and eleven in year twenty. The greatest demand for the department is for land use managers at seven (of which five are already filled). This demand will increase to 18, 30, and 32 in the fifth, tenth, and twentieth year respectively. The other point of demand is for LA experts in the area of registration and valuation. This demand, currently stands at eight (of which six are filled), but will expand to 11, 14, and 15 in the fifth, tenth, and twentieth year respectively.

Table 19: Demand Estimate for Federal Ministry of Agriculture

No.	Professions	No. of Post Permitted	Education Level Required			Posts filled	Educational Level Required			Gap	Future Additional Demands in:(note this is in addition to existing personnel)		
			Diploma	BSc/BA	MSc/MA		Diploma	BSc/BA	MSc/MA		5 yr	10 yr	20 yr
1	Land Surveyors (parcel and cadastral surveys)	1	0	1	0	1	0	1	0	0	5	3	2
2	Land /Real Estate Appraisers and Tax Specialist	1	0	1	0	1	0	1	0	0	1	2	2
3	GIS=Geographic Information System with Generic spatial Analytical functions.	3	1	2	0	2	1	1	0	1	2	2	1
4	LIS=Land Information System including Relational data base and Cadastral Information Linkage/RS	2	0	2	0	0	0	2	0	2	1	2	2
5	Land Use Managers(Land conservation ,Environmental Planners)	7	0	7	0	5	0	3	3	2	11	12	2
6	Land Use and City Planners	0	0	0	0	0	0	0	0	0	0	0	0
7	Land Property Lawyer	2	0	2	0	1	0	1	0	1	1	2	1
8	Land administration technician	0	0	0	0	0	0	0	0	0	0	0	0
9	Information technology & web site data encoder expert	0	0	0	0	0	0	0	0	0	0	0	0
10	Land administration Expert/registration, valuation	8	0	8	0	8	0	6	2	0	3	3	1

3.4.2.6.1 Rationale for Estimates

Officials at LAUD expressed their assumption that, based on sector trends, the demand for the number of experts in all professions would rise over the next twenty years. They cited the fact that over the next five years, approximately 48.5 million parcels will be surveyed and registered. In addition, government mandated land use plans are currently being prepared, which will in turn require increased hiring in the sector of all types of LA professionals. The increasing demand will taper off, however, as the certification and land use planning processes come to an end. The only remaining processes at that point will be the maintenance, updating, and revision of the LA systems that have been established.

3.4.2.6.2 Daily Office Transactions at the Woreda Level

Since the LAUD does not handle land transactions at the *Woreda* level, officials did not offer an estimate for this area.

3.4.2.6.3 Surveyor Team Productivity Estimate and Remaining Unsurveyed Land

Although the LAUD does not itself do surveying in conjunction with the certification process (this is the jurisdiction of the regions and urban areas), it has collected estimates on the amount of land that remains to be surveyed under its jurisdiction (rural and suburban areas) at the national level. During a visit made to LAUD offices in August, 2014, LAUD officials shared that current estimates of unsurveyed land at a national level were at more than 50,000,000 total parcels in rural and sub-urban properties, of which only 1.5 million have been certified at level 2 and, of those, only 500,000 have been registered. In closing this gap, LAUD works closely with LA oriented projects supported by international funding agencies, such as REILA, to determine survey team productivity levels and make projections regarding the certification process.

Based on estimates from four REILA project pilot programs using orthophoto, and survey teams with three trained personnel (one parasurveyor, one registrar, and one encoder who is charged with digitally encoding the survey results), and at least one local land lease holder per team, teams were able to produce digitally encoded surveys at the rate of between 19 and 25 parcels per day. Digitization of those records were completed at an average rate of between 20 and 30 parcels per day (see Table 20). When compared with regional estimates, which range from 25 parcels per day for the SNNP region to 80 parcels per day for the Tigray region, we note that there are large differences that are most probably a result of differing survey techniques and different types of terrain (see Figures 3 and 4).

Table 20: Performance Data for REILA Project Field Pilots in Four Regions

Region	Parcels Surveyed Per Team Per Day	Peak Productivity Per Team Per Day	Parcels Digitized Per Team Per Day	Peak Productivity Per Registrar Per Day
Amhara	25	-	30	-
Oromiya	22	50	20	46
SNNP	19	38	25	-
Tigray	28	-	30	-

Using this productivity data, it is possible to make national estimates for number of surveyors and number of registrars needed to complete the registration process in five years for rural areas. These estimates do not, however, provide a realistic picture of the number of surveyors and registrars needed to complete the certification process in pastoralist areas since no methodologies have been identified as of yet and no data has been collected on these methodologies. Nevertheless, when using actual productivity data from REILA pilots and applying it to the data for remaining parcels to be surveyed, we

Figure 3: Example of Performance Data from REILA Pilots in the Oromiya Region (Mapping)

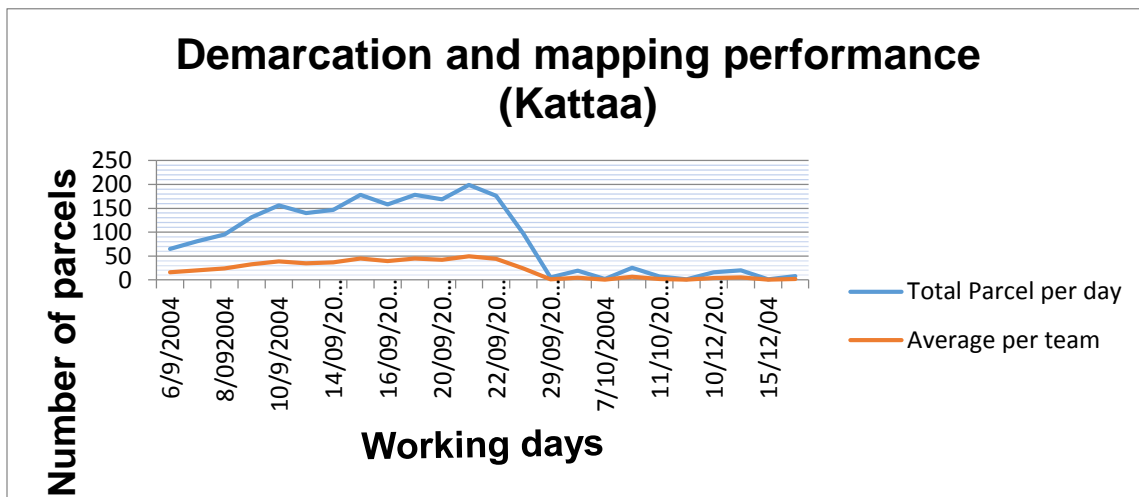
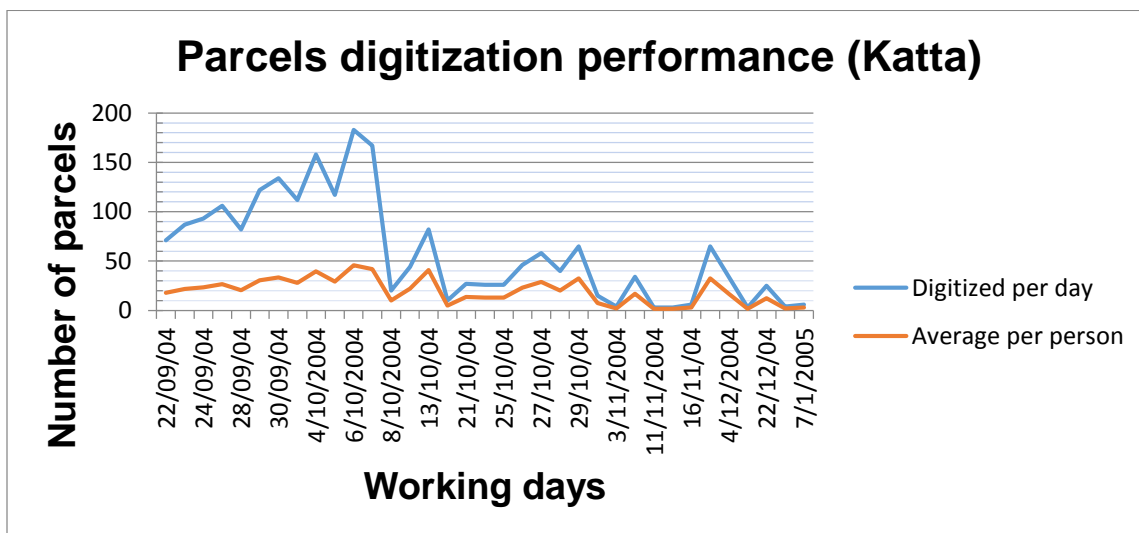


Figure 4: Example of Performance Data from REILA Pilots in the Oromiya Region (Digitization)



find the results displayed in Table 21. The table represents estimates based on a simple calculation dividing 50,000,000 parcels, by 22 parcels per day (the productivity average of

the three REILA pilots), by 260 work days per year (the number of works days in a year), and by the number of years needed to complete the surveying. As can be seen from Table 21, if the plan were to complete the surveying process in five years. It would require 1,748 surveyors working 260 days a year with an average productivity rate of 22 parcels per day. This would, however, only represent the number of surveyors needed to complete the certification process in the next five years (it does not calculate the number of surveyors needed for other LA activities), and it gives the number of surveyors needed for rural and sub-urban areas only (it does not include an estimate for the number of surveyors needed for the urban certification process).

Table 21: National Labor Demand Estimates for Surveyors, Encoders (GIS/LIS Trained Technicians) for Rural Sector Based on REILA Survey Team Productivity Estimates

	Number of Surveyors Needed	Number of Encoders Needed	Number of Registrars Needed
If completed in five years	1,748	1,748	1,748
If completed in ten years	874	874	874

3.4.3 Summary of Regional and National Survey Results

In this section we will first summarize the labor demand estimates by the regions and Ministries. We will then compare these with the labor demand estimates generated by the productivity data. In conclusion we will attempt to give a national estimate for national labor needs in the next five, ten, and twenty years.

After the completion of the second stage of data collection we felt that we were in a better position to make national estimates. As noted above, based on the data, national estimates could be calculated in a number of ways. The labor demand estimates collected from the regions and Ministries give a fairly clear picture of what the LA agencies believe will be the level of demand for the nine regions and the one independent city administration from which the data was collected, in the urban LA sector, and at the MoA, LAUD. They do *not*, however, include other public sector (e.g., infrastructure construction such as roads and railways, powerlines, and sewage) or private sector demand (such as residential and business construction and real estate). It is possible to estimate national demand in the LA sector by extrapolating data from the nine regions, one independent city, and two ministries, but it is not possible, based on the data that has been collected for this report, to estimate the other public sector or private sector demand. For that reason, the estimates that we make in this section are to be taken with a certain reserve, given that we know from the interviews that were undertaken that there is strong competition from these other sectors for personnel trained in LA technical and professional skills.

Table 22: Aggregate Rural Sector Demand Estimates Based on Data from Nine Regions and MoA LAUD

Position	Current levels	Estimated Additional Demand in 5 Years	Estimated Additional Demand in 10 Years	Estimated Additional Demand in 20 Years	Total Demand in 20 Years (excluding existing personnel)
Land Surveyors (parcel and cadastral surveys)	359	4,332	2,606	1363	8,301
Land / Real Estate Appraisers and Tax Specialist	65	101	352	702	1,155
GIS = Geographic Information System with generic spatial analytical functions,	80	687	823	858	2,368
LIS = Land Information System including relational data base and cadastral information linkage	170	467	561	730	1,758
Land Use Managers (Land Conservation, Environmental Planners)	677	1,309	1,355	1,778	4,442
Land Use and City Planners	0	0	0	0	0
Land Property Lawyer	344	625	958	1,323	2,906
Land Administration Technicians	2,680	3,527	7,432	3,888	14,847
Information technology & web site data encoder expert	15	54	44	37	135
Land administration experts (land admin, valuation, registration, investment etc.)	1,170	1,686	1,515	1102	4,303
Total	5,569	12,788	15,646	11,781	40,215

Table 23: Combined Urban and Rural Sector Demand Estimates

Position	5 yr	10 yr	20 yr	Totals
Land surveyors (parcel and cadastral surveys)	7,793	6,932	8,933	23,658
Land/real Estate Appraisers and Tax Specialist	2,204	2,980	5,301	10,485
GIS+ Geographic information System with generic spatial analytical functions.	3,061	3,790	6,050	12,901
LIS= Land information System including relational data base and cadastral information linkage	2,839	3,526	5,918	12,283
Land use Managers (Land Conservation Environmental planners)	2,025	2,344	3,344	7,713
Land Use and City Planners	3,408	3,750	6,562	13,720
Land property Lawyer	5,275	9,095	1,323	15,693
Land Administration Technicians if any please specify below	8,420	13,549	14,592	36,561
Information technology & web site data encoder expert	54	44	37	135
Land administration experts (land admin, valuation, registration, investment etc.)	3,685	4,013	5,474	13,172
Totals	38,764	50,023	57,534	146,321

to these estimates, there will be ongoing demand driven by new areas of need. Most of this increasing demand is driven by the urban estimates. As can be seen from Table 22, the aggregate demand for the rural LA sector over the next twenty years is estimated to reach only 40,251 additional personnel, compared to 106,106 estimated additional personnel for the urban sector. In other words, the urban sector in the next twenty years will require more than triple the number of LA personnel required for the rural sector according to these estimates. Second, the greatest demand area is for LA technicians, although this demand will grow over the next twenty years and is more related to the implementation of the new LA system, which is only in its beginning stages in many regions and urban areas. Third, total aggregate demand over twenty years is estimated at 146,321 (excluding existing personnel). This would indicate annual targets of approximately 7,316 personnel. The individual training needs broken down by year are represented in Table 24. It is not entirely clear, however, whether this demand estimate includes the private sector and other competing public sector entities like road construction and other infrastructural efforts that would draw LA personnel out of the LA sector and into other sectors.

As can be seen from Table 23, the greatest demand for trained professionals in the LA sector in the coming twenty years is for land surveyors and land administration technicians, although this could overlap with some of the other positions described, for example, GIS and LIS trained technicians as well as data encoder experts. Nevertheless, it is clear that first order technical skills are already in high demand, as the number of unfilled posts imply, and the need is urgent in order to construct the efficient LA administration structure the GTP envisions. From this information it is easy to predict, based on these estimates, what the training needs would be in terms of annual targets (see Table 24). In order to meet the 20 year estimated demand for the urban and rural sectors, it would require training a total of 7,316 per year in the various areas. When we consider, however, that approximately half of those could potentially involve training parasurveyors to complete the certification process, the demands on the formal education and training system (TVET and university programs) would be between 6,000 per year in the other professional areas. This certainly seems like an achievable figure even within the parameters of the existing educational capacity in Ethiopia.

Table 24: Annual Training Targets by Position Based on Urban and Rural Sector Demand Estimates

Position	Total Demand in 20 Years	Annual Training Targets to Meet Demand
Land Surveyors (parcel and cadastral surveys)	23,658	1183
Land / Real Estate Appraisers and Tax Specialist	10,485	524
GIS = Geographic Information System with generic spatial analytical functions,	12,901	645

LIS = Land Information System including relational data base and cadastral information linkage	12,283	614
Land Use Managers (Land Conservation, Environmental Planners)	7,713	386
Land Use and City Planners	13,720	686
Land Property Lawyer	15,693	785
Land Administration Technicians	36,561	1828
Information technology & web site data encoder expert	135	7
Land administration experts (land admin., valuation, registration, investment etc.)	13,172	659
Total for urban and rural LA sectors	146,321	7,316

3.5 Cross-cutting Issues

The following major points are consolidated from the survey results and group discussions and key informant interviews on cross-cutting issues.

3.5.1 Challenges in Land Administration

A commonly mentioned challenge in LA program and in all study regions is the lack of advanced equipment such as GIS facilities and Aerial Photo (Orthophoto) maps for urban areas (scale 1:2000).³⁹ A problem mentioned by Haramaya University discussants is the lack of trained instructors, cadastral surveyors, GIS and photogrammetry experts. Some of the professionals with B.Sc. and Diploma in drafting and surveying have moved to the Urban Construction Bureau, the Road Authority and private firms for better pay.

It is suggested by the discussants that in order to keep experienced workers, a more competitive salary might be needed and to provide short-term re-training to increase staff retention rates. It should be noted that a relatively high staff turnover was identified by various sources as contributing significantly to manpower shortages. The other option would be to work on the supply side, providing sufficient numbers of trained workers so that competition for positions increases and the willingness to work in lower paying government positions as well as to live in more remote areas also increases.

3.5.2 Certification and Taxation

Property appraisers and tax revenue specialist are badly needed to determine real estate values and equitable taxation rates, and to generate a sustainable revenue stream that can support national LA. Land appraisers are also important to determine collateral loan values

³⁹ While aerial photos are valuable for depicting terrain in relief, they cannot be used for accurately measuring surface distances. For such needs, orthophotos, digitized versions of aerial photos from which relief has been removed, are needed. Orthophotos have uniform scale and therefore serve as the base over which maps of various types can be overlaid.

and to resolve legal disputes. Introduction of a fair and appropriate taxation system requires highly trained professionals.

It is noted that regional land use and property rights regulations are needed on the question of compensation, definition of family members, real estate valuation and good governance. To date, land regulation is restricted to Amhara, Oromiya, SNNPR and Tigray and is expanding into other areas. In this regard, international and local expertise needs to be consulted. It is also noted that lack of reliable registration records tends to discourage potential investors and holds up land transactions. In the absence of reliable registration records, uncertainties over the legal status of land rights usually have to be resolved by time-consuming case-by-case investigation and agreements, which often incur lengthy negotiations.

Due to the shortage of specialists in LA, land development, land valuation, infrastructure etc., LA and management in Addis Ababa is done by other, un-related professions such as chemists. Professionals (e.g. cadastral surveyors) are often quitting the work and move to other organizations for better salaries.

In Oromiya, 99% of the households have obtained 1st level certificates, while 20% obtained 2nd level certificates in 16 *Woredas* using hand-held GPS, aerial photo-based large scale maps and surveyors. The major constraints mentioned here is the lack of skilled professionals in cadastral surveys, map reading (geo-references) photogrammetric and handling equipment such as Large Scale GPS, Total Station, etc.

A point repeatedly made by respondents is that most LA-related graduate professionals are more theoretically-trained than practical. Some even lack the basic skills of GIS, data processing and surveying. It is frequently emphasized that more professionals are needed for cadastral surveying, GIS and valuation, conflict resolution and conflict management skills. Training in urban and rural LA has not been given in Oromiya, as anticipated. One of the reasons for the lack of the training is the shortage of well-trained/qualified and practically-oriented instructors and necessary equipment.

3.5.3 Land-use Conflicts and Infrastructural Needs

Discussions observed that a considerable proportion of litigation cases associated with land use conflicts are resolved through courts, whereas the rest is determined through community elders. A key employer also pointed out that due to high land prices and the high cost of infrastructure such as roads, electricity, water supply, treatment, and storage facilities, there is relatively low demand for construction in spite of an on-going need to develop infrastructure. Lack of adequate public LA is a major constraint in the timely development of infrastructure to accommodate private sector investments. For the real estate sector, availability of surveyors and equipment are not major problems as significant number of staff move from government to the private sector for better payment.

Most universities in the country provide basic technical training, but lack the practical orientation and capacity to train an adequate number of professionals in LA. Property value appraiser offices have not yet been established in sub-cities, and the work is done by others on a limited contractual basis. Job demand assessment is a key requirement in planning for the development of the training capacity of universities and other training centers.

Under GTP, attempts are being made to implement a program in Urban Land Administration. The major challenge is the chronic scarcity of highly skilled professionals (e.g. planners, civil engineers as well as graduates with in depth qualifications and practical experience in LA). Some related issues and problems identified by respondents are outlined, below:

Land administration is a new program for Ethiopia and is needed to facilitate accurate parcel boundary demarcation and registration, to provide legal certification based on government regulations and to introduce the appropriate taxation system. It is also believed that Land markets serve an important function in allocating land to its best uses and better operators. There is a need for participatory local development planning combined with the appropriate expertise. For instance, in order to introduce systematic land demarcation and registration plans for 23 towns, stronger cadastral surveyors, land lawyers, IT and GIS experts have to be made available through appropriate training. In general, highly skilled professional trained at university level are needed for advanced LA and planning;

In this regard, graduates are expected to:

- operate and maintain surveying equipment;
- conduct advanced GPS data collection and carry out cadastral surveys;
- perform and manage advanced surveying computations; are able to interpret engineering drawings, conduct engineering surveys;
- develop subdivision design and surveys, undertake property and land surveys and develop procedures;
- conduct urban and rural land engineering surveying;
- interpret and analyze spatial and non-spatial data;
- perform adjudication for the legal cadaster, etc. In conjunction with these requirements, instructors should have satisfactory practical experiences or equivalent qualifications.

3.6 Limitations

In the conduct of this study, we made several assumptions. One is that a modernized LA sector will require trained professionals with at least a minimal knowledge of GIS/LIS technology and techniques. We are aware that there are other survey methods and archiving methods that do not require this type of training, but our estimates assume that the professional workforce of the future in LA will require a basic knowledge of these techniques and technologies.

Second, we assumed that each region was aware of the mandate for a new structure in LA that recommends official representation at the *Kebele* level and that this new structure factored into the estimates they submitted. We were able to get independent verification of this assumption through some of the qualitative interviews conducted with regional representatives, but this information was anecdotal and may not have been true in all cases. As of 2004, the only recent estimate to which we have access, there were approximately 30,000 *Kebeles* in Ethiopia.⁴⁰ This corresponds well to the estimates for total number of LA technicians needed in order to meet the demand over the next 20 years (37,926; see Table 1). Given that the current number of LA technicians employed in the public LA sector is only 2,680, it seems fair to assume that this dramatic increase in demand for LA technicians is, in fact, driven by the inclusion of the demand generated by new structure. Under the circumstances, we are confident that the regional representatives took the new structure into account when making their estimates.

In the conduct of this study we met with several limitations that bear mentioning here. First, it was not possible to get accurate figures on private sector LA labor demand nor were we able to find data on the demand generated by other public Ministries. In the case of the private sector, we were also unable to get a good sense of what kind of education and training might be taking place under their auspices. This study was intended to be an assessment of public LA sector labor demand for professionals trained in various aspects of LA, and so private sector demand and the demand of other public Ministries technically falls beyond the scope of this study. Nevertheless, it would have been useful to know what pressures these two other sources of labor demand would put on the public LA sector labor demand. For example, there is overlap in the demand for surveyors in all three sectors. We had anecdotal information through our interviews that this cross-sectorial demand was making it difficult to retain surveyors in the public LA sector because of higher wages, better working conditions, and more benefits in other sectors. We found, however, that it was impossible to quantify this demand without another thorough study. It would still be well worth investigating, but it unfortunately falls beyond the scope of this study.

Another evident weakness in the current study is that we had to rely on the regional and ministerial authorities to make accurate estimates of the future demand for labor in their jurisdiction. Although these authorities were in the best position to make these estimates, nevertheless, the estimates are based on professional judgment and not on scientific calculations. Whether such scientific calculations are even possible remains to be seen.

A further difficulty in the collection of data is that there has not yet been defined a strategy for defining the boundaries of traditionally pastoralist areas. The defining of pastoralist areas is fraught with complexity. As a recent USAID-sponsored study noted,

⁴⁰Shinn, David H., Ofcansky Thomas P. (2004). Kebele. In: Shinn, D. H.; Ofcansky T. P. (eds.): *Historical Dictionary of Ethiopia*. Lanham, Maryland et al., pp. 237-238.

not only are there traditional land use claims, there are also “secondary customary and contractual rights of access to resources, for instance, rights of way held under custom by neighboring communities, and negotiated rights of access to neighbor’s land.”⁴¹ Until such a strategy is defined, it will be difficult to attach exact numbers to these efforts to define and manage land rights among the pastoralist communities. We assume that such future efforts were taken into account in the estimates made by the various regions, but whether such estimates are accurate is unknown. Given the size of the land area devoted pastoralist communities, traditional ground based survey methods would be impossible. It is more likely that such areas will be defined using satellite or aerial technology, which means that the manpower demand will change the overall demand minimally.

This study also did not take into account current turnover rates for the public LA sector. In the qualitative interviews, representatives of the Amhara region estimated that their turnover rate was around 5-10% annually. If these numbers can be applied across the LA system, it would render a total estimate of between 153,521 and 160,831 total personnel.

Finally, the scope of this study did not allow us to pursue what we consider to be additional important pieces of information that would have required more time and effort to collect. These include the reasons behind the anomaly of the large number of graduates from the several LA academic programs at both the TVET level and the university level who are currently unemployed and the large number of posts in the public LA sector that remain unfilled. Why these two phenomena exist side by side is unknown. In the validation workshop that was held with public LA sector stakeholders, there was some conjecture that this was due to three factors, principally: 1) the lack of budget available to the regions to fill vacant posts, 2) the low salaries offered for posts in the public LA sector, and 3) outdated, stringent qualifications that make the posts uninviting to graduates. We were unable to independently confirm this information. We feel strongly, however, that it would be worthy of further analysis. Second, we were not able to confirm the number of graduates currently being produced at the TVET level and the university level for the LA sector. In spite of our best efforts, we were not able to acquire information on the number of TVET institutions currently offering LA related occupational standards nor were we able to confirm the number of students currently enrolled in LA related occupational standards or graduating from LA related programs. These figures would have allowed us to make more accurate estimates of the number of institutions and instructors that would need to be added to the system in order to meet the system demand. The current estimates in the report were acquired by extrapolating the number of estimates of the average number of students in TVET programs and from the average number of graduates from the university programs at BDU. Future studies should be conducted in order to determine these numbers more accurately.

3.7 Summary and Conclusion

In spite of these difficulties, it is nevertheless possible to say something about the next five years based on the data that has been collected and the estimates that have been made. We

⁴¹ Bruce, Ngaido, Nielsen & Jones-Casey, 2015, p. 6-7.

would suggest that the need can be divided into four orders of urgency based on national need. We would define that need, in order of urgency, as to:

1. complete the second level land certification process;
2. digitize and archive all certifications into a national database; based on national inventories,
3. begin a long-term process of land protection and management that will maximize land use and land preservation; and
4. build the capacity of and regularize the land appraisal, tax collection, and land adjudication structures and processes.

Given these four national priorities, we identify the following definable needs based on the estimates given:

- The largest single need is for surveyors, especially those with GIS/LIS capabilities. Given that government targets include second level certification within seven years, it is difficult to avoid the conclusion that this should be among the highest priorities. In addition, all the estimates placed the largest emphasis on surveyors and GIS/LIS specialists. It seems safe to conclude that this should be among the highest training priorities.
- GIS/LIS specialists who are in a position to process the results produced by an increased number of surveyors is also crucial. It would do little good to increase the number of surveyors and then create a bottleneck with the processing of records due to a lack of trained personnel. This means not only those who have GIS/LIS capabilities in the field, but also those in local and regional offices who are able to take the results and make them part of a national archive.
- A vision and culture of national land management needs to become part of the administrative structure of the EPLAUA. This requires advanced skills in land management, LA, land planning, and land protection. These higher level skills will take longer to produce, but form an important part of the national administrative structure.
- Support structure for the EPLAUA will be needed, including policy, legal, and educational experts. This will require specialized and advanced training in these areas.

With these assessed needs, we can now move on to the review of the curricular and institutional capacity to handle these needs.

4 Capacity and Gap Analyses

In this section we consider the existing state of the LA sector and its needs, as well as the existing state of the LA education and training system and its needs based on the results of the labor demand surveys.

4.1 Curricular Capacity Assessment

One of the objectives of this report is to assess the educational and training capacity of Ethiopian universities and TVET institutions to meet the current and future demands upon the country's LA system. This objective was accomplished primarily through a critical review of curricula, both national and international, and also through site visits at select institutions offering programs in various areas of LA. This section describes guidelines for assessing curricula based upon the demand study, analyzes current and proposed curricula, and identifies potential gaps between institutional training capacity and anticipated demands. The specific dimensions of the needed technical and professional expertise, as described in the previous sections, form the basis for assessing the existing educational and training system. Similarly, during site visits respondents made a number of suggestions to improve the effectiveness of educational programs. Taken together, the results of the demand survey and input from key stakeholders can be utilized to formulate guidelines for the curricula review and institutional capacity assessment. These guidelines, which are used here to assess the curricular and institutional capacity, are summarized as follows:

- there is a urgent need to address technical and professional needs for workers in employment fields identified as near-term, high-priority, such as, land surveyors, GIS/LIS specialists, real estate appraisers and tax specialists, land use managers, land use and city planners, university and college instructors, LA specialists, land property lawyers and LA technicians;
- programs must also address the professional capacity for workers in employment fields identified as high-priority over the long term such as land policy specialists;
- Perhaps, not quite so urgent, but necessary nonetheless, there is a longer-term need for training in highly needed areas, particularly policy related topics/issues, customary law, and land reform, as well as GIS application knowledge in development, and resource management (Appendix E: Table C17.1);
- it is incumbent to ensure that training is practice-oriented, not overly theoretical, which includes the use of internships, field practice, and other forms of experiential learning;
- at the same time, in order to meet the national development goals, it is important to ensure that there is financial and other forms of material support for practical needs training and field work, such as accommodation and transportation;
- in preparing for the long-term training needs, it is important to ensure that there are qualified, skilled instructors through a strategic program of human and institutional capacity building at the institutions that will be providing the training;
- in meeting future needs, it is vital to integrate land surveying and GIS knowledge and skills across the programs;
- given the needs in specific disciplines, preparations must be made now to introduce post-graduate training to enhance knowledge and skills.

4.1.1 Review of International Academic Program in LA and LA Related Fields

The LA education and training strategy positions itself in a global academic community and, while responding to local needs, also does well to inform itself through the experiences of the international community. In this section we give an overview of the existing international LA related academic programs and give an analysis of the key foci in international LA training and education. We reviewed many vocational courses in LA related skill areas, undergraduate LA programs from the Technical University of Kenya, the Cambodia Royal University of Agriculture, the Universiti Teknologi Malaysia, and the University of Botswana, and the Masters LA programs at the University of Wageningen, the University of Kathmandu, and the University of Twente.

4.1.1.1 TVET Programs

TVET programs are, by their nature, more skill oriented than theory oriented and therefore are very context specific, since the skills of any given market place can differ greatly even when the basic theoretical components are the same. Thus for example, although the theoretical mechanisms of air conditioning may be the same the world over, the specifics of a TVET qualifications framework for air conditioning repair will depend entirely on what brands dominate the market and what environmental conditions most affect air conditioning repair. While the biggest challenges in one context may be Freon depletion, in another they may be frequent power surges, brownouts, and/or blackouts. Comparing international TVET programs to those of Ethiopia is, therefore, of somewhat limited utility.

There is, however, a wealth of international TVET programs in specific technical skills related to land administration. Most of them focus on lower level technical skills, such as surveying, mapping, GIS, LIS, registry and archiving, just to name a few. Ethiopia currently has one of the most logically ordered and best defined LA sub-sector TVET designs of anything that is available internationally (see Figures 5 and 6). Ethiopian TVET programs include well-organized and well-structured training programs for both rural and urban LA training. In the case of the urban sub-sector, initiative was taken by the MoUDHC together with the ECSU to redesign the sub-sector (see Figure 5). The rural sector design went through an extensive review by sector stakeholders and has now become the basis for the ATVET programs at Assosa ATVET center. The programs are currently being offered and are being tested against sector needs. There is every indication, however, that these newly designed programs will fit the needs of the sector well.

Figure 5: Urban Land Development Sub-sector TVET Structure



A similar program design was carried out by REILA, drawing on national expertise, for the rural sector. It incorporates many of the same elements as the urban program, but is focused on the special needs of rural areas (see Figure 6). The program has already been implemented at the Assosa TVET program in Benishangule-Gumuz region. It has been suggested that the Ministry of Agriculture also use this program as a model for training potential ATVET instructors in the LA sector. Both of these programs compare well with international programs in the same area.

4.1.1.2 Undergraduate Education

There are a number of programs available internationally in LA and LA related fields (see Appendix F). In Appendix F, we have divided the courses into two tables. The first table describes the structure and content of academic programs in LA. The second table describes the structure and content of LA related programs, most of them specializing in a specific area of knowledge and skills within the broader field of LA. As can be seen from the programs there contained, there is great variety in the specific emphases in the programs, most of them reflecting their regional needs, no doubt. Nevertheless, all the

Figure 6: Rural Land Development Sub-sector TVET Structure



programs have one thing in common: a strong emphasis on GIS, LIS, and LA related technology. This is especially true for the new Masters of Science in Land Administration at the University of Twente, the Netherlands, where the first four courses are:

- Theory of GIS and Remote Sensing;
- Tools for GIS and Remote Sensing;
- Techniques for GIS and Remote Sensing;
- GIS and Remote Sensing in Land Administration.

Since the harmonization of the LA program curriculum at BDU, Haramaya University, and Woldia University, this is now also reflected in the LA undergraduate programs of Ethiopia as well.

4.1.1.3 Graduate Programs

There are, in fact, surprisingly, very few graduate programs in Land Administration at an international level. Most of the graduate programs address more specific expertise within the LA sector. There are three international programs, however, specifically in LA: the program at the University of Wageningen (the Netherlands), the University of Twente

(the Netherlands), and the University of Kathmandu (Nepal). A brief review of these respective programs reveals that the program at the University of Wageningen is more focused on issues of land planning and land use, while the programs at the University of Twente and the University of Kathmandu are more focused on the technical side of land administration. Both the program at the University of Twente and the program at the University of Kathmandu are notable for their heavy emphasis on GIS/LIS capability. The first four courses in the curriculum at the University of Twente are Theory of GIS and Remote Sensing; Tools for GIS and Remote Sensing; Techniques for GIS and Remote Sensing; and GIS and Remote Sensing in Land Administration. A more explicit endorsement of modern techniques and technologies would be hard to imagine. Somewhat more muted, but still very prominent, are GIS/LIS related courses at the University of Kathmandu. Here too the first five courses are: Geo Information Technology and Land Administration; Principles of GIS; Principles of Remote Sensing; Database and Geoinformation; Modeling for LA; and Land Information System; Data Handling Technologies. Here too cutting edge technologies are the core of the curriculum. Clearly, modern LA systems will need to assume the use of GIS/LIS in their structure and implementation.

4.1.2 LA Education and Training Programs in Ethiopia

For this report we reviewed the curricula of three programs at four universities offering courses of study in or related to LA. Additionally, this study reviewed the TVET model curricula based on occupational standards provided by local consultants for eight modules related to LA. It is unclear to what extent the TVET programs have been implemented, either in terms of number of programs, program locations, number of students currently enrolled, or system capacity. Tables 25 below summarizes the curricula reviewed. The curricula are described and reviewed according to the three educational levels represented: graduate programs, bachelor programs, and TVET programs.

Table 25: List of Reviewed University Curricula

Institution	College / Institute	Program Level	Program Name	Page Length
Harmonized Curriculum of Bahir Dar University, Haramaya University, and Woldia University	Institute of Land Administration; College of Agro-Industry and Land Resource	B.Sc.	Land Administration	202
Ethiopian Civil Service University		B.Sc.	Surveying and Mapping	35
Bahir Dar University	Institute of Land Administration	M.Sc.	Land Administration and Management	106

4.1.2.1 Graduate Capacity and Programs

The one Masters of Science in Land Administration program available in Ethiopia is offered by ILA at Bahir Dar University. It was designed jointly with the Royal Institute of Technology, Sweden. The curriculum is comprehensive and up to date. Analysis of the demand survey and focus group interviews with key stakeholders provides an estimate of the short- and long-term needs for Ethiopia's LA system. As previously described, two kinds of demands emerged as high-priority in both the short- and long-term timeframe: (1) technical expertise (practical training on technologies and skills); and (2) professional expertise (additional theoretical training on foundational issues, as well as principles, and policies and, in some cases, including a research component). It is clear from the program catalogue that the programs is based on a thorough assessment of Ethiopia's training needs, including the consideration of input from various stakeholders, and a thorough understanding of Ethiopia's unique land credit markets. The program is divided into a general introduction to the principles and practice of LA and then is followed by three focus areas from which students can choose:

- Land Information Management Systems;
- Real Property Law;
- and Real Property Valuation.

No program can address all desired needs. Nevertheless, this M.Sc. program should be considered a model for the country. Its design is context-based and course descriptions are up to date. The Land Information Systems offers three modules which are specifically related to LIS training (see Table 26). The other critical gap identified in the LA Masters program is a course devoted to land use planning generally, rather than the current urban planning focus. Such a course should include sections specifically devoted to rural land use planning, especially since a large proportion of the country consists of rural areas.

Table 26: LIS Track in ILA M.Sc. LA Program

SN	Course Code	Course Name	Cr	Contact hours				CP
			Hr	L	L/P	T	HS	
1	LAMg1021	Fundamentals of Land Information System	3	2	2	0	4	5
2	LAMg2022	Advanced Geographic Information System	3	2	2	0	4	5
3	LAMg2023	Photogrammetry and Remote Sensing	3	2	2	0	4	5
4	LAMg2024	Land Registration and Cadastre Systems	3	2	1	1	4	5
Total			12					20

Although ILA has been able to provide a quality program with qualified staff, it is evident from the needs assessment that the offerings of graduate education must expand if Ethiopia is to meet its workforce needs in the next two decades. Among the specializations that should be under consideration for graduate programs are specializations in GIS and LIS, environmental protection, land policy and law, land economics, appraisal, and valuation systems, urbanization and urban development, civil engineering, and land information systems. The land policy and law programs should provide opportunity for specialization in tax policy. Given the chronology of needs in Ethiopia, at this stage it is probably best to maintain a single strong Masters program in LA rather than diluting it into several different specializations. This would have the advantage of providing a critical mass of Ethiopian trained land managers for the LA system. Such a critical mass would be foundational in creating the culture of LA within the government structures mentioned above. To this base could be added specialized programs at the doctoral level to address specific country needs.

Seeing that doctoral programs require major investments in qualified faculty and facilities, it would be in the best interest of Ethiopia not to attempt to develop these programs alone, but rather to make use of the assets available in foreign education and training systems. Perhaps the most efficient and direct route for advanced degrees is to send promising students to foreign universities in order to acquire the credentials they need. This, however, has two distinct disadvantages. First, the education is decontextualized. Foreign programs are designed for foreign contexts and although talented students no doubt have the ability to make the proper applications to their home context, it would be better to have programs that are designed with the domestic context in mind. Second, it increases the rate of non-return. Although such investments in human capital can be protected through agreements of service, such agreements can be ignored with little recourse on the part of the home government. Moreover, such students have been trained in and for a foreign context, which means that their market value in the host country most probably is considerably higher than it is in their home country. Even if such students return, the continuing allure of a foreign income is strong.

Another way to address the need is through programs developed jointly with foreign universities in developed countries. Such efforts should come after the existing curriculum and institutional capacity of the universities are thoroughly reviewed in order to avoid a simple “copy and paste” approach to curricular revision. Joint programs would have two advantages: First, they allow Ethiopian graduate students to benefit from cutting edge knowledge through world class education systems. Second, they allow for contextualization of program materials into the Ethiopian context. Two types of agreements could be pursued. Twinning agreements allow for foreign and domestic universities to develop programs jointly, with the majority of the training taking place at the domestic institution. The degree can be issued in the name of the home institution, the foreign institution, or both. This would entail bringing foreign instructors into Ethiopia to provide instruction as well as possibly sending students away for classes. In terms of efficiency, the former strategy would be preferred in order to reach the maximum number of students. The advantage of these programs is that the program design is typically done

jointly, between the institutions, in order to meet the needs of both institutions. A particular subset of twinning agreements are dual degree programs, whereby the institutions collaborate and the degree is issued in the name of both institutions. These have a slightly higher threshold of quality, however, in that they are often subject to the academic quality standards of the foreign institution. Another form of joint collaboration programs are commonly called sandwich programs, where the students begins his or her education at a domestic institution, does most of the course work at the foreign institution, and then completes the program, usually by doing in-country research, at a domestic institution again. These programs offer the best of both worlds.

It should be noted that the workshop recommendation to pursue sandwich programs for doctoral training is already in the process of being designed for Ethiopian universities through joint regional cooperation with the East African Land Administration Academic Network. A further description of these efforts is included in section 4.2.4.

4.1.2.2 Undergraduate Programs Capacity

This study reviewed three B.Sc. programs, which included two programs in LA and one in surveying and mapping.

4.1.2.2.1 B.Sc. Land Administration, Institute of Land Administration, Bahir Dar University, Haramaya University, and Woldia University

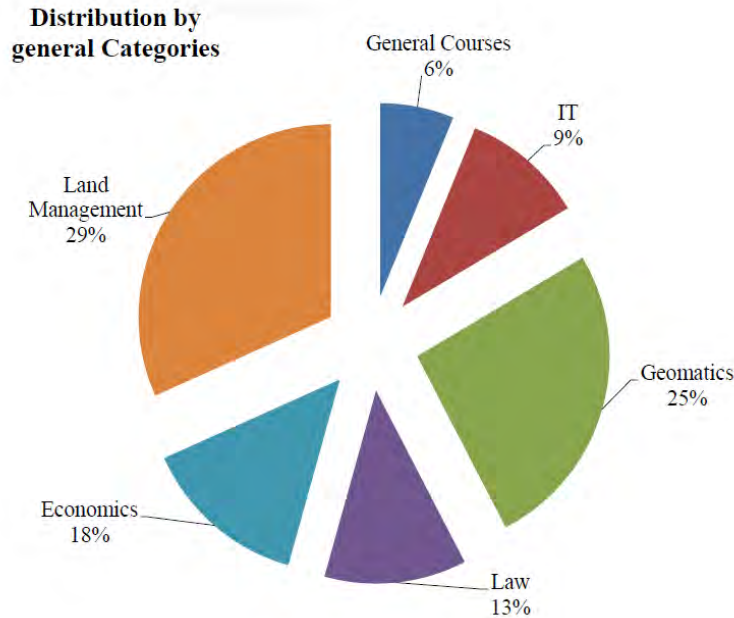
Recently, ILA, Haramaya University, and Woldia University introduced a new harmonized curriculum that has addressed many of the weaknesses in graduate

Table 27: Harmonized BSc LA Curriculum

SN	Categories	Module Name	Module Code	Credits
1	Basic Courses	English Language	EnLa-M1013	10
		Civics		5
2	IT	IT for LA	Comp-M1031	22
3	Geomatics	Surveying for LA	LaAd-M1041	31
		Land Information Systems	LaAd-M2051	30
4	Land Law	Property Right and Land Law	LaAd-M2061	31
5	Economics	Land Economics	LaAd-M3071	22
		Real Property Investment Analysis and Valuation	LaAd-M3081	22
6	Land Management	Land Management	LaAd-M3091	20
		Land Use Planning and Development	LaAd-M4101	30
		Land Tenure Policy	LaAd-M4111	24

knowledge, skills, and values mentioned by the various stakeholders. Like the graduate programs at ILA, the undergraduate program in LA sets the bar for a well-rounded LA

Figure 7: Distribution of Courses in Harmonized Curriculum by Area



curriculum that should be replicated in various regions to meet anticipated demand. The program is divided into six content categories as described below (see Table 27): Basic Courses, IT, Geomatics, Land Law, Economics, and Land Management. Each category contains one or more modules pertinent to the area described and each module contains a number of courses. Once again, it is a comprehensive introduction to the principles of LALU. Most importantly, the Geomatics category addresses the concern of lack of training in GIS/LIS technology and techniques. This new harmonized curriculum gives a comprehensive introduction to the most up-to-date LA technology and techniques and should be considered a model for the continent.

In Figure 7 one can plainly see the importance that the Geomatics category has in comparison with the rest of the curriculum. After the Land Management category, at 29% of the curricular content, Geomatics occupies the second largest part of the curriculum (at 25%). The specific content of the two modules contained in the Geomatics category (Surveying for LA and Land Information Systems) demonstrates how important the introduction to GIS/LIS has become in the newly harmonized curriculum. Module 4 (Surveying for LA) contains three courses related to surveying (Basic Surveying, Geodetic Surveying, and Satellite Positioning), all of which contain some GIS/LIS content (see Table 28).

Table 28: Course Content in Module 4 of Harmonized Curriculum

Module 04— Surveying for Land Administration (LaAd-MI041)

SN	Course Code	Course Name	Cr	Contact hours				CP
			Hr	L	L/P	T	HS	
1	Math1041	Applied Mathematics I for Land Administration	3	2	0	2	4	5
2	Math1042	Applied Mathematics II for Land Administration	3	2	0	2	4	5
3	LaAd1043	Basic Surveying	4	2	4	1	5	7
4	LaAd1044	Geodetic Surveying	4	2	3	2	5	7
5	LaAd1045	Satellite Positioning	4	2	4	0	6	7
Total			18					31

Likewise, in Module 5, the emphasis on GIS/LIS is evident from the course titles. Here Remote Sensing, Photogrammetry and Photo Interpretation, Geographic Information systems, Cadastral Survey and Land Registration, Cartography and Map Reading all have GIS/LIS content (see Table 29). Moreover, the module ends with an internship, which ensures that graduates have field experience in the different GIS/LIS techniques and technologies. These corrections respond precisely to the deficiencies in LA training and education indicated by stakeholders. Overall, the harmonized curriculum will serve well the needs of the LA sector.

Table 29: Course Content in Module 5 of Harmonized Curriculum

Module 05 Land Information System (LaAd-M2051)

SN	Course Code	Course Name	Cr	Contact hours				CP
			Hr	L	L/P	T	H S	
1	LaAd2051	Remote Sensing	2	1	2	0	2	3
2	LaAd2052	Photogrammetry and Photo Interpretation	3	2	3	0	3	5
3	LaAd2053	Geographic Information Systems	6	4	6	0	7	10
4	LaAd2054	Cadastral Survey and Land Registration	4	2	4	0	6	7
5	LaAd2055	Cartography and Map Reading	2	1	2	0	2	3
6	LaAd2056	Internship I	1	Semester break				2
Total			18					30

4.1.2.2.2 B.Sc. Surveying and Mapping, Ethiopian Civil Service University

In its design, this program is a good complement to the LA programs offered at other institutions. Its heavy emphasis on mapping, surveying, and GIS/LIS and remote sensing make it especially valuable for the immediate needs of the LA system. As such, it helps

address the immediate need for surveyors and GIS/LIS trained technicians. In analyzing the curriculum, it seems as though it might be worthwhile considering breaking out certain portions of the program to serve a dual purpose of B.Sc. training as well as technical certificate and vocational programs. At the very least, it could be written in such a way that TVET course equivalents. Although all three bachelors programs should include articulation and transfer agreements with TVET institutions in order to enhance mobility within the higher education system, this program in particular lends itself to close integration with the TVET system. From what we can discern, completion of TVET level 5 courses is required for entrance into the program. We wonder whether this does not, perhaps represent unnecessary duplication in some of the technical areas, such as surveying and mapping as well as GIS/LIS systems. It seems that both the TVET system and the higher education system would benefit from close integration. See Appendix C for a detailed schedule of course offerings.

4.1.2.3 TVET Programs Capacity

This study reviewed the TVET model curricula based on OS provided by local representatives of the TVET system for urban and rural LA and related programs (see figures 5 and 6).

The TVET college system was developed under auspices of the Ministry of Education with assistance from the Ethiopian-German Financial Cooperation with the goal to fully contribute to Ethiopia's vision of becoming a middle-income country by the year 2017. The goal of the TVET investment program is the improvement of the training of technical teachers and the improvement of technical capacities at selected TVET institutions. Technical and Vocational Education and Training (TVET) was less prioritized area in the history of the Ethiopian Education System. However, since 2000 a massive expansion of this sub-sector has taken place with the strategic goal of meeting the industry demand for middle-level skills, especially in the service and commercial agriculture sectors, essential drivers of development. The TVET system produces technicians with practical knowledge who, unlike in the past, would be job creators rather than expecting jobs to be provided by the government.

The number of TVET institutions has increased from 17 in 1996/97 to 437 in 2012/13 and enrolment from 2,924 to 238,884 in 2012/13. Ethiopia has embarked on a process of reforming its TVET-System using international standards and international best practices as the basis, and, adopting, adapting, and verifying them in the Ethiopian context. TVET colleges are given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

In 2012, sequa and ICON/GET, on behalf of KfW Development Finance, carried out a Feasibility Study on TVET and university education in Ethiopia. They reviewed the agriculturally oriented TVET institutions in Ethiopia (ATVETs) as part of the study. According to the study, there are 22 ATVETs in Ethiopia with an enrollment capacity of 25,000 and actual enrollment of 13,899. Many of the constraints that the system is facing are

due to the lack of qualified instructors. The study did not disaggregate by OS so it was impossible to tell from the data how many students were enrolled in LA related QFs or how many of those students actually graduate.

TVET institutions are vital to providing basic training for land surveying, land valuers and tax appraisers, GIS/LIS technicians, land managers, and LA technicians. These programs are in their early stages of implementation and, as such, are limited to a few institutions. A national strategy to meet the comprehensive need for LA professional training together with universities is outlined below in section five of this report.

The entire TVET system seems well designed and structured. It's potential for supplying lower level, short-term needs in the LA system is unequalled. As noted above, the TVET institutions are also starting to play an increasingly important role in the providing basic training of land surveying and GIS technicians. It is unknown, however, how many of the LA related programs are operating countrywide, where they are located, how many students they currently enroll, or how many graduates they produce annually.

We would also stress that the potential for integration into university programs is high. It is unclear to us why only level 5 TVET students are accepted into universities (this was true of the Ethiopia Civil Service University B.Sc. program in surveying and mapping, it was unclear whether the other undergraduate programs also accepted TVET students). One of the goals of the TVET system was to make it part of a post-secondary education and training system that promoted student mobility in both vertical and horizontal directions. We would recommend that the TVET system be more closely integrated into university training to accomplish that goal and to help sustain the supply of LA technicians and professionals needed in order to produce an efficient and effective national LA system.

4.2 Institutional Capacity Assessment

In this section we analyze the capacity of each one of the institutions visited in terms of their current capacity to deliver their programs. We will examine the three institutions to whose programs we currently have access.

4.2.1 Institute for Land Administration, Bahir Dar University

ILA has three assistant professors and about 30 lecturers with 4-5 PhD degrees between them. Instructors are experienced and staff is well-qualified to carry out research on national LA issues. As a whole the staff is supportive of collaboration with stakeholders.

ILA feels capable of providing consultancy services to the government and the private sectors on matters related to geographical information (GIS), environmental information system (EIS) and land information system (LIS), real property valuation, land law and policy, socio-economic baseline study, resettlement programs, natural resource baseline study, real estate finance and investment, and in architecture.

ILA reports to be well equipped for these tasks. It has the latest surveying equipment and computer labs to train its students, including 30 Leica Total Stations, 2 Trimble Total Stations, 10 Leica DGPS, 2 Trimble R8 GNSS RTK DGPS, 30 hand held GPS units and others. It uses the latest and licensed software such as Leica Geo office, ArcGIS, ERDAS, Geomatica, ArcCad, and AutoCad, It has 4 computer labs with 30 computers, each. Lately ILA has successfully installed and launched CORS (continuous operating reference station) providing global navigation system data through the internet to any user around the globe. This station also facilitates RTK (real time kinematic) surveying within and around Bahir Dar city. Besides ILA, other stakeholders such as the municipality, the Ethiopian mapping agency (EMA), INSA and others will benefit from this capacity.

Some budgetary concerns exist given the fact that the primary funding source (SIDA) has been terminated. The current administration seeks to expand the role of ILA with a land policy research dimension that will focus on critical issues such as agrarian reform and enhanced land productivity. After eight years and without SIDA support, the Institute report to be in a relatively good functional position although additional sustained support is identified. This includes:

- *Support for research* on various LA and management, particularly to many issues related land tenure, land ownership, land use, land transaction and registration, property valuation and expropriation, urbanization, housing, land investments, land consolidation. In addition, land laws and working procedures have to be tested and examined. Therefore, ILA seeks to establish a LA Research Center with outside funded leadership from a senior research professional who could also help prepare research funding proposals and provide training to the staff on research project preparation. The duration of this support would be up to 12 months. As ILA seeks to prepare annual national research workshops by inviting authors from all over Ethiopia and disseminate research findings to policy makers and stakeholders. This will need sustained financial support. Providing academic staff with foreign exposure by participating in international conferences, including the presentation of research papers to build institutional capacity, and strengthen existing networking with foreign partners. To requires financial assistance.
- *Develop and expand student internship/externships* for third and fourth year students to get practical training. Previously supported by SIDA, the fate of this program is in danger due to the lack of University financing. A related issue is that ILA has been an academic member of the Federation of International Surveyors (FIS) and the Eastern African LA Network (EALAN). This membership can be sustained as far as membership fees are paid, and in the latter case, it must host annual conferences every four years.
- *Expanding ILA's library* with the pressing need right now is to access electronic books and journals.
- *Expanding staff training and various fields*, including in real estate law and land economics.

- *Certification program in land surveyors and appraisers* with practical training to meet the huge existing and evolving demand of an economy in transition. ILA therefore seeks both technical and financial support in this regard.
- *Develop a Ph.D. program in LA* and related subjects that will benefit not only Ethiopian professionals but also other similar professionals from Eastern African countries. The initial stage of the program (curriculum development and providing courses for the first two batches) will involve the expertise of foreign university partners. ILA has already made contacts with experienced professors from Sweden, the Netherlands, Austria and Finland on the possibilities of their involvement. This initiative will definitely need support from partners.
- *Develop an outreach and job placement program* to meet the estimated near-term need of nearly 8,000 land managers and over 23,000 surveyor technicians and match ILA graduates with job vacancies.
- *Increased bilateral development assistance* from organizations such as SIDA, DFID, USAID, the Ministry of Foreign Affairs of Finland, GIZ with a focus on land management and institutional capacity development. The need is identified to strengthen LA training institutions such as ILA through allocating of research and or consultancy funding and providing MSc training opportunities for its staff. Finland has signed a Memorandum of Understanding with ILA BDU to train 45 MSc students in the Summer program.

Overall, ILA was presented as a well-established program developed primarily with SIDA support. The first group of B.Sc. students graduated in 2010 with a total of 250 graduates in 2013.⁴² It also offers a Master program.

See Appendix E for a recent staff profile (2010).

4.2.2 Ethiopian Civil Service University

Informal feedback indicates that it is difficult to meet the demand for LA professionals in the public sector because public service jobs, while offering job security and some benefits, pay substantially less (sometime 50% less) than private sector jobs. In addition, there appear to be substantial budgetary and staffing challenges in this program while the teaching and laboratory/practicum facilities seem wholly inadequate.

Currently 4 “Departments” exist: Early programs in Urban Planning and Urban Engineering, and 2 very new programs in Urban Land Management and Information Systems (started in 2013) and Surveying and Mapping (started in 2012). In concert, and with the new Urban Land Management and Information Systems program initiative, a more comprehensive and substantial Land Administration Program may emerge. This can only be expected if adequate resources are made available to meet staffing, infrastructural and equipment requirements

⁴²ILA, 2013. Advancing Land Rights for Growth and Transformation.

The program is severely affected by equipment shortages. Students are civil servants on government salary, while taking courses.

See Appendix E for the current staffing plan.

4.2.3 Woldia University, School of Land Administration

Woldia University, which is one of the nine public Universities newly established by the Ethiopian government, started land administration undergraduate education in September 2012 under the Faculty of Agriculture. It admitted 60 students in the first year. In 2013 the University upgraded the department into School of Land Administration. The School has a dean, secretary and an administrative assistant.

The School of Land Administration has 211 regular students at the undergraduate level. Enrollment has increased each year, and has almost doubled in the first three years of the program. The current enrolment by year is as follows: 54 3rd year students, 58 2nd year students and 99 1st year students.

At the time of the report there were 15 academic staff members in the school of Land Administration at Woldia University. The composition of staff represents a diversity of disciplinary backgrounds. The mix includes the following: 1 MSc in Land Administration; 9 BSc holders in Land Administration; 2 LLB in Law; 2 Diploma holders in Surveying; and 1 Diploma holder in IT. Several among these staff members of the School are in the process of completing further graduate level training. One staff member is enrolled in a MSc program in Geomatics; two staff are attending MSc studies in Remote Sensing; and one is attending LLM (Masters in Law).

Regarding laboratory equipment, Woldia has 24 Total Stations, 11 Theodolite, 11 Leveling instruments which the Schooling is sharing with the department of Civil Engineering, and one computer laboratory.

4.2.4 East African Land Administration Academic Network

East African Land Administration Academic Network
Adapted from *Land Administration Academic Education in Eastern Africa*⁴³
FIG Working Week 2013

Funded by SIDA, KTH has been supporting the development of national Bachelor of Science Programmes in Land Administration at four universities in Eastern Africa: Bahir Dar University (Ethiopia), Kenya Polytechnic University College (Kenya), Ardhi University (Tanzania) and Makerere University (Uganda). When in 2010 the SIDA capacity building program ended, the four universities involved decided to continue to work together in order to harmonise their BSc programs. This marked the beginning of a

⁴³Groenendijk, Hagenimana, Lengoiboni, Hussen, Musinguzi, Ndjovu & Wayumba (2013).

regional network of universities in Eastern Africa offering academic education in Land Administration: the Eastern Africa Land Administration Academic Network (EALAAN).

In the meantime EALAAN has grown and now includes also INES Ruhengeri, Rwanda, the National University (NUR) of Rwanda, and the Regional Center for Mapping of Resources for Development (RCMRD) in Kenya. Other countries that are expected to join the network soon are South Sudan, Burundi, Somalia and Eritrea. The network has broadened its focus to include Post Graduate Diploma (PGD), MSc programs and vocational training in land administration.

The members of the Eastern Africa Land Administration Academic Network (EALAAN) meet each other once a year during a two day workshop. Each year another university takes the lead in the network and is responsible for organising the workshop. The first workshop was organised in Nairobi by KPUC (2010), followed by Ethiopia, BDU, in 2011 and in Kampala by MKU in 2012. The network aims to support its members in the further development of their curricula, exchange of specialist staff and sharing of educational resources. It is further working on a regional scientific Journal and the development of a Compendium of Land Administration Practice in Eastern Africa.

With the growth of the network, both in number of countries and in scope of activities, formalisation of the network is one of the main issues for the next workshop meeting being organised by INES-Ruhengeri and the NUR in Rwanda in July 2013.

The Eastern Africa Land Administration Academic Network has strong links with European Universities in particular KTH in Sweden, the UNU School of Land Administration Studies at ITC (the Netherlands) and Munich Technical University (TUM) in Germany. Other European universities with close relations with Eastern African universities include Aalborg (Denmark) and Aalto (Finland).

4.3 Summary of Curricula Assessment & Institutional Capacity Assessment

The conclusion of the review of available LA programs and related curricula of assumed representative of university and Technical Vocational Educational Training (TVET) colleges is that the program offered at ILA is the most advanced and represents a solid program that, *when fully staffed and funded*, could function as the *example of a core program in LA in Ethiopia*. As such, it could be used as an *undergraduate program* model and replicated by universities (possibly expanded with a graduate program option) and TVET colleges to help meet the need for professional training in LA, including parcel/cadastral surveys, land registration, land information / cadastral information system development, land and property law, land valuation and taxation, and land use planning. There needs to be added emphasis on the cutting edge technologies currently in use in the international LA sector and their corresponding education and training programs, especially GIS and LIS components.

This also reflects the priority areas identified for a specialization in *graduate programs*, and short-term post-graduate training which, in addition to those identified above, include: applied spatial analysis, advanced remote sensing, GPS use in LA, land policy analysis and formulation, land law and legislative drafting, data base management, land dispute (conflict) resolution, urban and rural development planning.

In addition, institutional interest was expressed in *research and consultation* in areas such as impact assessment associated with land certification, assessment of the importance, role and mechanisms of land certification in pastoral and semi-pastoral areas, investment of land preparation, land valuation for compensation, land dispute resolution, the effectiveness of the application of LA tools, implementation gaps in land certification, and the impact of second-level certification.

4.4 Gap Analysis

In this section we will analyze two gaps. First we analyze the gap between the existing LA system and the near term needs (five years). Second, we analyze the gap between the current education and training system and the near term needs identified in the first gap analysis.

4.4.1 Land Administration System Gap Analysis

By our estimates, the gap between the existing capacity of the system and its needs in the next five years is approximately 39,000 technicians and professionals, in the following ten years, an additional 50,000, and in the ten years after that, an additional 58,000. This figure includes the academic staff needed to build the education and training systems related to the LA sector. The question is, how should these needs be address, in what order and in what quantities? These needs can be divided into three levels as depicted in Figure 8. Based on the results of the assessment and using to a certain extent our own calculations, we have devised the above best estimate of the system needs as a starting point for a national dialogue. In what follows, we explain each one.

4.4.1.1 Short-term Needs (5 years)

Surveyors: The most critical need in the next five years will be for the lower level technical skills. National land registrations goals means that all regions will be working feverishly to complete the registration of properties. The mandate to have second level certification for all properties within the next seven years makes this demand all the more acute. Complicating this demand is the fact that surveyors as also needed in the private sector and in other government sectors, such as in building construction, real estate, and road construction. In the foregoing sections we produced two estimates. One was based on productivity estimates for the second level certification process. Using productivity data from four regions and the national ministries, we estimated that approximately 2,500 surveyors would have to be trained *immediately* in order to complete the national certification process in five years. This represents about one third of the demand estimates from the regions and national ministries, which totals approximately 8,000 surveyors in the next five years. If a certification process were implemented using parasurveyors as we will

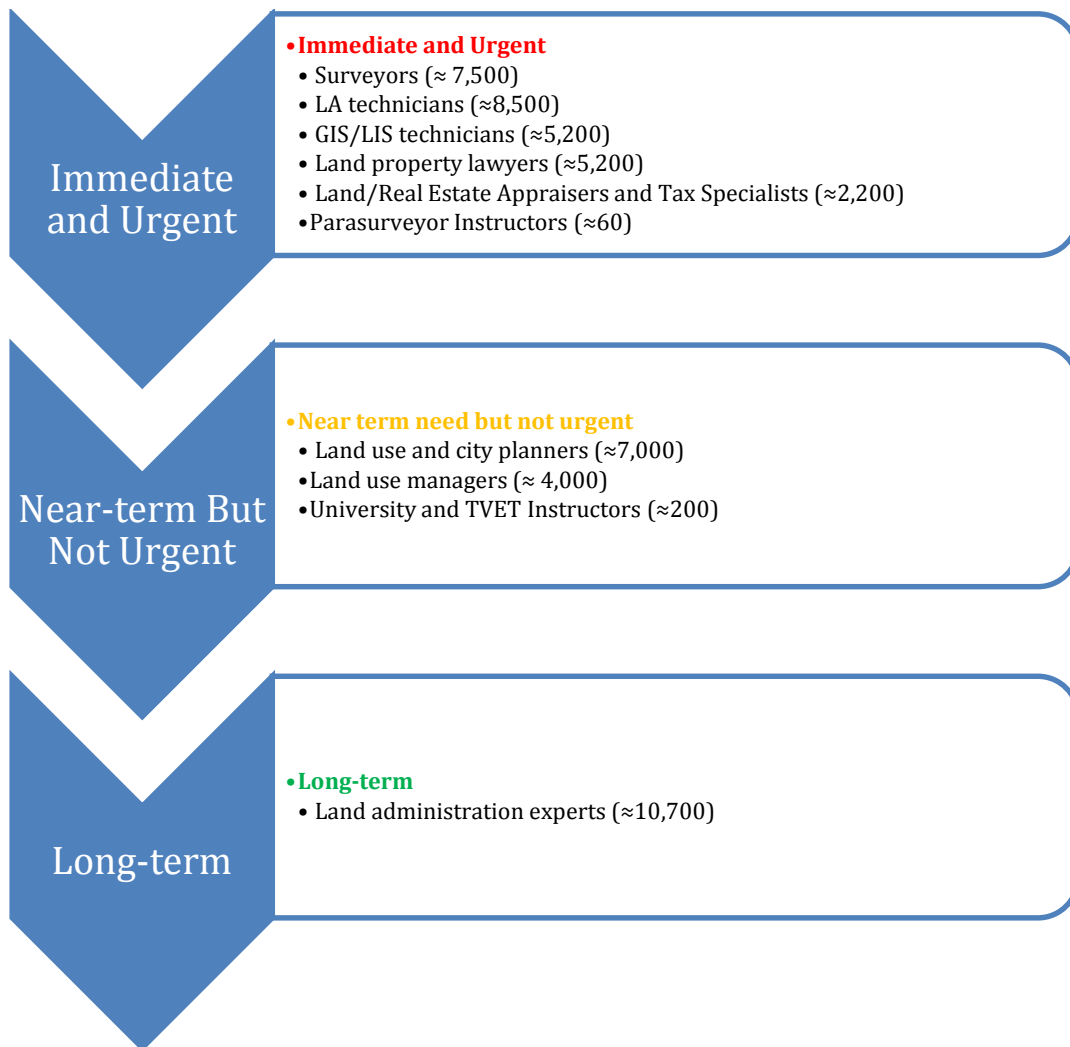
recommend below, this need could be met relatively quickly. The demands will vary across the country, with urban areas requiring more surveyors than rural areas.

LA Technicians: These are sub-professionals working at the *Kebele* level. They are TVET trained to assist with land demarcation and registration as well as a broad spectrum of supporting activities for the LA sector. Currently there are more than 30,000 rural *Kebeles* in the country. Based on the regional and national estimates, the total number of LA technicians that should be added in the next five years is approximately 8,500. The majority of this demand is in the urban sector (4,893) rather than the rural sector (3,527). The demand for these positions continues high over the next twenty years, with estimates at an additional 13,500 in ten years, and an additional 14,500 in twenty years. If these training levels are achieved, it should be possible to implement the recommended LA structure placing LA representation in each one of the *Kebeles* nationwide.

GIS/LIS technicians. In addition to field experts who are able to do level 2 certification, there will be an additional need for back office personnel, especially registrars, who are trained in GIS/LIS in order to process the results of the accelerated survey process. Among those needed will be staff who are able to take survey results and turn them into legal records using GPS coordinates and then to develop and maintain efficient digital archives of all land certification records. The regional and federal ministry estimates extrapolated to a national level would mean a total of approximately 5,200 experts trained in these areas over the next five years in addition to the surveyors and LA technicians, with whom these skills overlap somewhat.

Land Property Lawyers: It is difficult to get a reasonable estimate for the number of lawyers needed in order to service the new land certification system. Many of the disputes are being handled locally and do not yet require the courts to resolve them. Increased activity in the land markets, however, will also put upward pressure on demand. The totals are estimated at 5,271 for the entire nation in the next five years. Most of this demand is driven by the urban sector, where transactions and adjudication are more frequent. The urban sector estimates its needs at 4,650 additional land lawyers over the next five years. That demand increases to nearly 8,000 in the next five years for the urban sector and a total urban and rural demand of approximately 16,000 additional land lawyers in the next 20 years. Although it is probably not as pressing a need as that of LA technicians and surveyors, nevertheless, given the amount of time required to train a land lawyer, it would be important to begin the training for this future demand immediately.

Figure 8: Gap Analysis Land Administration System



Land/real estate appraisers and tax specialists: It may seem counterintuitive to put this group in the “urgent” bracket, but quickly organizing and increasing tax appraisal revenues would be the best way to finance the gaps in the LA education and training system. Estimates for the demand for property valuers and tax specialists was at approximately 2,200 over the next five years, increasing to 3,000 in the next five years, and almost doubling to 5,301 in the next 10 years. This would mean a real estate and tax appraisal team of approximately 15 per *Woreda* on average.

Parasurveyor Instructors: As noted above, we are recommending a strategy whereby the bulk of the surveying needed for the certification process could be carried out by parasurveyors. This strategy has two things to recommend it. First, the amount of time required to train a parasurveyor is minimal. The LIFT and REILA projects are both

working with parasurveyors who are placed in the field after only two weeks of training. Their productivity and accuracy is comparable to that of surveyors trained in the more traditional TVET system and in the university system, but with only a fraction of the time dedication required. TVET and university training are desirable for other reasons, but there is no reason why the majority of the field work for the certification process can't be completed by parasurveyors. Second, the amount of time to prepare instructors for this activity is minimal compared to what it would take to prepare a TVET instructor or a university professor. It is estimated that one instructor can train 10 trainees in two weeks. If an instructor can do 20 trainings per year, 13 instructors could train the 2,500 parasurveyors needed for the national certification process within one year. This would make possible the seven year goal for the national certification process.

4.6.1.2 Near-term But Not Urgent

University and TVET Instructors: This particular need could just as well have been placed in the urgent category, since the existing system capacity is not sufficient to produce the number of surveyors and GIS/LIS specialists needed to meet the system needs. The total number of TVET graduates in the areas of surveying and other LA related areas is unknown at this time. According to the Ministry of Education, the average class size for TVET education is 29 (Ministry of Education, 2011). If we were to assume that every person who began a TVET QF in surveying completed it, and that every QF in surveying required one instructor, we would have a maximum estimated need of 24,000 surveyors, plus a maximum estimated need of 24,000 for GIS/LIS specialists, and an additional maximum estimated need of 37,000 for LA technicians divided by an average class size of 29 for a total of approximately 2,965 complete QF trainings for the technical/vocational level alone.

When we divide that number by the twenty years that it would take to accumulate that level of demand, it would imply that there would have to be approximately 148 QFs offered per year, half of which would have to be offered in the area of LA technician (59 QF sessions), one quarter in surveying, (36 QF sessions), one eighth in GIS (21 QFs) and one eighth in LIS (21 QFs). If one instructor were able to supervise two QFs from beginning to end every two years, that would mean that a total of 116 instructors could handle all of the LA training needs of the TVET system on a national level and would be able to train 86,000 of the total demand of 146,000 over the next twenty years if, that is, the instructors continued in their posts for all twenty years (see Table 30). We can probably assume an unknown turnover rate which would elevate this number somewhat. The problem remains, however, that these instructors would have to be in place almost immediately in order for the system to function properly and the training targets to be met, especially since the four positions described here (surveyors, GIS/LIS technicians, and LA technicians) are needed urgently and should be one of the top priorities of the system. As we had mentioned before, there is no data on the number of QFs offered for LA, which makes it difficult to know what the exact need is. We do know anecdotally, however, that there are already a lack of qualified instructors in the TVET system, which means that almost without a doubt, the identification, recruiting, and/or training of TVET instructors becomes an immediate top priority.

Table 30: Estimated Need for TVET Instructors over Next Twenty Years

QF	5 year target	10 year target	20 year target
LA technician	59 instructors = 8,500 trained personnel	59 instructors = 8,500 trained personnel	59 instructors = 17,000 trained personnel
Surveyors	36 instructors = 5,250 trained surveyors	36 instructors = 5,250 trained surveyors	36 instructors = 10,500 trained surveyors
GIS technicians	21 instructors = 3,000 trained personnel	21 instructors = 3,000 trained personnel	21 instructors = 6,000 trained personnel
LIS technicians	21 instructors = 3,000 trained personnel	21 instructors = 3,000 trained personnel	21 instructors = 6,000 trained personnel
Totals	137 instructors = 19,750 trained personnel	137 instructors = 19,750 trained personnel	137 instructors = 39,500 trained personnel

Land Use Managers: It is understandable that land use managers would be in relatively high demand, since it is at the heart of the LA sector. The survey estimates put the need at 7,713. This would average out to approximately 10 land managers for each of the 770 *Woredas* in Ethiopia (including urban administrative zones). The above figure would average out to 11 additional managers per *Woreda* or district.

Land Use and City Planners: With the constant urban growth, it is safe to assume that land use and especially urban planners will be in demand well into the future. This seems one area where the demand will not diminish over time and may, in fact, increase. The estimates for this position can in at 13,727, of which 13,720 were projected in the urban LA sector. This would translate to approximately 145 city planners for the 96 urban areas currently listed on the MoUDHC website.

4.6.1.3 Long Term

Land Administration Experts: The regional and national estimates for this position were at 13,172 over the next 20 years, 4,303 of which occur in the rural sector and 8,869 in the urban sector. Since this position requires more extensive education (a minimum of four years), short-term solutions are simply not possible.

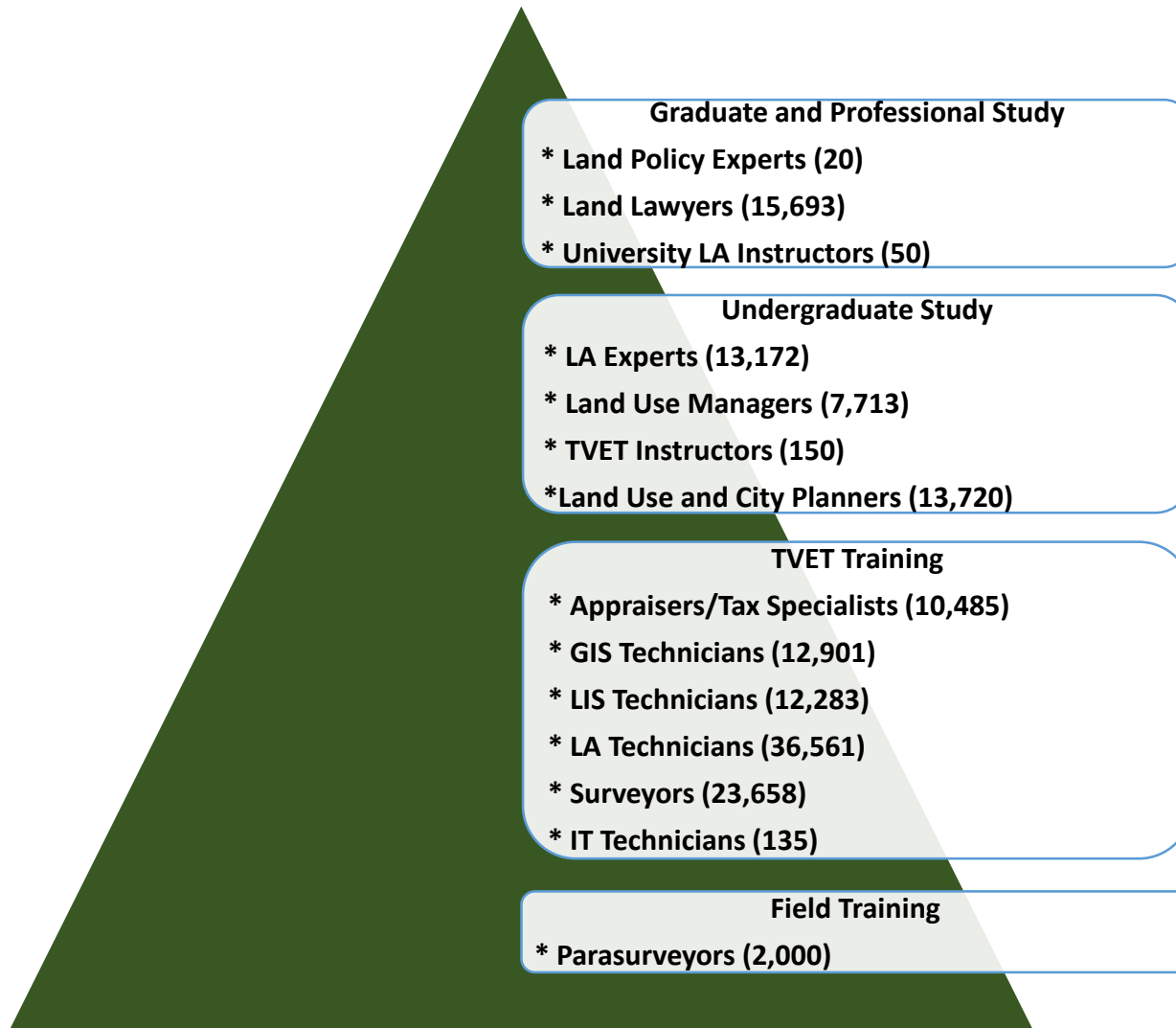
4.6.2 Land Administration Education and Training Gap Analysis

In order to propose an education and training strategy, it would be important to understand what the current gaps are, what type of training each position would require, how long that training would take, who would be qualified as an instructor, and with what urgency that training would be needed. In what follows, we analyze the education and training gaps detected by regional and urban authorities in the current work force, we look at how the training needs might be met (Figure 9).

Table 31: Gaps in Education and Training according to Regional and City Authorities

Position	Identified Gaps
Surveyor	<ul style="list-style-type: none"> • Has some theoretical knowledge • Has no practical surveying skills • Not familiar with surveying equipment Inadequate knowledge on basics of surveying and inadequate skills in collecting accurate GPS measurements • Culture of sharing knowledge is a problem and skills in leading the crew.
GIS Technician	<ul style="list-style-type: none"> • No advanced knowledge on GIS/RS • No practical skill with software and hardware • Poor skills in coaching others • Unable to improve skills as the assigned staffs is not supplied with the necessary materials.
Land Use Manager	<ul style="list-style-type: none"> • Lack basics of land resources survey & land use planning • Lack of practical skills on land resources survey and detail procedures in land use planning • No basic skills in preparation of land use planning • Lack basics of land use planning and skills in land resources survey and land use planning • Unexposed to any kind of land use planning exercise • Land use planners are trained in urban land use planning and hence don't have proper skills and knowledge in rural land use planning.
Land Administration Experts	<ul style="list-style-type: none"> • No have basic knowledge and skills (trying to bridge in short term training) • No knowledge of land administration • No knowledge of basics of land administration • Lack of leadership skills
Land Lawyer	<p>Not well exposed to the existing land law, hence, lack experience No knowledge of land management</p>

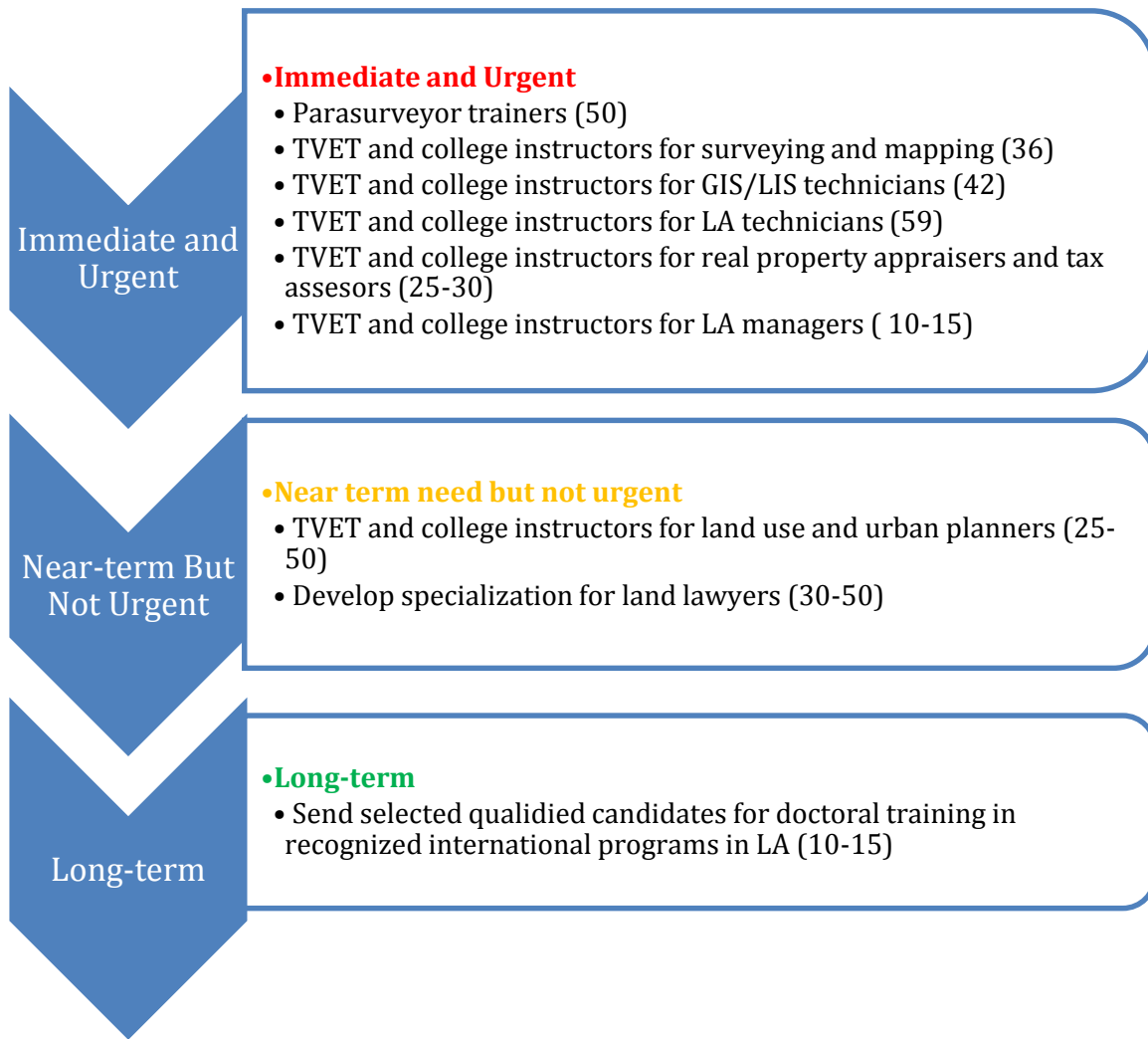
Figure 9: Hierarchy of National Training Needs



In Table 31, we see the education and training gaps identified by regional and city authorities in the existing workforce. These gaps fall into the areas of knowledge, skills, and experience. All three are lacking, which means that the current education and training system will have to be improved in the area of content, skills training, and experiential learning in order for them to be more effective (but see above comments on the harmonized curriculum of Bahir Dar University, Haramaya University, and Woldia University).

In figure 10, based on the estimates made by the regions, the federal ministries, and the survey team productivity data, we have displayed graphically how the approximately 146,321 new personnel in the LA labor force might be distributed. As can be seen from the graphic, we assume that placements would be made at the regional level, the *Woreda* level, the *Kebele* level and in city administration authorities. As has been shown through the national estimates, almost half of this demand will come from the urban sector. Figure 9

Figure 10: Education and Training Needs by Level of Urgency



is a hierarchical display of where the various trainings would take place, ranging from the field to graduate programs. There may be differing interpretations of what sort of education and training would be required for each one of the positions listed in the survey questions, but in the figure we have attempted to put each position at the minimum level of training required. For example, although there is no reason in principle that an appraiser or a tax specialist could not go on for an undergraduate university degree, it is our assumption that a minimum of TVET competency based training would be required for these positions. Thus also with Land Use Managers, for example. Although a minimum of university training would be required in order to assume these positions, there is no reason that someone with a graduate degree could not hold this post. Based on these two models of labor distribution and training distribution, we now make some estimates as to the needs of the system divided into immediate, near-term, and long-term.

4.6.2.1 Urgent Needs

- *Parasurveyor Trainers, TVET and University Instructors for Surveying and Mapping:* If total need is approximately 23,658 surveyors and cartographers over the next twenty years, an accurate estimate of need would depend on a couple of different factors for which we do not currently have information: 1) the existing number of qualified instructors, 2) the current graduation rate. From these two factors it would be relatively easy to calculate the number of graduates per instructor and make a reasonable estimate of need based on the total number of additional surveyors and cartographers needed in the next five years. As noted above, there is an immediate need to train parasurveyors. If the goal of training 2,500 parasurveyors is to be achieved in five years, it would require no more than 50 parasurveyor trainers to complete the task. In addition, between approximately 150 TVET instructors would be required to complete the technical training in the areas of LA technicians, GIS technicians, LIS technicians, valuers, surveyors, and IT technicians. In order to be prepared for this training needs, the search for instructors should begin immediately. There are also needs at the undergraduate and graduate level, but the key to this strategic approach to training and education is to start with the lower level technical skills, but be sure to design integrated education and training systems such that those who acquire the technical skills can easily move into an upper level educational system without unnecessary redundancies.
- *Parasurveyor Trainers:* As was already noted above, the entire modernization effort of the LA sector depends on the successful completion of the land certification process. All resources should be marshalled to immediately identify for train trainers for preparation of the national teams of parasurveyors. Without a rapid and successful completion of the certification process, the remainder of these efforts will be delayed. For that reason, the training of parasurveyors should take top priority in the training and education strategy.
- *TVET and College Instructors for GIS/LIS technicians:* Like the above, this estimate boils down to a simple ratio of instructor to graduate. If the system need is accurately estimated at approximately 24,000 GIS/LIS technicians, and we assume the TVET

ratios of 29 to one, we are looking at an estimate of approximately 42 TVET instructors plus an additional 10-20 university instructors with specialization in this area. Again, assuming that TVET instructors are capable of teaching approximately 2 QFs per year and that university instructor-to-graduate ratios are much lower than in the TVET system, we assume that a reasonable estimate for system need is between 52 and 62 instructors.

- *TVET and College Instructors for LA Technicians and Managers:* If we assume that the national need estimate of approximately 30,000 LA technicians and an additional 11,000 LA managers, then, the system should have between 59 TVET instructors to prepare LA technicians on a national level, and between 5 and 10 undergraduate and graduate instructors with specialization in land management. That means a total of between 64 and 69 instructors at all levels.
- *TVET and College Instructors for Real Property Appraisers and Tax Assessors:* With national need estimated at just over 10,000, calculating on the same basis, with the majority of this need being met through the TVET system and the remainder reaching higher levels of specialization through the university system, this urgent need will require a maximum of 18 instructors. Assuming that one instructor teaches multiple sessions but reducing the ratios for university education, we estimate that the need will fall between 25 and 30 new instructors to meet the national need in the next five years.

4.6.2.2 Near-term But Not Urgent

- *TVET and College Instructors for Land Use and Urban Planners:* Given the more pressing demands of property certification, the need for urban planners is not, perhaps, as urgent as the above mentioned needs. Nevertheless, it would be unwise to neglect this need. With current urbanization growth rates at approximately 4% annually (World Bank, 2013), a concerted effort to “get ahead of the curve” on urban planning is important in order to avoid the more egregious consequences of urban sprawl such as extreme poverty, disease, and crime. The TVET system is already equipped to produce level four training in urban land development and marketing administration as well as for urban planning as evidenced by the curricula published by the national TVET system. How many instructors and students there are currently in the system, or instructor to graduate ratios, are unknown. Using our own estimates, of 13,720 planners needed, and assuming that half that need could be met by TVET training but that the other half would require university education, a total national training staff of between 15 and 20 instructors would be sufficient. The problem here is that there are few urban planning training TVET and university education and training programs currently. This will have to be remedied if the demand is to be met adequately.
- *Develop a Specialization for Land Lawyers:* It is unclear whether such a specialization may already exist in country. If so, the rather limited demand for this position may be met by existing infrastructure (Ali, 2011). If not, it would probably require the development of specialists in land law. This could be easily fit into the existing structure of legal education and training. The training courses are handled by the TVET system and the education courses by universities and law schools. With the limited demand for land lawyers, the need could either be met by the existing system or, if not,

then an additional 25 specialists spread through the regional educational systems would suffice to meet the need.

- *Strengthen and Increase Land Administration Programs:* Perhaps among the most acute needs of the system, although not particularly urgent nor something that can be dealt urgently, is the need to meet the demand for 3,000 to 5,000 land managers and administrators by increasing the number of new programs in LA and strengthening existing programs. It is clear from the staffing dilemma faced by Haramaya University's LA program that there are not sufficient qualified instructors to staff all of the existing programs. It is our understanding from information submitted to us that there are currently a total of perhaps five LA programs available nationally. If we assume that each program has annual graduation rates somewhere near ILA's 43 graduates per year, which is a total of only 214 graduates per year in the existing infrastructure. In order to meet the demand of 3,000 to 5,000 estimated for the next five years, it would require annual graduation rates of between 600 and 1,000 or between three times and five times the current capacity. Again, if we assume that an academic staff of 30 per program is reasonable, that means that between 300 and 600 new academic staff would have to be added to the existing capacity in order to meet the five year demand. Adding between 300 and 600 academic staff at the university level in LA in five years would be an outright impossibility. At the very best, under current circumstances, one might assume that the system could produce between 20 and 30 Masters graduates per year who would then be able to teach at the undergraduate level. This need, however, is not urgent. Although it might be desirable to have university trained land managers and administrators in all areas within the next five years, the truth is that the system is currently able to function without them and could do so indefinitely into the future. For that reason, we have suggested a number between 150 and 300. That would mean between 30 and 60 graduates at the masters level in the next five years. This could probably be handled by the existing Masters program in LA at ILA.

4.6.2.3 Long Term

- *Land Administration Doctoral Program:* It is in the best interests of Ethiopia to develop its own doctoral program for LA. As long as Ethiopia is required to send its academic elite abroad for doctoral training, it will lose a certain portion of them to migration while losing precious time and effort through programs that are decontextualized. Preparation for a LA doctorate should begin already now with an inventory of needed PhDs and a selection of potential candidates for these degrees. If this endeavor is undertaken immediately and funding is provided for potential candidates, then a doctoral program could be up and running within the next five years. In its initial stages, it would require external support both in terms of expertise and financial support, but within a ten year time frame, the program could be self-sufficient, at least in human capital terms. In our estimation, the development of a doctoral program would require investment in between 10 and 15 academic staff.

5. Strategic Solutions & Recommendations

Given these gaps in both the LA system and the LA education and training system, what steps must be taken in order to fill the gaps and to develop Ethiopia's LA system into an efficient and effective structure for the national good? In this section we will look at strategic solutions on the institutional and curricular level. After a discussing the recommendations in detail, this section end with a description of the process through which the solutions were vetted with LA stakeholders during a validation workshop on June 23-24, 2015.

5.1 Institutional Recommendations

As noted above, the TVET system is an efficient and effective way of meeting national employment needs, especially at the lower levels of the LA system. In order to meet the demand, two things would be necessary on an institutional level.

- *Incorporate parasurveyor training as the basis of the certification process.* There are clear advantages to using this model for training the basic workforce for the certification process. As was noted above, based on productivity data, the number of parasurveyors that would be needed in order to complete the national certification program in five years would not exceed 2,500 for the nation.⁴⁴ If we assume that one parasurveyor trainer can train twenty people at a time that would require an immediate need for 50 trainers capable of implementing the two week training currently being used by both REILA and LIFT.
- *Develop stronger articulation and transfer agreements between project training systems, TVETs, and universities.* Strengthening the linkages between the informal training taking place in the LA projects (such as LIFT and REILA) and TVET programs, and then, in turn, between TVETs and university programs would allow for an increase in the number of students transitioning from the para-technical, to the technical level and to the professional level in LA. Taking the mapping and surveying B.Sc. program at ECSU as an example, certain classes could be given as dual credit, serving both as certificate level qualifications and university level qualifications. In this way, students who are enrolled in technical programs can reduce their time to degree at the university level by applying credits gained through their technical training to their degree completion at the university. For example, in the case of the Land Administration B.Sc. program at ILA, certain of the geomatic and land management courses could be taken at TVET institutions and then have their credit applied toward a university degree should the student so choose.
- *Increase the number of TVET QFs to meet the demand of 105,000 additional TVET trained personnel over the next twenty years.* As was noted above in the labor demand estimates (see Figure 7), over the next twenty years, Ethiopia will need to train approximately 105,000 technicians at the TVET level in order to supply the needs of the LA sector, which would imply annual training targets of approximately

⁴⁴ There may be other uses for parasurveyors that would increase the total number beyond 2,500. However, the current LA system structure does not include the parasurveyor position.

5,200 personnel per year. It is not certain, however, that instructors would be needed for each one of these separate areas of expertise listed above, however, since, for example, GIS and LIS competencies could be part of a broader LA technician QF training program. These numbers represent basic training. Most QFs

Figure 11: Possible Training and Education Articulation and Transfer Framework

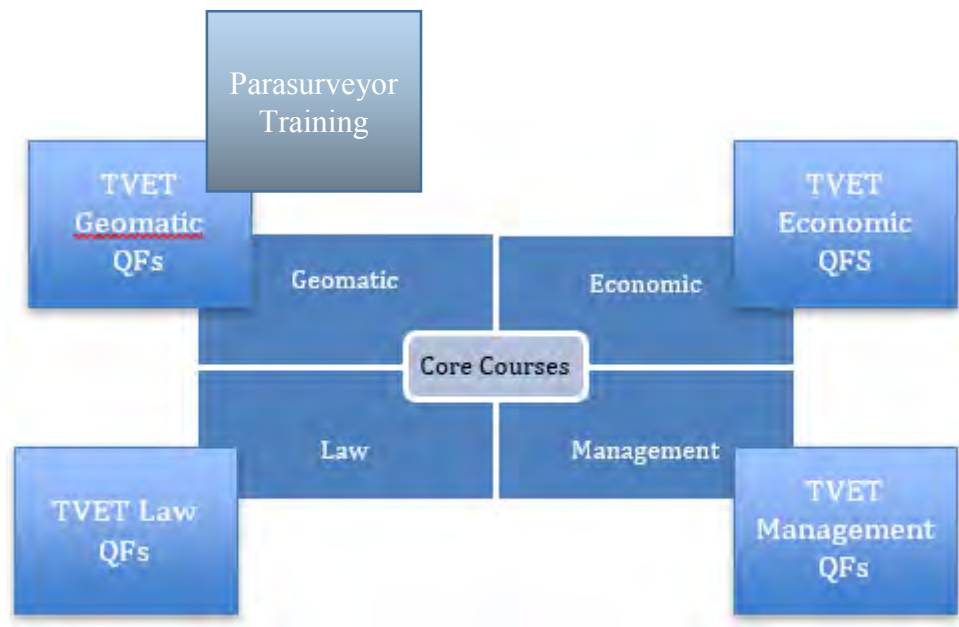


Table 32: Average Number of TVET Trained Personnel per Region and Number of Needed QF Instructors to Meet Demand in 20 Years

Position	20 Year Aggregate Demand	20 Year Aggregate Demand per Region	Number of Instructors Needed Per Region
Appraisers/Tax Specialists	10,485	953	1
GIS Technicians	12,901	1,173	1
LIS Technicians	12,283	1,117	1
LA Technicians	36,561	3,324	2
Surveyors	23,658	2,969	2
IT Technicians	135	12	1
Total	105,023	9,548	8

are divided into levels as well which means that there are more advanced and less advanced levels of training. More advanced levels would increase these numbers. In

the coming five years, we recommend that provision be made for four regional and four urban (two each for Addis Ababa and two for Dire Dawa) LA TVETs with urban and rural QFs as well as specializations in Surveying, Land Valuation, and LA IT. That would translate into a total of 64 trained instructors (8 per TVET). Whether these TVETs would need to be housed separately from existing TVET programs or could be integrated into existing facilities would have to be considered when calculating the costs of such efforts but, more importantly, it will require adequate investments in training equipment in order to make the competency based training to be effective.

- *Improve the quality of existing undergraduate and graduate LA programs and gradually increase the number of institutions offering LA degree programs.* In order to meet the high demand for land managers throughout the LA system, at a minimum, the number of institutions offering Land Administration B.Sc. programs should double in the next five years. In order to accomplish these goals, educational administrators could consider a national cooperative agreement for sharing human resources.
- *Strengthen existing LA degree granting institutions through cooperative agreements with international universities to fill in gaps in expertise until local experts can be credentialed.* There are clearly some gaps in the number of qualified instructors, especially at the graduate level, making the opening of new programs difficult. Long-term strategies of faculty development should be designed in order to fill these gaps. In the meantime, cooperative agreements should be sought and signed with international institutions such as MSU, Ferris State University, and ITC in the Netherlands in order to both enrich existing programs through international exchange and to fill current gaps until faculty development programs can produce the necessary credentials to implement plans for growth and expansion of the system.
- *Raise the annual number of Masters graduates to 30.* The only way in which this could be possible is by almost immediately raising the number of annual graduates from the LA Masters program at ILA to 30 per year. This may require financial incentives for students in order to continue on to study at this level and an enhancement of sector-wide salaries in order to retain graduates. The only way in which this will occur is if the GoE increases budget expenditures in the LA area.
- *Immediately identify five potential doctoral students for doctoral study in different needed areas of specialization in LA.* In order for a the long term needs of the system to be met effectively arrangements should be made immediately to identify and support five potential doctoral students who could be prepared to go on for further study. These students should be sent abroad under service agreements in order to ensure that the specializations needed for a doctoral program are in place before the end of the five year period. A second cohort of five students should be selected for the following year.
- *Allocate a percentage of land tax revenues to the development of LA programs.* The development of an efficient and effective assessment and taxation system will greatly enhance the amount of revenue available from taxation. It would be a wise

investment, especially in these early stages for the Ethiopian government to allocate a sufficient percentage of its tax revenues to allow for the above recommendations to be implemented.

5.2 Curricula Recommendations

Many of the programs needed to service the LA system are already in place. There are, however, still some gaps that could be filled. We are recommending the following additions:

- *A TVET program for mapping and surveying.* As can be seen from the newly revised urban LA subsector TVET structure, there is provision made for a level III specialization in cadastral mapping and surveying. It was not clear whether such a corresponding QF already exists for the rural LA subsector. If not, it should be created immediately.
- *A TVET program for GIS/LIS technicians.* It does not appear that such QFs are currently offered through the TVET system. Although one might not expect an entire occupational standard to be devoted to these two types of data generation and management systems, one would at least expect that they should be central to other LA related occupational standards. Nevertheless, familiarity with and the ability to manage such data does not appear to be central to the occupational standards that we have been able to analyze. In fact, they receive scant mention. All current LA QFs should be updated including elements of familiarity with and competency in the generation and management of GIS and LIS data.
- *A TVET Program for Land Administration Technician.* At the very least, this program should include special courses in record creation, record archiving, and record retrieval using the new GIS/LIS based data systems. This is already part of the urban land development subsector curricular structure, having one level III OS devoted to Real Property Registry and Land Information Management System Service and one level IV LIS based OS on Land Information Management System Administration. Corresponding OS should be offered in the rural land development sub-sector as well.
- *Specialization in Land Law.* Once again, it is not clear whether such a specialization already exists. If so, no additional curricula in this area are needed. If not, it may be able to create a specialization within the existing legal curricula, or, perhaps more efficiently, to offer a certificate in Land Law Specialization through universities with LA programs. In this way, rather than training a specific group of lawyers to acquire specialization in land law through existing legal programs, any lawyer could add the specialization to their credentials through the specialization certificate.
- *A Doctoral Program for Land Administration.* It may not be necessary to create this program in the near term. Current needs could be met by sending qualified candidates to study in strong international programs in order to meet the staffing needs of LA graduate programs. This program should contain core courses in LA and use theory and then specializations in the four areas already considered the

- building blocks of LA: Geomatics (advanced GIS/EIS/LIS theory and practice with a strong ICT component); Economics (advanced land economics, including valuation theory, and tax theory); Law (advanced land legal theory and land policy); and Management (advanced urban and rural planning theory, resource management, and civil engineering components).
- *Upgrading the skills and knowledge of current LA system personnel.* The LA system includes 8,944 existing LA public sector personnel. Many of these are currently inadequately trained. We recommend that an inventory of existing knowledge and skills be done and that a strategy to update the knowledge and skills of existing sector personnel be designed.
 - *Improve pedagogical training and practice especially in TVET institutions.* This need is evident from the TVET to the post-graduate level. More active learning strategies must be part of the teaching and learning culture in all the educational institutions involved. In the national validation workshop we learned that Woldia University is preparing to address the concern by offering certification program for TVET. On the other hand, REILA has proposed to use the Assosa ATVET to train TVET instructors in the rural LA training framework.

5.3 Recommended Training strategy

For meeting the system demand in the near and long term, this report proposes an educational LA program strategy that would involve a 4-tiered approach:

5.3.1 Tier 1: Parasurveyor Programing

The most immediate need in the sector are a large number of surveyors to bring the national certification process to a close. By our estimates, based on productivity data, this number is around 24,000 trained surveyors, of which 2,500 could be para-surveyors trained specifically to complete the certification process. The training of this number of surveyors through the existing TVET system would be cumbersome and far too long. Two projects have successfully implemented parasurveyor training that takes only two weeks to complete and has a field accuracy level of 95% and a quality assurance review process that guarantees 100% accuracy. These numbers cannot be ignored. This would, however, be only a short-term solution in order to complete the certification process. A certain percentage of these trained parasurveyors should continue on to do more advanced TVET training and then move permanently into the LA workforce. For this reason the need to recognizing the competencies gained in these informal trainings within the TVET QF frameworks is urgent.

5.3.2 Tier 2: TVET Programming

The second tier of the recommended training strategy consists of avocational and technical training program at the college level that offers QFs in land surveying, basic GIS/LIS applications, property valuation, and LA IT. It should be strongly tied to the first tier training so that those who complete the parasurveyor training can move quickly into the TVET system. Some or all of this could be rolled into a more comprehensive LA technician

training program. It would depend on how the individual QFs are designed and for what purposes.

5.3.3 Tier 3: Undergraduate Programming

The third tier of the training strategy consists of a broader Land Administration program at the B.Sc. level involving the courses currently offered or planned by ILA supplemented by the added curriculum focus and essentially builds on that capacity while improving and scaling up capacity domestically. This effort should have two stages. The first stage should focus on improving the quality of existing programs. This would have two aspects. We would see this involving some key TVETs and selected universities that already have some basic capacity along these lines. The universities that meet these general requirements are identified in the report and the TT team in Ethiopia could help further identify promising candidates, especially at the college level.

5.3.4 Tier 4: Graduate Programming

The third tier of the training strategy consists of a **M.Sc. Land Administration Program** that involves the additional 5 courses identified in the report and would focus on the training of a select group of **LA program leaders** who would be instrumental in fashioning a national capacity at key universities. The 5 courses would expand the programmatic focus beyond what is offered at ILA and such program could be based on the training of 10-20 professionals / year, carefully selected with the goal to provide the key leadership in **expanding academic training and research capacity in LA**. MSU could help evolve such program by working closely with ITC - University of Twente.

5.4 Implementation Plan

The implementation of the above recommendations should follow the priorities that we outlined above. As a result, we are recommending a three phase strategy that corresponds to the level of priority indicated (see Table 12).

Table 33: Implementation Plan

Phase 1			
Task	Sub-tasks	Responsible Entities	Completion Date
Parasurveyor and TVET instructors for surveying and mapping (50 parasurveyor instructors and 36 TVET instructors)	1. Determine whether qualification frameworks exist for surveying and mapping in the TVET system.		3 months
	2. Develop a train the trainer model in conjunction with the TVET authorities to accredit those trained.		12 months

	3. Determine where the greatest need for trained technicians are and prioritize those areas.		3 months
	4. Identify qualifying institutions and, where they are absent, work with potential institutions to qualify.		12 months
	5. Recruit 2 instructors to implement a train the trainer model every two years starting at twelve months and assist them with qualifying within the TVET system.		12 months 36 months 60 months
TVET and college instructors for GIS/LIS technicians (42)	1. Determine whether qualification frameworks exist for surveying and mapping in the TVET system.		3 months
	2. If no qualification framework exists, develop one.		12 months
	3. Determine where the greatest need for trained technicians are and prioritize those areas.		3 months
	4. Identify qualifying institutions and, where they are absent, work with potential institutions to qualify.		12 months
	5. Recruit 10 instructors per year for five years and assist them with qualifying within the TVET system.		12 months 24 months 36 months 48 months 60 months
TVET and college instructors for land	1. Determine whether qualification frameworks exist for surveying and mapping in the TVET system.		3 months

administrative technicians (59)	2. If no qualification framework exists, develop one.		12 months
	3. Determine where the greatest need for trained technicians are and prioritize those areas.		3 months
	4. Identify qualifying institutions and, where they are absent, work with potential institutions to qualify.		12 months
	5. Recruit 15 instructors per year for five years and assist them with qualifying within the TVET system.		12 months 24 months 36 months 48 months 60 months
TVET and college instructors for real property appraisers and tax assessors (25-30)	1. Determine whether qualification frameworks exist for surveying and mapping in the TVET system.		3 months
	2. If no qualification framework exists, develop one.		12 months
	3. Determine where the greatest need for trained technicians are and prioritize those areas.		3 months
	4. Identify qualifying institutions and, where they are absent, work with potential institutions to qualify.		12 months
	5. Recruit 40 instructors per year for five years and assist them with qualifying within the TVET system.		12 months 24 months 36 months 48 months 60 months
Phase 2			
TVET and college instructors for	1. Determine whether qualification frameworks exist for surveying and		3 months

land use and urban planners (25-50)	mapping in the TVET system.		
	2. If no qualification framework exists, develop one.		12 months
	3. Determine where the greatest need for trained technicians are and prioritize those areas.		3 months
	4. Identify qualifying institutions and, where they are absent, work with potential institutions to qualify.		12 months
	5. Recruit 10 instructors per year for five years and assist them with qualifying within the TVET system.		12 months 24 months 36 months 48 months 60 months
Develop specialization for land lawyers (30-50)	1. Determine whether a specialization in land law exists and where it exists.		3 months
	2. If no specialization exists, work with select institutions to develop one.		12 months
	3. Determine where the greatest need for trained lawyers is and prioritize those areas.		3 months
	4. Determine whether instructors exist to impart specialized instruction in land law. If not, train them.		36 months
Strengthen and increase LA programs	1. Identify the regions of greatest need for land managers and administrators.		3 months
	2. Identify five institutions in the five areas of greatest need capable of hosting a LA undergraduate program.		6 months

	3. Identify gaps in existing staff for an undergraduate program in all LA degree programs.		12 months
	4. Identify potential B.Sc. holders for further training at the masters level in order to fill gaps in existing staff.		15 months
	5. Send identified candidates for further training at masters level at ILA.		48 months
	6. Integrate newly trained staff into new land management programs.		60 months
Phase 3			
Develop doctorate for LA with possibility of specializations (10-15)	1. Convene national convention to develop curriculum for doctoral level.		3 months
	2. Do gap analysis at ILA looking at potential gaps in existing personnel for implementation of a doctoral program in LA.		6 months
	3. Identify candidates to pursue doctoral education in elite international institutions.		9 months
	4. Identify elite international institutions for study in areas of specialization needed.		9 months
	5. Sign service agreements with doctoral students.		9 months
	6. Apply to international institutions		12 months
	7. Develop a staffing plan for first year of doctoral classes.		18 months

	8. Recruit and sign agreements with international faculty for first two years of classes.		24 months
	9. Begin promotion of program among masters students in the region.		36 months
	10. Open applications for first cohort.		48 months
	11. Begin classes		60 months

5.5 Validation Workshop

In order to ensure the applicability of the outputs of this research, the study design included a validation workshop. The Tetra Tech Land Administration office organized the workshop in collaboration with the study’s consultants. The workshop occurred in Bishoftu, Ethiopia on June 23 and 24, 2015. The purpose of the workshop was to receive critical feedback on the following aspects of this study: (1) data collection and data analysis methodology for both the demand assessment survey and the curricula & institutional capacity assessment; (2) institutional and curricular recommendations; (3) proposed training strategy and implementation plan. The research team reviewed each point of the workshop feedback. The existing version of this report incorporates updated data, curricular and institutional assessments based upon more recent curricula, and many of revised data points from the labor demand survey.

The two-day workshop engaged over 30 stakeholders from the Land Administration system in Ethiopia. Participants represented a diversity of sectors from the LA system including the MoA, MoUDHC, city and rural LA systems, TVET institutions, universities, private sector, and international agencies (See Appendix I for a detailed list of participants and represented agencies, organizations, and institutions). This breadth of diversity was one of the greatest strengths of the workshop, providing robust analysis of the methodology, assessments, and recommendations of this report.

The research team designed the sessions of the workshop mindful of adult learning theory and focus group research methodology in order to maximize stakeholder participation. Day 1 included an introduction of participants, presentations from each member of the research team, and participatory feedback sessions guided by a semi-structured group discussion protocol. Round 1 of stakeholder discussion organized groups according to sectors (e.g. public administration, academic, non-government organizations, etc.). Round 2 of stakeholder discussion organized groups across sectors. The various rounds allowed participants to engage and provide ideas from similar and different perspectives as their own. Appendix I includes the workshop program, and semi-structured group discussion protocol.

Overall, the stakeholders expressed strong appreciation for the report. In large part the stakeholders validated the methodology, findings and recommendations. Major ideas and recommendations that stakeholders validated include the following: the need for technical training at lower education levels is critical to finish the credentialing task; toward that end, reliance upon TVET institutions and short courses to develop parasurveyors is a feasible strategy to develop the bulk of the labor demand for credentialing land; designing sandwich programs to develop a PHD program in LA related fields is a key strategy for sustainable management of Ethiopia's LA system; a recommendation for a "endorsement workshop" for responsible parties at ministry, universities, and regional levels to establish a governance structure for oversight of the implementation plan, budget, and a monitoring and evaluation plan.

Appendix A: Demand Assessment Survey

Example of the Demand Survey Questionnaire

Note: Three target groups were identified. The survey was implemented by a TetraTech consultant and results of this demand assessment together with the interviews are referenced in this report:

**Ethiopia Demand Survey for
Land Administration, Planning, and Policy Professionals
(Version for Employers of Land Administration Professionals in the Public and
Private Sector)**

Note: Your participation in this survey is completely voluntary. The identification information will only be used to contact you if questions remain. All final information will be compiled without any personal identification. Your participation and insights are very important to help identify future educational needs for Ethiopian LA and development programs. We thank in advance for your participation.

A. Identification of the respondent

A1.Name (Please print clearly):	
A2.Date (dd/mm/yyyy):	A3.Gender: 1.Male 2.Female
A3.Permanent Address:	
A4.City :	A5.Woreda/Sub-City
A6. Home Phone:	A7.Cell Phone:
A8. E-mail:	

B. Education

B1.When did you start your job? (month/year): _____

B2.What was your educational major: _____ (First major):

(Second major, if applicable):

B3.What was your last degree before taking this job?

C. Employment Information of the respondent



C01. Presently employed? 1.YES → 2.NO	C02. JOB TITLE	
	C03. JOB POSITION	
C06. Seeking employment? 1.YES 2.NO	C04. Name of employer	
C07. Full or Part-Time: 1.FULL 2.PART-TIME	C05.Type of business	
C08. Private Sector 1.YES 2.NO		
Employer Information		
C09. Contact name:		C10. Contact Phone:
C11. Email Address		C12. Fax Number:
C13. Alternate Contact Name:		C14. Alternate Contact Phone:

Now, let us talk about the demand for the various professions in the field (from your perspective)

C14. For the Professions, below, what do YOU think are the main reasons and anticipate demand? (in 5 years and in 20 years)

Professions	Reasons for the choice	Level of demand (1.high, 2.medium, and 3.low)	Country-wide # of positions needed (your estimate)
1) Land Surveyors (parcel and cadastral surveys)		5 years: 20 years:	5 years: 20 years:
2) Land / Real Estate Appraisers and Tax Specialist		5 years: 20 years:	5 years: 20 years:
3) GIS/LIS* specialists (applied information systems)		5 years: 20 years:	5 years: 20 years:
*GIS = Geographic Information System with generic spatial analytical functions,			
*LIS = Land Information System including relational			

data base and cadastral information linkage			
4) Land Use Managers (Land Conservation, Environmental Planners)		5 years: 20 years:	5 years: 20 years:
5) Land Use and City Planners		5 years: 20 years:	5 years: 20 years:
6) Land Policy Specialist		5 years: 20 years:	5 years: 20 years:
7) University and College Instructors in the subject matter identified		5 years: 20 years:	5 years: 20 years:
8) Land Administration Specialist		5 years: 20 years:	5 years: 20 years:
9) Land Property Lawyer		5 years: 20 years:	5 years: 20 years:
10) Land Administration Technicians		5 years: 20 years:	5 years: 20 years:

C15. Can you identify at least 5 people in those professions currently?

#	Name	Contact
1		
2		
3		
4		
5		

C16. Briefly describe how you see the Main Duties for these professions:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

C17. Is adequate training available for these professions in the country?

1. Yes 2. No 3. Partial

If NO or PARTIAL, briefly identify the most significant needs from your perspective:

C18. If YES, how CLOSELY are the professions related to the education available in country?

1. Directly related 2. Somewhat related

C19. Is your profession related to your career interest? 1. Yes 2. No

C20. How did you find your current job? (Circle the code)

1. Newspaper 2. Profession training institution/Job board 3. Internship 4. Friend
5. Internet
6. Other
(specify): _____

C21. How long after graduation you think it will take (on the average), for these professionals to find a job?

(Months) : _____

(If OVER a YEAR, how many years? _____)

C22. Are most of the professionals identified working in the PRIVATE sector?

1. Yes 2. No

If YES, which professions:

C23. Are most of the professionals identified employed in the PUBLIC sector? 1. Yes 2. No

If YES, identify the professions with the highest number of jobs

C24. Do the professionals employed perform to the needs and satisfaction of the employer? 1. Yes 2. No

If NO, what are the gaps/deficiency of the employees?

D. Salaries/Wages and Benefits

D01. What is the monthly salary for these professions (in local currency)?

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____
- 9 _____
- 10 _____

D02. What job benefits do you anticipate these professions are entitled to?

- a. Medical/health insurance _____ b. housing allowance _____ c. transport allowance _____
- d. phone allowance _____ e. Life insurance _____ f. Paid vacation _____
- g. Paid personal leave _____ h. Paid sick leave _____ i. Pension _____
- g. Tuition reimbursement _____ h. Other Benefits (*special job accommodations, child care, union membership*) _____

D03. If you represent one of the professions identified in section C14 (select the number 1 through 10, see below: __ (please be as specific as possible)

1.	Land Surveyors (parcel and LAND cadastral surveys)
2.	Land / Real Estate Appraisers and Tax Specialist
3.	GIS/LIS specialists (applied information systems)
4.	Land Use Managers (Land Conservation, Environmental Planners)
5.	Land Use and City Planners
6.	Land Policy Specialist
7.	University and College Instructors in the

subject matter identified
8. Land Administration Specialist
9. Land Property Lawyer
10. Land Administration Technicians

D04. General Job Satisfaction (*gauge how satisfied the professionals feel about various aspects of their job. Use a “satisfaction scale” with 4 = Very Satisfied / 3 = Somewhat Satisfied / 2 = Somewhat Dissatisfied / 1 = Very Dissatisfied. (It is recommended that specific strengths or issues be discussed in detail)*)

How satisfied currently are you (or your best judgment on professionals you may know or hear about)?

D04a. Job duties and skills required? _____

Comments:

D04b. Work environment (atmosphere, pressure, facilities)? _____

Comments:

D04c. Relationship with co-workers? _____

Comments:

D04d. Work hours? _____

Comments:

D04e. Wage/benefits? _____

Comments:

D04f. Opportunities to gain new skills and advanced training? _____

Comments:

E. Job Advancement Information

(Based on your best judgment, please answer the following questions. For each question, circle Yes or No and use the provided space for comments)

E01. Have their responsibilities increased in a significant way? 1. Yes 2.No

E01a. If yes, describe. _____

E02. Are they been promoted to a new position in the last 2 years? 1. Yes 2.No

E02a. If yes, describe. _____

E03. Have they received an increase in wages or hours? 1. Yes 2.No

E03a. If yes, describe. _____

E04. Has your status changed so that you are now eligible for benefits? 1. Yes 2.No

E04a. If yes, describe. _____

E05. Have you begun or completed training to gain additional skills that will position you for a raise or promotion? 1. Yes 2. No

E05a. If yes, describe. _____

F. Further Education for current professionals in the professions anticipated to be highly demanded

F01. Whether you are employed or not, are you currently a student?

1. Yes, part-time 2. Yes, full-time 3. Not currently a student (skip to section G)

F02.If currently a student, which school are you attending?

F03a. What is(are) the Degree(s) you are pursuing?

F03b. What is(are) your Major(s)?

F04. When did you start pursuing additional education? (dd/mm/yyyy):

G. General Feedback on the training received (for current professionals in the professions anticipated to be in high demand)

		Mark with "X" the appropriate answer [Note: only one answer is permitted]			
G01	Question	1. Disagree	2. Agree	3. Strongly agree	4. Very Strongly Agree
1	The application and orientation process clearly communicated what you expect from the program				
2	Training institution's staff helped you to clarify your goals and to identify obstacles to achieving them				
3	Training institution's staff worked in a supportive way with you to address specific obstacles				
4	The training program connected you with useful community resources to help you address the needs				
5	Training institution's instructors were helpful and supportive				
6	You were able to develop strong, positive relationship with other students from yours/other training institutions				
7	Training Institution gave you the training and assistance you needed to develop specific job skills				
8	Training Institution gave you the information and experience to perform successful job search				
9	Training Institution helped you develop the problem solving and teamwork skills you need to be successful on the job				
10	Overall, the program met your goals				
11	You would recommend your training institution to others				

Which training institution would you recommend?

G02. Which specific aspects of the training of the demanded professions are MOST likely to be helpful in meeting their need?

G03. What specific aspects of the training of the demanded professions LEAST helpful in meeting their needs?

G04. Please, provide suggestions for improving the services and support provided to the students in these highly demanded professions.

Other Comments:

We thank you for your time. Please contact us (see below) with any questions you may have. We thank you again for your participation!

Appendix B: Semi-Structured Interview Protocol

- 1) What professional positions are most needed in the next 5 years given the needs of Ethiopia's land administrationsystem? In the next 20 years?
- 2) What is your assessment of the current capacity of the educational and training system for preparing land administration professionals?
- 3) What kinds of curricular or training reforms are necessary to address gaps between the current capacity and future needs of the land administrationsystem?

Appendix C: Validity and Reliability of First Stage Survey Data

The data for this report was collected from those who are working in or closely related to some area of LA. The TOR did not, however, call for a “formal survey.” The methodology was not intended to attain high levels of probability and the data collected reflects this. The data collected, therefore, is of somewhat limited predictive value. This is especially evident when it comes to the estimates for needed technical and professional training in five and twenty years. The following tables detail the limitations of the data. It was not a scientifically constructed sample, does not meet scientific standards of representativity, does not meet the scientific threshold for significance ($P < .05$), and therefore is not generalizable under tightly constructed scientific protocols. Such a study would require significantly more time and investments of time and manpower. Nevertheless, while the data is limited in its predictive power, it is valuable for knowing the range of opinions among practitioners and perhaps the proportions of need between technical and professional skill and, when taken together with the insights of experts collected through the interview process, it helps to round out a general picture of the country wide needs.

In the tables below (Table 3 and Table 4), the left column lists the names of professional and technical positions needed for the LA effort. The next column gives the type of data collected, and the third column gives the numerical results. The next three columns repeat the first but with different positions. As can be seen from the data on the five year estimates, minimum and maximum ranges are very large, as are standard deviations. At the bottom of each data column for the different professions, highlighted in yellow, is the information regarding confidence levels. The two ciphers listed, behind the CI95% line, are the range of possible totals if given a confidence interval of 95 percent. The final cipher gives the probability of a random variable falling with a range of $\pm 2,000$ of the mean value, or a range of 4,000 around the mean. When looking at these two ciphers, it becomes apparent that there is little statistical probability that these means are accurate estimates of the actual needs. In other words, taking the position of land surveyor as an example, the range of possible estimates with a 95% confidence interval are between 9,565 and 19,413, while the probability of the true estimate falling between 12,489 and 16,489 is only seven percent.

Table 34: Estimates of demand by professional/technical areas in five years

C14.4a Number of Positions Needed for Professions in 5 Years					
1) LAND SURVEYORS	Minimum	40	6) LAND POLICY SPECIALISTS	Minimum	45
	Maximum	100000		Maximum	16000
	Mean	14489		Mean	3258
	Std. D.	22188		Std. D.	4554
	Sum	1130116		Sum	104265
	Valid N	78		Valid N	32
	95% CI	9565		95% CI	1680
Probability ± 2,000	19413	Probability ± 2,000	4836		
2) LAND/REAL ESTATE APPRISERS and TAX SPECIALISTS	Minimum	19	7) UNIVERSITY and COLLEGE INSTRUCTORS	Minimum	40
	Maximum	30000		Maximum	20000
	Mean	4171		Mean	3647
	Std. D.	6545		Std. D.	4532
	Sum	200184		Sum	134940
	Valid N	48		Valid N	37
	95% CI	2319		95% CI	2187
Probability ± 2,000	6022	Probability ± 2,000	5107		
3) GIS/LIS SPECIALISTS	Minimum	10	8) LAND ADMINISTRATION SPECIALISTS	Minimum	45
	Maximum	100000		Maximum	20000
	Mean	9057		Mean	3569
	Std. D.	18873		Std. D.	4087
	Sum	715508		Sum	171318
	Valid N	79		Valid N	48
	95% CI	4895		95% CI	2413
Probability ± 2,000	13219	Probability ± 2,000	4725		
4) LAND USE MANAGERS	Minimum	19	9) LAND PROPERTY LAWYERS	Minimum	27
	Maximum	100000		Maximum	30000
	Mean	8335		Mean	3096
	Std. D.	17410		Std. D.	5866
	Sum	491774		Sum	120763
	Valid N	59		Valid N	39
	95% CI	3893		95% CI	1255
Probability ± 2,000	12778	Probability ± 2,000	4937		
5) LAND USE and CITY PLANNERS	Minimum	19	10) LAND ADMINISTRATION TECHNICIANS	Minimum	81
	Maximum	100000		Maximum	50000
	Mean	8795		Mean	4740
	Std. D.	20878		Std. D.	8888
	Sum	422171		Sum	165906
	Valid N	48		Valid N	35
	95% CI	2889		95% CI	1795
Probability ± 2,000	14702	Probability ± 2,000	7685		
	Probability ± 2,000	8%	Probability ± 2,000	18%	

The same weaknesses are evident in the 20 year estimates as can be seen from the table below (Table 4). There too the probabilities of a random cipher falling within a 4,000 range around the mean are very low. This does not mean, however, that the data is altogether unreliable. It only means that more weight should be given to the calculated estimates of those who are in positions of leadership in the field. For this reason, in making estimates, we will triangulate the data with the results of the semi-structured interviews, given that most of them were conducted with leaders who are in a position to know.

Table 35: Estimates of demands by professional/technical area in 20 years

C14.4a Number of Positions Needed for Professions in 20 Years					
1) LAND SURVEYORS	Minimum	37	6) LAND POLICY SPECIALISTS	Minimum	50
	Maximum	150000		Maximum	80000
	Mean	14371		Mean	4901
	Std. D.	23703		Std. D.	13980
	Sum	1005955		Sum	156840
	Valid N	70		Valid N	32
	95% CI	8818		95% CI	57
	19924		9745		
	Probability ± 2,000	7%		Probability ± 2,000	11%
2) LAND/REAL ESTATE APPRISERS and TAX SPECIALISTS	Minimum	90	7) UNIVERSITY and COLLEGE INSTRUCTORS	Minimum	200
	Maximum	90000		Maximum	20000
	Mean	6790		Mean	4111
	Std. D.	13918		Std. D.	4688
	Sum	312345		Sum	147990
	Valid N	46		Valid N	36
	95% CI	2768		95% CI	2579
	10812		5642		
	Probability ± 2,000	11%		Probability ± 2,000	33%
3) GIS/LIS SPECIALISTS	Minimum	100	8) LAND ADMINISTRATION SPECIALISTS	Minimum	200
	Maximum	100000		Maximum	100000
	Mean	10867		Mean	7419
	Std. D.	19031		Std. D.	16619
	Sum	782419		Sum	356120
	Valid N	72		Valid N	48
	95% CI	6471		95% CI	2718
	15263		12121		
	Probability ± 2,000	8%		Probability ± 2,000	10%
4) LAND USE MANAGERS	Minimum	95	9) LAND PROPERTY LAWYERS	Minimum	34
	Maximum	59000		Maximum	60000
	Mean	7310		Mean	4243
	Std. D.	9934		Std. D.	9969
	Sum	409365		Sum	161235
	Valid N	56		Valid N	38
	95% CI	4708		95% CI	1073
	9912		7413		
	Probability ± 2,000	16%		Probability ± 2,000	16%
5) LAND USE and CITY PLANNERS	Minimum	95	10) LAND ADMINISTRATION TECHNICIANS	Minimum	60
	Maximum	60000		Maximum	30000
	Mean	8689		Mean	8203
	Std. D.	14681		Std. D.	10232
	Sum	390993		Sum	270708
	Valid N	45		Valid N	33
	95% CI	4399		95% CI	4712
	12978		11694		
	Probability ± 2,000	11%		Probability ± 2,000	16%

Appendix D: Second Stage Data Collection Survey Instrument

ETHIOPIA - LAND ADMINISTRATION TO NURTURE DEVELOPMENT (LAND) PROGRAM

Survey questionnaire for triangulation of the previous survey results

1. Demand estimate for land administration professionals

Region-----

1.1 Assess the current available technical manpower and gaps in your region and estimate demands of professionals in your region in 5, 10 & 20 years time based on the GTP and other policy documents.

No.	Professions	No. of Posts permitted	Education level required			Posts filled	Educational level required			Gap	Future additional demands in: (in addition to existing personnel)	
			Diploma	BSc/ BA	MSc/ MA		Diploma	BSc/ BA	MSc/ MA		5 yr	10 yr
1	Land Surveyors (parcel and cadastral surveys)											
2	Land / Real Estate Appraisers and Tax Specialist											
3	GIS = Geographic Information System with generic spatial analytical functions,											
4	LIS = Land Information System including relational data base and cadastral information linkage											
5	Land Use Managers (Land Conservation, Environmental Planners)											
6	Land Use and City Planners											
8	Land Property Lawyer											
9	Land Administration Technicians											
	if any please specify below											

2. **Briefly** state the reasons for the decline or rise in demand of each profession in the coming 5, 10 & 20 years time based on the above table results.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. Others

3. Based on your experiences and random consultation of *Woreda* and zonal offices, estimate the average number of customers coming to *Woreda* offices seeking land related services. It would be good if the estimate is based on daily basis.
4. Based on your experience, on average, how many hectares of land can one surveyor team survey in one day?
5. How many hectares of land in your region remain unsurveyed?
6. Once a survey is made by the surveyors, explain what typically happens to the survey. What is the process for registering the survey and making it part of the permanent record?
7. Discuss the major skills and knowledge gaps of the above professionals in your institution/organization in properly discharging the responsibilities they are given.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. Others

8. Which professions are critically important for your organization at present and in the next 5, 10 and 20 years time? Why? List in order of importance.

Appendix E: Courses in Curricula Related to Land Administration (select universities)

*B.Sc. Land Administration, Institute of Land Administration (ILA),
Bahir Dar University*

COURSE YEAR AND NAME
YEAR I - Introduction to Land Administration Theory, Principle and Techniques
Introduction to Land Administration
Introduction to Public and Civic Law
Applied Mathematics in Land Administration
Applied Statistics in Land Administration
Communicative English Skills
Introduction to Computer Science, Word Processing and Presentation
Introduction to Data Base Management
Environmental and Natural Resource Management
YEAR II - Applied Surveying, Law and Economics
Basic Surveying
Basic Remote Sensing (Platforms, Land Cover/Use Classification and Mapping)
Photointerpretation and Photogrammetry
Economics in Land Administration (Micro and Macro)
Land Tenure and Property Rights Law
Planning Laws and Regulations
Land Economics and Location Analysis
Land Market Analysis
YEAR III Applied Information Systems, Spatial and Natural Resource Economics
Geographic and Land Information Systems
Cadastral Surveys and Land Registration
Land Information Systems
Land Resource Valuation and Taxation

Benefit Cost and Investment Analysis
Land Use Planning and Economic Development
Applied Writing (2 Semesters)
YEAR IV Applied Land Resource Valuation
Real Estate Appraisal
Property Expropriation and Compensation
Rural and Urban Leases
Land Conflict Communication and Resolution
Land Registration and Taxation
Land Policy and Sustainable Economic Development
Senior Project (2 semesters)

Year I Semester I

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Introduction to Land Administration	Laad 161	4cr.hrs	Introduction to law and public law	Laad 151	4 cr.hrs
Applied Mathematics for Land Administration I			Laad 131	4 cr.hrs	
Communicative English Skills			EnLa 121	3 cr.hrs	
Introduction to Computer			Comp 123	2 cr.hrs	
Total			17		

Year I Semester II

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Environement and Natural Ressources Magt			Laad 162	6cr.hrs	
Applied Mathematics for Land Administration II			Laad 132	4cr.hrs	
Computer Programming and data base			Comp122	6cr.hrs	
Statistics for Land Administration			Laad 142	3cr.hr	



Total	19
-------	----

Year II Semester I

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Basic Surveying			Laad 231		4cr.hrs
Micro & Macro-economics for Land Administration			Laad 241		6cr.hrs
Basic Writing Skills			EnLa 221		3 Cr.hrs
Land Tenure	Laad 261	3 cr.hrs	Property law	Laad 251	4 cr.hrs
Total			20		

Year II Semester II

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Geodetic Surveying	Laad 230	4 cr.hrs	Satellite Positioning	Laad 232	4 cr.hrs
Property market Analysis	Laad 242	4 cr.hrs			
Photogrammetry and Remote sensing			Laad 234		6 cr.hrs
Total			18		

Year III Semester I

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Geographic Information Systems (GIS)			Laad 331		6 cr.hrs
Civil Laws (8cr.hrs)			Laad 351		8 cr. hrs
Research methods for Land Administration			Laad 361		3 cr.hrs
Total			17		

Year III Semester II

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr

Cadastral Survey and Land Registration				Laad 332	6cr.hrs
Land Law	Laad 352	4 cr.hr	Property Investment Analysis	Laad 342	4cr.hrs
Urban and Rural Land Use Planning and Development				Laad 362	6cr.hrs
Total				20	

Year IV Semester I

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Property Valuation (8cr.hrs)				Laad 441	8 cr.hrs
Compulsory Land Acquisition	Laad 461	3 cr.hr	Urban and Rural Land Leases	Laad 463	4 cr.hrs
Senior Essay I				Laad 465	3 cr..hr
Total				18	

Year IV Semester II

Block I			Block II		
Course name	Code	Credit hr	Course name	Code	Credit hr
Governing Common Land and Infrastructure				Laad 460	6cr.hrs
Land policy and Reforms	Laad 462	3 cr.hr	Communication and Negotiation	Laad 464	4 cr.hrs
Senior Essay II				Laad 466	3 cr..hr
Total				16	

List of Required Classes

LIST OF REQUIRED COURSES											
	BASIC TRACKS	Course Code	Cr.Hr	1	2	3	4	5	6	7	8
1	Communicative English Skills	EnLa 121	3 cr.hrs	3							
2	Introduction to Computer	Comp 123	2 cr.hrs	2							

	Computer Programming and Data Base	Comp122	6cr.hrs		6								
4	Basic Writing Skills	EnLa 221	3 Cr.hrs			3							
	TOTAL		14										
	GEOMATIC TRACK												
1	Applied Mathematics for Land Administration I	Laad 131	4 cr.hrs	4									
2	Applied Mathematics for Land Administration II	Laad 132	4cr.hrs		4								
3	Basic Surveying	Laad 231	4cr.hrs			4							
4	Geodetic Surveying	Laad 230	4 cr.hrs				4						
5	Satellite Positioning	Laad 232	4 cr.hrs				4						
6	Photogrammetry and Remote sensing	Laad 234	6 cr.hrs				6						
7	Geographic Information Systems (GIS)	Laad 331	6 cr.hrs					6					
8	Cadastral Survey and Land Registration	Laad 332	6cr.hrs						6				
	TOTAL		38										
	ECONOMICS TRACK												
1	Statistics for Land Administration	Laad 142	3cr.hr		3								
2	Micro & Macro-economics for Land Administration	Laad 241	6cr.hrs			6							
3	Property Market Analysis	Laad 242	4 cr.hrs				4						
4	Property Investment Analysis	Laad 342	4cr.hrs						4				
5	Property Valuation (8cr.hrs)	Laad 441	8 cr.hrs								8		
	TOTAL		25										
	LAW TRACK												
1	Introduction to law and public law	Laad 151	4 cr.hrs	4									
2	Property Law	Laad 251	4 cr.hrs			4							
3	Civil Law	Laad 351	8 cr.hrs					8					
4	Land Law	Laad 352	4 cr.hr						4				
	TOTAL		20										
	LAND MANAGEMENT TRACK												

1	Introduction to Land Administration	Laad 161	4cr.hrs	4									
2	Environment and Natural Resource Mgnt.	Laad 162	6cr.hrs		6								
3	Land Tenure	Laad 261	3 cr.hrs			3							
4	Research methods for Land Administration	Laad 361	3 cr.hrs					3					
5	Urban and Rural Land Use Planning and Development	Laad 362	6cr.hrs						6				
6	Compulsory Land Acquisition	Laad 461	3 cr.hr								3		
7	Urban and Rural Land Leases	Laad 463	4 cr.hrs								4		
8	Senior Essay I	Laad 465	3 cr..hr								3		
9	Governing Common Land and Infrastructure	Laad 460	6cr.hrs										6
10	Land Policy and Reforms	Laad 462	3 cr.hr										3
11	Communication and Negotiation	Laad 464	4 cr.hrs										4
12	Senior Essay II	Laad 466	3 cr..hr										3
	TOTAL		48										
	Number of credit Hours per semester			1	1	2	1	1	2	1	1	1	1
	Total Credit Hours		145	7	9	0	8	7	0	8	6		

B.Sc. Surveying and Mapping, Ethiopian Civil Service University

Course Categorization Supportive Courses

Category	Course No.	Course Title	Cr. Hr.
Mathematics and Statistics	Math 101	Preliminary Mathematics	3
	Math 102	Analytic Geometry and Calculus	3
	Stat 201	Statistics	4
	Math 201	Applied Mathematics	3
Language	Eng 101	English for Development Studies	3
	Eng 142	Spoken English	2
	Eng 241	Technical writing for developmental studies	3
Ethics	DM 482	Ethics & Public Service delivery	3
Total Courses	8	Total Credit Hours	24

Related Courses

Category	Course No.	Course Title	Cr.Hr.
Computer based courses	Comp 141	Basics of Computer Skill	2
	Comp 242	Fundamentals of Programming	3
	Comp 341	Fundamentals of Database System (DBS)	3
Social Studies	SM 101	Fundamentals of Geography	3
	SM 431	Research Methodology	3
Environmental	SM 321	Basics of Environmental Management	3
Economics and Finance	Econ 102	Basics of Economics	3
Planning, Design and Engineering Courses	UE 261	Computer Aided Design	2
	UP 202	Land Use development and controls	2

	UE 141	Graphic Communication skills I	3
	UE 142	Graphic Communication skills II	3
	UE 241	Architectural working drawing	3
	UE 342	Building Construction	3
	UE 361	Construction Material	3
	UE 372	Highway	3
	UE 441	Quantity Surveying	3
	SM 371	Terrain Analysis	2
Physics	Phy 101	General Physics	3
Land Management	ULMIS 302	Land Management and Administration	3
Total Courses	19	Total Credit Hours	53

Major Courses

Category	Course No.	Course Title	Cr. Hr.
Surveying Courses	SM 141	Basics of Surveying	3
	SM 341	Surveying Software's	3
	SM 152	Topographic Surveying	3
	SM 202	Theory of measurement error and adjustment	3
	SM 242	Route Surveying & Design	3
	SM 352	Cadastral Surveying	3
	SM 451	Cadastral project	3
	SM 441	Construction Surveying	3
	SM 261	Control Surveying	3
	SM 302	Surveying organization and planning	2
Mapping Course	SM 241	Cartography	3

	SM 102	Map Reading and Interpretation	3
	SM 331	Coordinate system and Map Projection	3
	SM 461	Digital Mapping	3
	SM 212	Photogrammetry I	3
	SM 351	Photogrammetry II	2
GIS and Remote Sensing Courses	SM 362	Geographic Information System (GIS)	3
	ULMIS 441	Land Information System (LIS)	3
	SM 122	Remote Sensing	2
	SM 252	Fundamentals of Global Position system (GPS)	3
	ULMIS 422	Land Policy and Legislation	3
Senior Essay	SM 442	Senior Project	6
Practical Attachment	SM 471	Practicum	1
Total Courses	23	Total Credit Hours	67
Grand Total	50	Grand Total	144

COURSE ARRANGEMENT BY SEMESTER

Year 1 Semester 1

Course Code	Course title	Cr.hr.	Lec.	Lab.	Prerequisite
Eng 101	English for Development Studies	3	3	0	
Math 101	Preliminary Mathematics	3	3	1 *	
Comp 141	Basics of Computer Skill	2	1	3	
SM 101	Fundamentals of Geography	3	3	0	

UE 141	Graphic Communication Skills I	3	1	6	
Phy 101	General Physics	3	3	0	
SM 141	Basics of Surveying	3	2	3	
		20	16	13	

* Tutor Hour

Year 1 Semester 2					
Course Code	Course title	Cr.hr.	Lec .	Lab.	Prerequisite
Math 102	Analytic Geometry and Calculus	3	3	1 *	Math 101
UE 142	Graphic Communication Skills II	3	1	6	UE 141
Econ 102	Basics of Economics	3	3	0	Math 101
SM 102	Map Reading and Interpretation	3	3	0	
SM 122	Remote Sensing	2	1	3	
Eng 142	Spoken English	2	0	2	
SM 152	Topographic Surveying	3	2	3	SM 141
		19	13	15	
* Tutor Hour					

Year 2 Semester 1

Course Code	Course title	Cr.hr	Lec	Lab.	Prerequisite
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Eng 241	Technical writing for developmental studies	3	3	0	Eng 101
Stat 201	Statistics	4	4	1 *	Math 102
UE 241	Architectural working drawing	3	1	6	UE 142
SM 241	Cartography	3	2	3	SM 102
Math 201	Applied mathematics	3	3	1*	Math 102
UE 261	Computer Aided Design	2	1	6	Comp 141
SM 261	Control Surveying	3	2	3	SM 141
		21	16	20	
* Tutor Hour					

Year 2 semester 2

Course Code	Course title	Cr.hr	Lec	Lab.	Prerequisite
SM 242	Route Surveying and Design	3	1	6	SM 141
UP 202	Land use development and controls	2	2	0	
SM 202	Theory of measurement errors and adjustment	3	3	0	Math 101
SM 252	Fundamentals of Global Position system (GPS)	3	1	6	
SM 212	Photogrammetry I	3	2	3	
Comp 242	Fundamental of Programming	3	2	3	Comp 141

	17	11	18	
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Year 3 semester 1

Course Code	Course title	Cr.hr .	Lec.	Lab .	Prerequisite
UE 361	Construction Material	3	2	3	
SM 341	Surveying Software's	3	1	6	SM 141
SM 371	Terrain Analysis	2	1	3	
SM 351	Photogrammetry II	2	1	3	SM 212
Comp 341	Fundamentals of Database System (DBS)	3	2	3	Comp 141
SM 321	Basics of Environmental Management	3	3	0	
SM 331	Coordinate system and Map Projection	3	3	0	SM 102
		19	13	18	

Year 3 semester 2

Course Code	Course title	Cr.hr .	Lec.	Lab .	Prerequisite
SM 362	Geographic Information System (GIS)	3	2	3	Comp141, SM 102
ULMIS 302	Land Management and Administration	3	3	0	
UE 372	Highway	3	2	3	
SM 352	Cadastral Surveying	3	2	3	SM 141

SM 302	Surveying organization and planning	2	2	0	
UE 342	Building Construction	3	2	3	UE 142 & UE 361
		17	13	12	

Year 4 semester 1

Course Code	Course title	Cr.hr	Lec.	Lab.	Prerequisite
SM 441	Construction surveying	3	2	3	SM 141
SM 461	Digital Mapping	3	1	6	SM 102, SM 362
SM 451	Cadastral project	3	1	6	SM 352,
ULMIS 441	Land Information System (LIS)	3	2	3	SM 362
UE 441	Quantity Surveying	3	2	3	UE 342
SM 431	Research Methodology	3	3	0	
SM 471	* Practicum	1	0	3	All except DM 482 and ULMIS 422
		19	11	24	
* Practicum – This course should be given in 4th year 1st semester for two months.					

Year 4 Semester 2

Course No.	Course title	Cr.hr	Lec.	Lab.	Prerequisite
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SM 442	Senior Project	6	0	18	All except DM 482 and ULMIS 422
DM 482	Ethics & Public Service delivery	3	3	0	
ULMIS 422	Land Policy and Legislation	3	3	0	
		12	6	18	

SUMMARY OF COURSES AND CREDIT HOURS

Year	Sem	Total no. of Courses	Total Credit hrs.	Total Lecture hrs.	Total Lab. Hrs.	Total Hours
1	1	7	20	16	13	29
	2	7	19	13	15	28
2	1	7	21	16	20	36
	2	6	17	11	18	29
3	1	7	19	13	18	31
	2	6	17	13	12	25
4	1	7	19	11	24	35
	2	3	12	6	18	24

Total	50	144	99	138	237
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Appendix F: Staffing Plan for Selected Universities

Staffing Profile for Institute of Land Administration (ILA), Bahir Dar University (2010)

#	Name of the instructor	Sex	Nation.	Degree	Academic Rank	Specialization
1	AbatenehYitayew	M	Ethiopian	BSc	G/ Assistant II	Civil Engineer
2	AchamyelehGashu	M	Ethiopian	MSc	Lecturer (PhD student)	LA
3	AmezenReda	M	Ethiopian	B.Sc	G/Assistant II	Surveying
4	AndeneteAssagre	M	Ethiopian	MSc	Lecturer	Geodesy
5	AsmamawTenko	M	Ethiopian	Bed	Ass. Lecturer	LA
6	BekeleBedada	M	Ethiopian	B.Sc	G/Assistant II	Surveying
7	BelachewYirsaw	M	Ethiopian	MSc	Lecturer (PhD student)	LA
8	BerhanuKefale	M	Ethiopian	MSc	Lecturer (PhD student)	Geoinformatics
9	BirhanuAlene	M	Ethiopian	MSc	Lecture	Urban Planning
10	Daniel W/Gebriel	M	Ethiopian	MSc	Lecturer (PhD student)	LA
11	GetachewTesfaye	M	Ethiopian	MSc	Lecturer	Geoinformatics

1 2	HibretBelete	M	Ethiopian	MSc	Lecturer	LA
1 3	Mekonnen	M	Ethiopian	Diplo ma	Tech. Assistant	IT
1 4	Melekot	M	Ethiopian	Diplo ma	Tech. Assistant	IT
1 5	MelkamuBelachew	M	Ethiopian	MSc	Lecturer	LA
1 6	MinichelAlemu	M	Ethiopian	Diplo ma	Tech. Assistant	Surveying
1 7	SeidHussen	M	Ethiopian	MSc	Lecturer	LA
1 8	TayeMinale	M	Ethiopian	LL.B	Ass. Lecturer	Law
1 9	TeshomeTaffa	M	Ethiopian	MSc	Associate Professor	LA
2 0	WebanteFetene	M	Ethiopian	BA	Ass. Lecturer	Economics
2 1	WorkaferahuAbebe	F	Ethiopian	MSc	Lecturer	Geodesy
2 2	ZelalemYibrah	M	Ethiopian	LL.B	Ass. Lecturer	Law
2 3	ZelalemYirga	M	Ethiopian	MSc	Lecturer	LA

Staffing Plan for Ethiopian Civil Service University

Specialization	Qualification	Background	No	Remark
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Urban Planner	Msc /BSc	Urban planning (in case of MSc/MA)	1	To be pulled from UP dept	
Architect	BSc and above	Architecture(in case of MSc/MA)	1	To be pulled from UE dept	
Regional Planner	MA and above	Geography or related	1	To be pulled from UP or ULMIS dept	
Urban design specialist	MA and above	Urb.planning/Arch it.	1	To be pulled from UP dept	
Environmental-Planner	Msc and above	Any related	1	To be pulled from UE, UP or ULMIS dept	
Surveying	Msc. and above	-	3	Full time	I dept
Cartographer	Msc. and above		1	Full time	I dept
GIS specialist	Msc. and above	Any related.	1	Full time	I dept
LIS specialist	Msc. and above	Any related.	1	Full time	I dept
Design/Drafting tech.	BSc. and above	-	1	Full time	I dept
Surveying and Mapping	BSc and above		1	Full time	I dept
Geographer	BA and above		1	To be pulled from UP dept	
Statistician	MA and above		1	To be pulled from Math unit.	
Mathematics	MA and above	-	2	To be pulled from Math unit.	
English	MA and above	-	2	To be pulled from English Lang. unit.	
Law Professional	LLB or LLM	-	1	To be pulled from UP dept	

IT specialist	M.Sc in Computer Engineering		1	Full time for I dept	
Lab Assistant	Diploma in computer Science		2	Full time for I dept	
Secretary		-	1	Full time	for I dept

Appendix G: Tabular Survey Results

DEMAND SURVEY ON LAND ADMINISTRATION, PLANNING AND POLICY PROFESSIONALS

Data Output

SECTION A - Identification



Number of respondents participated in the study

	REGION									
	Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
No.	15	29	30	18	9	9	6	19	4	139
%	10.8%	20.9%	21.6%	12.9%	6.5%	6.5%	4.3%	13.7%	2.9%	100.0%

A3) Gender of respondents participated in the study

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Male	No.	15	27	27	18	9	8	4	16	4	128
	% of Total	10.8%	19.4%	19.4%	12.9%	6.5%	5.8%	2.9%	11.5%	2.9%	92.1%
Female	No.		2	3			1	2	3		11
	% of Total		1.4%	2.2%			0.7%	1.4%	2.2%		7.9%
Total	No.	15	29	30	18	9	9	6	19	4	139
	% of Total	10.8%	20.9%	21.6%	12.9%	6.5%	6.5%	4.3%	13.7%	2.9%	100.0%

SECTION B - Educational status of respondents

B2) Educational Major of respondents

	REGION																			
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Architectural designing	1	0.7%									1	0.7%							2	1.5%
Urban planning	2	1.5%	1	0.7%	3	2.2%					2	1.5%	2	1.5%	1	0.7%			11	8.2%
Agriculture	1	0.7%																	1	0.7%
Forestry	3	2.2%					1	0.7%											4	3.0%
Soil and water management	3	2.2%																	3	2.2%
Surveying	2	1.5%	1	0.7%					1	0.7%			2	1.5%	2	1.5%			8	6.0%
Technology/Surveying																				
General drafting	1	0.7%									1	0.7%							2	1.5%
Marketing	1	0.7%			1	0.7%	1	0.7%											3	2.2%
Construction	1	0.7%																	1	0.7%
Development Economics			1	0.7%															1	0.7%
Agricultural Engineering			1	0.7%										1	0.7%				2	1.5%
Agricultural Extension			1	0.7%															1	0.7%
Pedagogy			1	0.7%															1	0.7%
Applied Geography			3	2.2%															3	2.2%
Land administration			4	3.0%	1	0.7%			2	1.5%									7	5.2%
Business administration			2	1.5%													1	0.7%	3	2.2%
Computer Science			1	0.7%	2	1.5%								1	0.7%				4	3.0%
Economics			3	2.2%			1	0.7%						1	0.7%				5	3.7%

Information technology			1	0.7%	1	0.7%			1	0.7%			1	0.7%					4	3.0%
Natural resource management			2	1.5%			2	1.5%						1	0.7%				5	3.7%
Geodesy			2	1.5%															2	1.5%
Law			2	1.5%	2	1.5%													4	3.0%
Geographic Information System (GIS)			1	0.7%	1	0.7%								1	0.7%				3	2.2%
GIS and remote sensing			1	0.7%	1	0.7%								1	0.7%				3	2.2%
Civil engineering					2	1.5%											1	0.7%	3	2.2%
Soil science					1	0.7%													1	0.7%
Plant science					3	2.2%													3	2.2%

B2) Educational Major of respondents (continued)

	REGION																				
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Photogrammetric					1	0.7%														1	0.7%
Agricultural economics					1	0.7%									1	0.7%				2	1.5%
Rural development					1	0.7%			1	0.7%					1	0.7%				3	2.2%
Geography and environmental studies					1	0.7%														1	0.7%
Geology					1	0.7%														1	0.7%
Urban Management					1	0.7%					1	0.7%								2	1.5%
General Agriculture					1	0.7%	1	0.7%												2	1.5%

Natural Science					1	0.7%												1	0.7%	
Animal Science					1	0.7%	2	1.5%										3	2.2%	
Geo information					1	0.7%												1	0.7%	
Range land Management							1	0.7%										1	0.7%	
Accounting							2	1.5%			1	0.7%						3	2.2%	
Land Management							1	0.7%			1	0.7%						2	1.5%	
Hydraulic engineering							1	0.7%										1	0.7%	
Building construction							1	0.7%										1	0.7%	
Engineering							1	0.7%										1	0.7%	
Environmental management									1	0.7%								1	0.7%	
Land and water resources									1	0.7%								1	0.7%	
Geography					1	0.7%			1	0.7%	2	1.5%	1	0.7%	2	1.5%		7	5.2%	
Land resource management and environmental protection									1	0.7%								1	0.7%	
Agronomy															1	0.7%		1	0.7%	
Veterinary medicine															1	0.7%		1	0.7%	
Development studies															1	0.7%		1	0.7%	
Electricity															1	0.7%		1	0.7%	
Agronomy															2	1.5%		2	1.5%	
Public administration and Development management																	2	1.5%	2	1.5%
Total	15	11.2%	28	20.9%	29	21.6%	15	11.2%	9	6.7%	9	6.7%	6	4.5%	19	14.2%	4	3.0%	134	100%

3) What was your last degree before taking this job?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
MSc	No.	4	7	7	2		1		5		26
	%	44.4%	35.0%	29.2%	11.8%		14.3%		29.4%		24.3%
MA	No.	3	5	7		2			2		19
	%	33.3%	25%	29.2%		25%			11.8%		17.8%
BSc	No.	1	4	8	11	2	1	2	4	1	34
	%	11.1%	20.0%	33.3%	64.7%	25.0%	14.3%	100.0%	23.5%	33.3%	31.8%
PhD	No.	1	1								2
	%	11.1%	5.0%								1.9%
LLB	No.		1								1
	%		5%								0.9%
BA	No.		1	2	2	2	3		3	1	14
	%		5.0%	8.3%	11.8%	25.0%	42.9%		17.6%	33.3%	13.1%
Advanced Diploma	No.				1						
	%				5.9%						
Diploma	No.		1		1	2	2		2		8
	%		5.0%		5.9%	25%	28.6%		11.8%		7.5%
BEd	No.								1		1

	%								5.9%		0.9%
MBA	No.									1	1
	%									33.3%	0.9%
Total	No.	9	20	24	17	8	7	2	17	3	107
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

SECTION C - Employment Information of respondents

C01) Are you presently employed?

		region									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	No.	15	26	29	17	9	9	6	18	4	133
	%	100.0%	96.3%	96.7%	100.0%	100.0%	100.0%	100.0%	94.7%	100.0%	97.8%
No	No.		1	1					1		3
	%		3.7%	3.3%					5.3%		2.2%
Total	No.	15	27	30	17	9	9	6	19	4	136
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C02) If employed - JOB TITLE

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total

	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Senior expert	1	6.7%																	1	0.8%
Cadastral surveyor	1	6.7%	2	8.3%							1	11.1%							4	3.1%
Property system officer	1	6.7%	1	4.2%															2	1.6%
Land use planning expert	1	6.7%																	1	0.8%
City/Urban planner	1	6.7%											2	33.3%	1	5.9%			4	3.1%
Lecturer/Instructor	7	46.7%	10	41.7%	6	23.1%			4	44.4%					3	17.6%			30	23.6%
Researcher	1	6.7%	2	8.3%	1	3.8%													4	3.1%
Surveyor	1	6.7%			1	3.8%	1	5.9%					2	33.3%			1	25.0%	6	4.7%
Trainer	1	6.7%													1	5.9%			2	1.6%
Land administration officer/expert			3	12.5%	4	15.4%			2	22.2%					2	11.8%			11	8.7%
Farmer			1	4.2%															1	0.8%
Compensation officer			1	4.2%															1	0.8%
Investor			1	4.2%															1	0.8%
Real estate property registrar			3	12.5%									1	11.1%					4	3.1%
Civil Engineer					1	3.8%													1	0.8%
Rural LA officer					1	3.8%													1	0.8%
Administrator					1	3.8%													1	0.8%
Land readjustment regularization					1	3.8%													1	0.8%
Public relation officer					1	3.8%									1	5.9%			2	1.6%

Agronomist					1	3.8%														1	0.8%
Monitoring officer					1	3.8%														1	0.8%
GIS Officer					1	3.8%														1	0.8%

C02) JOB TITLE (continued)

	REGION																				
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Geospatial analyst					1	3.8%														1	0.8%
Labor market researcher					1	3.8%														1	0.8%
Agricultural expert					1	3.8%														1	0.8%
Coordinator							1	5.9%												1	0.8%
Officer							8	47.1%												8	6.3%
Case process owner							1	5.9%												1	0.8%
Market study and training case coordinator							1	5.9%												1	0.8%
Project coordinator							1	5.9%												1	0.8%
Case team leader							1	5.9%												1	0.8%
Land use expert							2	11.8%	1	11.1%										3	2.4%
Team leader							1	5.9%												1	0.8%

land dispute resolution officer										1	11.1%									1	0.8%
Teacher										1	11.1%									1	0.8%
Urban land service delivery Standardization support processor												1	11.1%							1	0.8%
Planer and programmer												1	11.1%					1	25.0%	2	1.6%
Urban administrator												1	11.1%							1	0.8%
City plan process owner												1	11.1%	1	16.7%					2	1.6%
Regional planner												1	11.1%							1	0.8%
Property valuation and marketing officer												1	11.1%							1	0.8%

C02) JOB TITLE (continued)

	REGION																					
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
land bank and transfer coordinator												1	11.1%								1	0.8%
Land valuation																1	5.9%				1	0.8%
Environment pollution control officer																1	5.9%				1	0.8%
Land registration and certification expert					1	3.8%										2	11.8%	1	25.0%		4	3.1%

Land development and administration work processor															1	5.9%			1	0.8%
Technology transfer office coordinator															1	5.9%			1	0.8%
Training material supply officer															1	5.9%			1	0.8%
GIS and remote sensing officer													1	16.7%					1	0.8%
Land data officer															1	5.9%			1	0.8%
Researcher and lecturer															1	5.9%			1	0.8%
Consultant					1	3.8%													1	0.8%
Sales executive					1	3.8%													1	0.8%
Land development and administration head																	1	25.0%	1	0.8%
Total	15	100%	24	100%	26	100%	17	100%	9	100%	9	100%	6	100%	17	100%	4	100%	127	100%

C03) If employed - JOB POSITION

	REGION																			
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
GIS expert	1	7.7%			5	25.0%			1	12.5%	3	42.9%			8	57.1%	1	50.0%	19	18.8%

Project Coordinator	3	23.1%																					3	3.0%	
Case manager	1	7.7%																						1	1.0%
Project supervisor	1	7.7%			1	5.0%					1	25.0%						1	50.0%					4	4.0%
Lecturer /Assistant lecturer	4	30.8%	5	27.8%	2	10.0%		2	25.0%				3	21.4%										16	15.8%
Research council head	1	7.7%																						1	1.0%
Asst./Associate professor	2	15.4%											1	7.1%										3	3.0%
land administration and use process owner				3	16.7%	1	5.0%					1	25.0%											5	5.0%
Cadastral surveying expert				3	16.7%	1	5.0%																	4	4.0%
Regional senior expert				1	5.6%																			1	1.0%
Education expert				1	5.6%																			1	1.0%
Land registration officer				1	5.6%																			1	1.0%
Land compensation officer				1	5.6%																			1	1.0%
Post graduate assistant				1	5.6%																			1	1.0%
vice Dean				1	5.6%																			1	1.0%
Director				1	5.6%																			1	1.0%
Application development head						1	5.0%																	1	1.0%
Department head						2	10.0%																	2	2.0%

Head of the federal urban property and information agency						1	5.0%												1	1.0%
Institution head						1	5.0%												1	1.0%
Urban planning department head						1	5.0%												1	1.0%

C03) JOB POSITION (continued)

	REGION																				
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Per time lecturer					1	5.0%														1	1.0%
Industrial extension worker							1	6.7%												1	1.0%
Market study and training officer							1	6.7%												1	1.0%
Accountant							1	6.7%												1	1.0%
Project officer							2	13.3%												2	2.0%
Soil and water conservation specialist							2	13.3%												2	2.0%
Forestry and wildlife resource officer							1	6.7%												1	1.0%
Land use and utilization officer							1	6.7%												1	1.0%

Biodiversity researcher						1	6.7%													1	1.0%
Land project coordinator						1	6.7%													1	1.0%
Urban land administration land engineer expert						1	6.7%													1	1.0%
GIS specialist						1	6.7%													1	1.0%
Socio-economic expert						1	6.7%													1	1.0%
Sanitation work team leader						1	6.7%													1	1.0%
Graduate assistant										3	37.5%									3	3.0%
Not applicable										1	12.5%									1	1.0%
Irrigation development head										1	12.5%									1	1.0%

C03) JOB POSITION (continued)

	REGION																				
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Standardization case team leader											1	14.3%								1	1.0%
Regular worker/employee											1	14.3%								1	1.0%
Team leader											1	14.3%								1	1.0%

City plan process owner												1	14.3%								1	1.0%	
Urban planning expert														2	50.0%							2	2.0%
Land bank expert																				1	7.1%	1	1.0%
Trade coordinator																				1	7.1%	1	1.0%
Center for African Studies Head						1	5.0%															1	1.0%
Consultant						1	5.0%															1	1.0%
Sales executive						1	5.0%															1	1.0%
Total	13	100%	18	100%	20	100%	15	100%	8	100%	7	100%	4	100%	14	100%	2	100%	101	100%			

C04) Name of employer

	REGION																					
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Environmental protection land administration and use agency/Authority	2	20.0%											2	33.3%							4	4.1%
Ministry of urban development and construction	1	10.0%																			1	1.0%
Mekelle University	5	50.0%																			5	5.1%

Mekelle Poly Technique collage	2	20.0%																	2	2.0%
Bureau of Environmental Protection and Land Administration			4	21.1%	2	8.3%			1	16.7%									7	7.1%
Bahir Dar city administration office			6	31.6%															6	6.1%
Bahir Dar city industry and urban service office			1	5.3%															1	1.0%
TVET College/commission Bahir Dar University			2	10.5%	2	8.3%	4	26.7%											8	8.2%
Geomark system					2	8.3%													2	2.0%
sunshine construction					1	4.2%													1	1.0%
Ethiopian Civil Service University					5	20.8%													5	5.1%
Land development management bureau tenure administration transitional period service project office					1	4.2%													1	1.0%

C04) Name of employer (continued)

	REGION																				
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Ministry of agriculture					5	20.8%														5	5.1%
Oromiya bureau and rural land and environmental protection					1	4.2%														1	1.0%
Federal urban land and land related registration information agency					1	4.2%														1	1.0%
Livestock, crop and rural development bureau							6	40.0%												6	6.1%
City administration/ Municipality							5	33.3%					4	66.7%						9	9.2%
Haromaya university									5	83.3%					2	15.4%				7	7.1%
Land development and Management bureau											4	100.0%								4	4.1%
Ministry of education															1	7.7%				1	1.0%

Natural resource and environmental protection authority															8	61.5%			8	8.2%
Wondirad Mengesha school															1	7.7%			1	1.0%
Poly technique collage															1	7.7%			1	1.0%
Enyi real estate					3	12.5%													3	3.1%
City development and constitution bureau																	1	100.0%	1	1.0%
Addis Ababa University					1	4.2%													1	1.0%
Total	10	100%	19	100%	24	100%	15	100%	6	100%	4	100%	6	100%	13	100%	1	100%	98	100%

C05) Type of Business

	REGION																			
	Tigray		Amhara		Addis Ababa		Somali		Oromiya		Dire Dawa		Afar		SNNP		Harari		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Land related research	1	8.3%	1	7.7%															2	2.3%
Soil, land use planning and policy formulation	1	8.3%																	1	1.2%
Urban/City service-giving activity	1	8.3%					1	7.7%			1	33.3%			1	7.1%			4	4.7%
Training institution	8	66.7%													3	21.4%			11	12.8%
Building rural land administration system			1	7.7%															1	1.2%

Environmental Protection			1	7.7%												1	1.2%
Land administration	1	8.3%			4	30.8%		2	66.7%	2	33.3%	5	35.7%			14	16.3%
Land use Planning			1	7.7%												1	1.2%
Free service-givers to the city			1	7.7%												1	1.2%
Public administration			1	7.7%	1	7.7%	1	20.0%								3	3.5%
LA office			6	46.2%										1	100.0%	7	8.1%
Academic/Education/Research			1	7.7%	3	15.8%		1	20.0%			1	7.1%			6	7.0%
Construction and real estate development					1	5.3%										1	1.2%
City administration					8	42.1%										8	9.3%
Administering rural land use planning and environmental protection					1	5.3%										1	1.2%
Project works and service delivery					1	5.3%										1	1.2%

C05) Type of Business (continued)

REGION										
Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total	



	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Consultancy service					1	5.3%													1	1.2%
Service delivery activity					1	5.3%			2	40.0%			2	33.3%					5	5.8%
Range land management							1	7.7%											1	1.2%
Training at college level							1	7.7%											1	1.2%
Marketing/Trading							1	7.7%											1	1.2%
Animal protection							1	7.7%											1	1.2%
Forest resource and products							1	7.7%											1	1.2%
Biodiversity protection							1	7.7%											1	1.2%
Soil and water conservation							1	7.7%											1	1.2%
Urban planning									1	20.0%									1	1.2%
Urban Planning and land administration													2	33.3%					2	2.3%
Conservation of natural resource and environmental protection															1	7.1%			1	1.2%
Land certification and environmental protection															1	7.1%			1	1.2%
Land information registration															1	7.1%			1	1.2%

Land administration, land use and environmental protection																	1	7.1%			1	1.2%
Real estate					3	15.8%															3	3.5%
Total	12	100%	13	100%	19	100%	13	100%	5	100%	3	100%	6	100%	14	100%	1	100%			86	100%

C06) Seeking Employment

		region									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	No.	6	2	8	6	1	1		7	1	32
	%	54.5%	11.1%	47.1%	33.3%	25.0%	25.0%		46.7%	50.0%	35.2%
No	No.	5	16	9	12	3	3	2	8	1	59
	%	45.5%	88.9%	52.9%	66.7%	75.0%	75.0%	100.0%	53.3%	50.0%	64.8%
Total	No.	11	18	17	18	4	4	2	15	2	91
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C07) FULL-TIME or PART-TIME

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Full	No.	14	20	25	16	9	6	3	16	3	112
	%	100.0%	95.2%	92.6%	94.1%	100.0%	100.0%	100.0%	94.1%	100.0%	95.7%

Part time	No.		1	2	1				1		5
	%		4.8%	7.4%	5.9%				5.9%		4.3%
Total	No.	14	21	27	17	9	6	3	17	3	117
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C08) PRIVATE SECTOR

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Yes	No.	1		5					1		7
	%	6.7%		18.5%					5.9%		5.7%
No	No.	14	24	22	18	7	7	6	16	2	116
	%	93.3%	100.0%	81.5%	100.0%	100.0%	100.0%	100.0%	94.1%	100.0%	94.3%
Total	No.	15	24	27	18	7	7	6	17	2	123
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C14.1.1 Reason for choosing LAND SURVEYORS^a

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Cadastral survey is useful in order to implement land administration programme	No.	1	1								2
	% of Total	1.3%	1.3%								2.7%
Profession in GPS/total station are important for 1st & 2nd level certification	No.	1									1
	% of Total	1.3%									1.3%

GIS is vital to measure parcels and produce various types of maps	No.	1								1
	% of Total	1.3%								1.3%
Demand on land lawyer is high in the coming 20 years	No.	2	1							3
	% of Total	2.7%	1.3%							4.0%
The demand will last in 5 years time, and less number afterwards	No.	1								1
	% of Total	1.3%								1.3%
High demand at least in 20 years time	No.	1								1
	% of Total	1.3%								1.3%
This type of training is vital to fill the professional gap	No.	1	1							2
	% of Total	1.3%	1.3%							2.7%
2nd level certification require high trained professionals	No.		2							2
	% of Total		2.7%							2.7%
Cadastral surveying is one of the tools for proper land administration programme	No.		7							7
	% of Total		9.3%							9.3%
The country's land is not properly measured by cadastral surveyor	No.		1							1
	% of Total		1.3%							1.3%
Since the government is planning to implement the 2nd level certificate, cadastral surveyors are needed	No.		1							1
	% of Total		1.3%							1.3%
Highly skilled instructors are needed to train students on LA	No.		1							1
	% of Total		1.3%							1.3%
The country's land has to be administered properly	No.	2								2
	% of Total	2.7%								2.7%
Land surveyors are the engine for LA purposes	No.					1				1

	% of Total		1.3%						1.3%
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C14.1.1 Reason for choosing LAND SURVEYORS(continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Professionals and equipments are necessary for land security	No.			1							1
	% of Total			1.3%							1.3%
There is no adequate LA professionals	No.			2							2
	% of Total			2.7%							2.7%
Land certification programme require highly skilled professionals	No.			1							1
	% of Total			1.3%							1.3%
Urban expansion need skill full professionals	No.			1							1
	% of Total			1.3%							1.3%
Need highly skilled professionals for 1st & 2nd certification levels	No.			1							1
	% of Total			1.3%							1.3%
Cadastral surveyors are needed at list for the coming 5 years.	No.			1					1		2
	% of Total			1.3%					1.3%		2.7%
Many surveyors are needed for the coming 20 years	No.			1							1
	% of Total			1.3%							1.3%
In order to survey and register the various parcels, skill manpower are vital	No.			1							1
	% of Total			1.3%							1.3%
	No.			1							1

Highly skilled instructors are urgently needed for the training program	% of Total			1.3%						1.3%
The government strategic plan/MDG requires LA professionals	No.			1						1
Due to lack of highly skilled professionals in LA, land lawyers, cadastral surveyors, etc are vital	No.			1			2			3
Trained professionals are needed for the establishment of cadastral centre	No.			1						1
LA related professionals in GPS, GIS, AutoCAD etc are urgently needed.	% of Total			1.3%			2.7%			1.3%
Highly skilled professionals are important for effective LA activities	No.			2						2
	% of Total			2.7%						2.7%
	No.			1						1
	% of Total			1.3%						1.3%

C14.1.1 Reason for choosing LAND SURVEYORS(continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
In order to conduct land registration activities, LIS, GIS and cadastral surveyors are needed	No.			1							1
Land use and city planners are important for all levels of urban development	% of Total			1.3%							1.3%
Land use managers are highly demanded both in the rural and urban sectors	No.			1							1
There is hardly any profession in land registration	% of Total			1.3%							1.3%
	No.			1							1

	% of Total			1.3%						1.3%
Construction booms require a great number of cadastral surveyor and GIS/LIS experts	No.			1						1
	% of Total			1.3%						1.3%
Difficult to understand the land resources in all regions with skilled professionals in LIS	No.								1	1
	% of Total			1.3%						1.3%
GIS/LIS, land lawyers and land use managers required for land registration, compensation and certification.	No.								1	1
	% of Total								1.3%	1.3%
The need of skilled LA professionals in order to implement the project rapidly	No.								1	1
	% of Total								1.3%	1.3%
LA is a new subject, which requires professionals in multidisciplinary subjects	No.								1	1
	% of Total								1.3%	1.3%
Resolving border dispute among farmers require land lawyers	No.								1	1
	% of Total								1.3%	1.3%
Many GIS professionals are needed for the coming 5 years but less afterwards	No.								1	1
	% of Total								1.3%	1.3%
Skilled/experienced instructors are required in many universities and colleges	No.								1	1
	% of Total								1.3%	1.3%
Hardly any highly skilled professionals in LA	No.								1	1
	% of Total								1.3%	1.3%
As urban expansion increases, city planners, surveyors and GIS experts are greatly needed	No.								1	1
	% of Total								1.3%	1.3%

C14.1.1 Reason for choosing LAND SURVEYORS(continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Land security, registration, compensation, valuation and certification need several professionals	No. % of Total							1 1.3%			1 1.3%
GIS/LIS and surveying professionals are urgently needed if LA is implemented successfully	No. % of Total							1 1.3%			1 1.3%
Without cadastral surveyors, compensation, registration and certification activities is impossible	No. % of Total							1 1.3%			1 1.3%
Shortage of cadastral surveyors has become one of the constraints for LA programme	No. % of Total							2 2.7%	1 1.3%		3 4.0%
Land surveying skills are important for LA	No. % of Total							1 1.3%			1 1.3%
The measurement of Individual parcels require highly skilled professionals	No. % of Total							1 1.3%			1 1.3%
All types of LA related professional gap are observed in all surveyed regions	No. % of Total							1 1.3%			1 1.3%
Land reform and land distribution activities demand knowledge and skills especially in GIS, land management	No. % of Total							1 1.3%			1 1.3%
In order to conduct accurate parcel measurement, the professionals and equipments are important	No. % of Total							1 1.3%			1 1.3%
	No.							1			1

Well designed surveying and registration activities are vital for positive outcome of LA	% of Total								1.3%		1.3%
Urban land planning is still in progress	No.			1							1
	% of Total			1.3%							1.3%
It is necessary to enhance skills of cadastral surveyor	No.			1							1
	% of Total			1.3%							1.3%
The duty of land surveyor is wide and necessary due to continuous urban expansion	No.									1	1
	% of Total								1.3%		1.3%
Total	No.	10	15	24	1	5	6	3	9	2	75
	% of Total	13.3%	20.0%	32.0%	1.3%	6.7%	8.0%	4.0%	12.0%	2.7%	100.0%

C14.1.2 Reason for choosing LAND/REAL ESTATE APPRAISERS AND TAX SPECIALISTS

		REGION							Total	
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	SNNP	Harari		
Urban land has to be measured by land use and city planners using GIS, AutoCAD and orthophoto technologies	Valid N	1								1
	% of Total	2.5%								2.5%
The accomplishment of 2nd level certification can generate government revenue	Valid N	1								1
	% of Total	2.5%								2.5%
Without highly trained professionals in land use planning and GIS, modern urbanization can not be expected	Valid N		1	1						2
	% of Total		2.5%	2.5%						5.0%
	Valid N		1							1

Real Estate development in the country is on low stage	% of Total	2.5%						2.5%
Land related tax specialists in the country are almost none	Valid N	2			2			4
	% of Total	5.0%			5.0%			10.0%
Training in LIS and land use professionals on B.Sc level are urgently needed	Valid N	1						1
	% of Total	2.5%						2.5%
LA issue is the government high priority, which requires property appraisers and lawyers and land specialists	Valid N	2						2
	% of Total	5.0%						5.0%
Real estate and property valuation experts have high demand in all sectors and all regions	Valid N	2						2
	% of Total	5.0%						5.0%
LA program has been enacted without necessary professionals in GIS/LIS, land use and administration	Valid N	2						2
	% of Total	5.0%						5.0%
Property valuation experts are on a high demand now and in the future	Valid N	1						1
	% of Total	2.5%						2.5%

C14.1.2 Reason for choosing LAND/REAL ESTATE APPRAISERS AND TAX SPECIALISTS (continued)

	REGION							Total
	Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	SNNP	Harari	
Valid N		1						1

Real estate expansion requires city and land use planners, cadastral surveyors land policy specialists	% of Total	2.5%							2.5%
	Valid N		2						2
Land valuation, registration and certification are the prerequisite for proper tax collection	% of Total		5.0%						5.0%
	Valid N		1						1
In order to advance proper land valuation, property lawyers are desirable	% of Total		2.5%						2.5%
	Valid N		1						1
The rapidly growing real estate market requires land property appraisers and tax specialists	% of Total		2.5%						2.5%
	Valid N		1						1
Evaluator and tax specialists can help for the fast growing real estate business	% of Total		2.5%						2.5%
	Valid N		1						1
Land property valutors and cadastral surveyors are needed urgently for proper urban land use system	% of Total		2.5%						2.5%
	Valid N		1						1
Parcel and cadastral surveys are in a great demand in all regions	% of Total		2.5%						2.5%
	Valid N		1						1
Cadastre based measurement makes easier for regulation, land registration, compensation and taxation	% of Total		2.5%						2.5%
	Valid N		1						1

The economic value of land resources can not be comprehended without property valuers	% of Total			2.5%					2.5%
Land property valuers are indispensable for proper tax administration system	Valid N			1					1
	% of Total			2.5%					2.5%
Fair land taxation system can not be implemented without knowledge in land registration and property valuation	Valid N			1					1
	% of Total			2.5%					2.5%

C14.1.2 Reason for choosing LAND/REAL ESTATE APPRAISERS AND TAX SPECIALISTS (continued)

		REGION							Total
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	SNNP	Harari	
Due to shortage of skilled instructors, many universities have problems to train students in LA	Valid N			1					1
	% of Total			2.5%					2.5%
Lack of LA experts in many regions have created problems of understanding the issue of LA and use	Valid N					1			1
	% of Total					2.5%			2.5%
Due to lack of real estate appraisal, the right value of land and properties can't be fixed in a proper manner	Valid N					1			1
	% of Total					2.5%			2.5%
Although construction is increasing, the quality of the land is questionable due to shortage of surveyors and valuers	Valid N					1			1
	% of Total					2.5%			2.5%
Despite poor management, demand on urban land and real estate is increasing, which require LA specialists	Valid N				1				1
	% of Total				2.5%				2.5%

Shortage of trained surveyors is paradoxical to the rapidly growing urbanization and real estate	Valid N				1					1
	% of Total				2.5%					2.5%
land property lawyers and managers have the ability to estimate the cost of land , property value and land tax	Valid N				2					2
	% of Total				5.0%					5.0%
Limited number of experts in LA has brought lack of clear definition of the issue and nor has alleviated border dispute	Valid N						1			1
	% of Total						2.5%			2.5%
Real estate business is growing fast	Valid N			1						1
	% of Total			2.5%						2.5%
It is critical duty for property transfer	Valid N							1		1
	% of Total							2.5%		2.5%
Total	Valid N	2	13	14	4	5	1	1		40
	% of Total	5.0%	32.5%	35.0%	10.0%	12.5%	2.5%	2.5%		100.0%

C14.1.3 Reason for choosing GIS/LIS Specialists^a

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
GIS application in LA is not yet developed	Valid N	1	1								2
	% of Total	1.2%	1.2%								2.4%

The ongoing infrastructural development requires great numbers of GIS experts	Valid N % of Total	1 1.2%	1 1.2%																2 2.4%
The collected data requires GIS/LIS experts and trained data analysts and managers	Valid N % of Total	1 1.2%	1 1.2%																2 2.4%
A currently, GIS experts are on high demand and the demand will be reduced after 5 years	Valid N % of Total	1 1.2%	1 1.2%																2 2.4%
GIS technology is a tool in order to process information gather from aerial photo and satellite images	Valid N % of Total																		1 1.2%
Land information data cannot be processed without GIS application	Valid N % of Total																		1 1.2%
Land lawyers are on high demand at least for the coming 5 years	Valid N % of Total																		1 1.2%

We need to integrate both spatial and attribute data using GIS and similar technologies	Valid N		1						1
	% of Total		1.2%						1.2%
	Valid N		2						2
As we facing climate change induced socio-economic problems, land technicians can contribute to alleviate the problems	% of Total		2.4%						2.4%
	Valid N	2	1						3
	% of Total	2.4%	1.2%						3.6%
In order to store land information, GIS technology is required	Valid N	1	2						3
	% of Total	1.2%	2.4%						3.6%
	Valid N	1	2						3
Land use planning demands GIS, remote sensing and orthophoto technologies	% of Total	1.2%	2.4%						3.6%
	Valid N	1	2						3
	% of Total	1.2%	2.4%						3.6%

C14.1.3 Reason for choosing GIS/LIS Specialists (continued)

	REGION	Total
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		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
In order to store and analyze data, GIS/LIS specialists are necessary	Valid N	1	1	1							3
	% of Total	1.2%	1.2%	1.2%							3.6%
Land property lawyers are needed in order to determine the property values of urban and rural land	Valid N	1	0	1							2
	% of Total	1.2%	0.0%	1.2%							2.4%
Resource processing technologies are significantly needed for land survey and registration purposes	Valid N			1							1
	% of Total			1.2%							1.2%
Qualified man power in LIS is not available even though the demand in is high	Valid N			1							1
	% of Total			1.2%							1.2%
There is high gap in professional LA instructors in all universities and colleges	Valid N			1							1
	% of Total			1.2%							1.2%
Qualified Instructors are needed for training program in LA	Valid N							1			1
	% of Total							1.2%			1.2%

The proposed training center in LA is impossible without well trained instructors and knowledgeable land administrators	Valid N	1								1
	% of Total	1.2%								1.2%
Urban land information and data organization demand highly skilled man power and advanced technologies	Valid N	2								2
	% of Total	2.4%								2.4%
GIS is important in to store and produce geo-information	Valid N	1								1
	% of Total	1.2%								1.2%
Land information data can not be processed and stored without GIS and related technologies and skilled manpower	Valid N	1								1
	% of Total	1.2%								1.2%
GIS skill and knowledge is important for urban development sectors	Valid N	1								1
	% of Total	1.2%								1.2%
Different skills are highly demanded to acquire job opportunities	Valid N	1								1
	% of Total	1.2%								1.2%

C14.1.3 Reason for choosing GIS/LIS Specialists (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
In order to process spatial data and to produce maps in different scales (useful for 2nd level certifications)	Valid N			1							1
need GI	% of Total			1.2%							1.2%
GIS/LIS is a tool for the implementation of LA programme	Valid N			1							1
Advance training in LA can fill the current gap	Valid N			1							1
GIS is very much applicable to process data relevant to LA	Valid N			1							1
GIS & LIS are vital to create data base in LA	Valid N			2							2
Land policy is important for property valuation and regulation	Valid N			1							1
	Valid N			1							1

Without highly skilled professionals, it is impossible to implement LA programme as planned	% of Total	1.2%							1.2%
Land property registration is planned in almost all major cities, which require skilled professionals	Valid N	1							1
Application of GIS/LIS has to be introduced in all Woredas and regions	% of Total	1.2%							1.2%
The vast land of the pastoralists requires GIS/LIS to process satellite images/aerial photos	Valid N	1							1
LA specialists are useful for urban management and planning	% of Total	2.4%							2.4%
land use managers are needed since Ethiopia is implementing modern land registration and documentation system	Valid N	1							1
GIS specialists are demanded by all types of sectors	% of Total	1.2%							1.2%

C14.1.3 Reason for choosing GIS/LIS Specialists (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
In order to document the land resources, GIS/LIS is paramount important	Valid N					1					1
	% of Total					1.2%					1.2%
GIS/LIS is useful for land related data analysis	Valid N					1					1
	% of Total					1.2%					1.2%
Land policy specialists are useful for tenure security	Valid N					1					1
	% of Total					1.2%					1.2%
In order to analyze and display spatial data , LIS is useful	Valid N					1					1
	% of Total					1.2%					1.2%
If we want to know proper information on land resources, advanced technologies such as GPS, GIS are vital	Valid N					1					1
	% of Total					1.2%					1.2%
	Valid N					1					1

Land related information is very important for all development projects	% of Total				1.2%				1.2%
Land use managers are needed for land management and administration	Valid N				1				1
We are expected to use GIS technology for each and every services related to LA	% of Total				1.2%				1.2%
Despite all types of land related information require GIS, professionals are not available	Valid N				5				5
The need of GIS/LIS for the management of digital data	% of Total				6.0%				6.0%
The utilization of cadastre survey technique is increasing from time to time, which is applicable to our LA project	Valid N				1				1
	% of Total				1.2%				1.2%
	Valid N				1				1

Land information system in useful both in urban and rural land administration in Ethiopia	% of Total						1.2%				1.2%
GIS is a tool which is important for LA and use, tenure and environmental security	Valid N						1	1			2
	% of Total						1.2%	1.2%			2.4%

C14.1.3 Reason for choosing GIS/LIS Specialists (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
A great number of professionals are needed is implement LA correctly	Valid N								1		1
	% of Total								1.2%		1.2%
Aerial photo, satellite images, GIS and Arc-view are important for mapping and certification	Valid N								1		1
	% of Total								1.2%		1.2%
	Valid N								2		2

Well trained Instructors and training equipments are useful for LA	% of Total								2.4%		2.4%
Data analysis and mapping activities require GIS/LIS	Valid N % of Total								1 1.2%		1 1.2%
In order to control land resources applied	Valid N % of Total								1 1.2%		1 1.2%
land Lawyer profession is needed for proper land tenure security	Valid N % of Total								1 1.2%		1 1.2%
This technology is very important for development	Valid N % of Total			2 2.4%							2 2.4%
Necessary to formulate and develop land information system	Valid N % of Total			1 1.2%							1 1.2%
Important to organize land administration process in a modernized way	Valid N % of Total									1 1.2%	1 1.2%
Total	Valid N % of Total	10 12.0%	16 19.3%	25 30.1%	3 3.6%	9 10.8%	9 10.8%	2 2.4%	8 9.6%	1 1.2%	83 100.0%

Percentages and totals are based on responses.

C14.4.1 Reason for choosing LAND USE Managers



		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
In order to conserve natural resources and bring sustainable development, land use planning is a prerequisite	Valid N	2	1								3
	% of	4.3%	2.1%								6.4%
	Total										
Rural and urban management is important for economic services	Valid N	1									1
	% of	2.1%									2.1%
	Total										
Cadastral system is one of the tools in the implementation of Land administration	Valid N		1								1
	% of		2.1%								2.1%
	Total										
Highly skilled professionals and knowledge is a prerequisite for land and environmental conservation	Valid N		2								2
	% of		4.3%								4.3%
	Total										
The current environmental degradation can be alleviated through effective land administration	Valid N		1			2					3
	% of		2.1%			4.3%					6.4%
	Total										
Environmental management goes hand to hand to the implementation of LA programme	Valid N		1								1
	% of		2.1%								2.1%
	Total										
For successful land tenure security and proper land utilization, qualified manpower are needed	Valid N			1							1
	% of			2.1%							2.1%
	Total										
	Valid N			1							1

to prepare rural land planning, land use managers are in great need	% of Total			2.1%						2.1%
We need land use planners for the rapidly growing urban sector, real estate and modern farms	Valid N			1						1
	% of Total			2.1%						2.1%
City and land use planners are needed at the woreda and kebele levels	Valid N			1						1
	% of Total			2.1%						2.1%
Urban development require land use planners and GIS experts	Valid N			1						1
	% of Total			2.1%						2.1%
The demand in most of the professions are greatly needed for the coming 20 years	Valid N			1						1
	% of Total			2.1%						2.1%

C14.1.4 Reason for choosing LAND USE Managers (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Qualified staff can improve land use/cover and climate change	Valid N			1							1
	% of Total			2.1%							2.1%
	Valid N			1							1

Experts on land use/climate change are extremely needed	% of Total	2.1%							2.1%
	Valid N	1							1
Well trained and experienced staff are useful for land administration	% of Total	2.1%							2.1%
	Valid N	1							1
Environment related issues go hand to hand with LA	% of Total	2.1%							2.1%
	Valid N	1							1
GIS for environmental issues must be taken into consideration	% of Total	2.1%							2.1%
	Valid N	1							1
Managers currently working in the urban sector need advanced training	% of Total	2.1%							2.1%
	Valid N		2						2
Land reform specialists are in high demand in all regions in the country	% of Total		4.3%						4.3%
	Valid N		1						1
Advanced training in LA is essential for the country's future	% of Total		2.1%						2.1%
	Valid N		1						1
Trained city planner is a prerequisite for urban development	% of Total		2.1%						2.1%
	Valid N	2		1	1				4

GIS/LIS is a tool for effective land use planning and implementation	% of Total			4.3%		2.1%	2.1%			8.5%
land is the backbone of the country's economy, and its resources should be managed carefully	Valid N					1				1
	% of Total					2.1%				2.1%
Land use managers are essential for sustainable development	Valid N					1				1
	% of Total					2.1%				2.1%
Well trained land use managers are needed for sustainable LA	Valid N					1				1
	% of Total					2.1%				2.1%

C14.1.4 Reason for choosing LAND USE Managers (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Currently, there is no soil conservation and environment specialists in many regions	Valid N						2				2
	% of Total						4.3%				4.3%
Environmentalists are in a great demand for sustainable land LA programme	Valid N						1				1
	% of Total						2.1%				2.1%
	Valid N						1				1

The demand on land use manager will be reduced after 10 years	% of Total					2.1%				2.1%
	Valid N						1			1
Land lawyer profession is in a great demand for the coming 5 years	% of Total						2.1%			2.1%
	Valid N							1		1
Land use planners are required in the coming 7 years	% of Total							2.1%		2.1%
	Valid N			1					1	2
Rural land use/city planner are the engine for environment management plan	% of Total			2.1%				2.1%		4.3%
	Valid N							1		1
Well thought out land use policy is basic for correct LA	% of Total							2.1%		2.1%
	Valid N			1					1	2
There will be high demand in all professions in the country	% of Total			2.1%				2.1%		4.3%
	Valid N								1	1
Correct land use planning is essential for land rehabilitation	% of Total							2.1%		2.1%
	Valid N			1						1
Needs to adopt new land use planning with the growing nature of urbanization	% of Total			2.1%						2.1%
	Valid N									1
Total	Valid N	3	6	17	4	6	5	1	5	47

% of Total	6.4%	12.8%	36.2%	8.5%	12.8%	10.6%	2.1%	10.6%		100.0%
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C14.1.5 Reason for choosing LAND USE and CITY Planners

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Land use planning is an essential part of LA	Valid N	1									1
	% of Total	2.9%									2.9%
Through GIS technology, effective LA is possible, which can alleviate land use conflict in the rural and urban areas	Valid N	1									1
	% of Total	2.9%									2.9%
As urban planner, I can understand how land use management skills and knowledge are needed for the implementation of LA	Valid N	1									1
	% of Total	2.9%									2.9%
City planners are helpful and a prerequisite for the implementation of effective LA programme	Valid N	1									1
	% of Total	2.9%									2.9%
Shortage of land policy specialists is one of the constraints for efficient urban LA programme	Valid N		2			1					3
	% of Total		5.7%			2.9%					8.6%
highly skilled instructors are urgently needed in order to produce professionals in urban and rural LA	Valid N		1								1
	% of Total		2.9%								2.9%
As LA is a new project for Ethiopia, city planners are in a high demand	Valid N		1								1
	% of Total		2.9%								2.9%

Urban growth need well trained professionals in cadastral survey, GIS application and land management	Valid N	1	1							2
	% of Total	2.9%	2.9%							5.7%
Urban planning related profession is useful for sustainable city development	Valid N		1							1
	% of Total		2.9%							2.9%
Land use planning is one of the very important activities for correct LA	Valid N			1						1
	% of Total			2.9%						2.9%
Proper and well designed land use planning is essential for long-lasting sustainable land use and management	Valid N			2						2
	% of Total			5.7%						5.7%
Planners (although they are very few) do not have advanced training in LA	Valid N			3			1			4
	% of Total			8.6%			2.9%			11.4%

C14.1.5 Reason for choosing LAND USE and CITY Planners (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
The proclamation can't be translated into action without trained staff in LA	Valid N			1						1
	% of Total			2.9%						2.9%
Practically designed land use planning has a great role in advancing LA programme	Valid N			1						1
	% of Total			2.9%						2.9%
	Valid N			1						1

Adequate training in land use planning and land development increase the demand by the private and public sectors	% of Total	2.9%					2.9%
The rapidly growing urban centers require massive land use planners and GIS/LIS experts	Valid N % of Total	1 2.9%	1	1	1		3 8.6%
Adequate knowledge and skills in LA are vital for sustainable land use	Valid N % of Total	1 2.9%					1 2.9%
City planners are in a great demand in all regions, Woredas and Kebeles	Valid N % of Total	1 2.9%			2		3 8.6%
The emerging cities and towns require great number of professionals relevant to LA	Valid N % of Total		1 2.9%				1 2.9%
Sustainable land use protects cities and towns from being degraded and damaged	Valid N % of Total		1 2.9%				1 2.9%
Since urban center is growing rapidly, city planners are greatly needed at least in the 1st 5 years	Valid N % of Total				1 2.9%		1 2.9%
Land use planners are needed in order to introduced sustainable development both in the urban and rural areas	Valid N % of Total					1 2.9%	1 2.9%
High demand on land lawyer and city planners	Valid N % of Total	1 2.9%					1 2.9%
Proper management requires trained professionals	Valid N % of Total					1 2.9%	1 2.9%

Total	Valid N	5	6	13	2	2	4	1	2	35
	% of Total	14.3%	17.1%	37.1%	5.7%	5.7%	11.4%	2.9%	5.7%	100.0%

C14.1.6 Reason for choosing LAND POLICY Specialists

		REGION								
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	Total
In order to implement LA programme, policy specialists are badly needed	Valid N		1	1						2
	% of Total		4.0%	4.0%						8.0%
A great number of well trained land policy specialists are required, if border dispute are resolved	Valid N		1							1
	% of Total		4.0%							4.0%
Highly trained land policy specialist are needed, if tenure and environmental security have to be solved	Valid N		1							1
	% of Total		4.0%							4.0%
Land policy specialists are in a high demand in many Woredas and regions	Valid N		1							1
	% of Total		4.0%							4.0%
Land policy specialists are needed for the implementation of land use and rehabilitation policies	Valid N	1								1
	% of Total	4.0%								4.0%
A land policy specialist is a prerequisite for the successful implementation of LA and use programme	Valid N	1								1
	% of Total	4.0%								4.0%
	Valid N			1						1

Policy amendment is important if LA programme is implemented in the pastoralist areas	% of Total			4.0%					4.0%
Land security professionals are not available in many regions	Valid N			2			2		4
	% of Total			8.0%			8.0%		16.0%
Experiences in all fields are critical	Valid N			1					1
	% of Total			4.0%					4.0%
Land policy specialists must show direction for other professionals	Valid N			1					1
	% of Total			4.0%					4.0%
Students in LA will be responsible if they are taught by well trained instructors	Valid N			1					1
	% of Total			4.0%					4.0%

C14.1.6 Reason for choosing LAND POLICY Specialists (continued)

		REGION								
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	Total
Shortage of trained manpower is critical to LA	Valid N			1						1
	% of Total			4.0%						4.0%
Land lawyers are in a great demand for policy analysis and interpretation of the law	Valid N			1						1
	% of Total			4.0%						4.0%
Experienced and well trained instructors are needed if students in LA have proper training	Valid N			1						1
	% of Total			4.0%						4.0%

Land use policy has to be critically revised and amended applicable to LA	Valid N % of Total			1 4.0%					1 4.0%
Proper land resource utilization is possible if LA is implemented correctly	Valid N % of Total				1 4.0%				1 4.0%
In order to implement land use policy, environmental regulation is essential	Valid N % of Total					1 4.0%			1 4.0%
For the purpose of land reform implementation, property lawyers have to be involved	Valid N % of Total					1 4.0%			1 4.0%
land and land related policies are complete and center of ether urban policies	Valid N % of Total						1 4.0%		1 4.0%
In order to control land grabbing and environmental degradation, land lawyer are important	Valid N % of Total						1 4.0%		1 4.0%
Land property lawyers is in high demand in all regions in the country	Valid N % of Total							1 4.0%	1 4.0%
Total	Valid N % of Total	2 8.0%	4 16.0%	11 44.0%	1 4.0%	2 8.0%	4 16.0%	1 4.0%	25 100.0%

C14.1.7 Reason for choosing UNIERSITY and COLLEGE Instructors

REGION									
Tigray	Amhar a	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	Total	



Highly skilled instructors in land administration are very few, therefore, short and long-term strategies are paramount	Valid N	1							1
	% of Total	3.3%							3.3%
Universities and colleges have responsibility to produce practically minded professionals in LA and use	Valid N	1							1
	% of Total	3.3%							3.3%
Without skilled instructors, many universities have plans to train people in land administration programme	Valid N	1							1
	% of Total	3.3%							3.3%
Different universities and colleges require well trained Instructors specializing in Real estate value	Valid N	1							1
	% of Total	3.3%							3.3%
Skilled manpower is a prerequisite for LA and consequently for land certification and taxation	Valid N	1							1
	% of Total	3.3%							3.3%
Need the establishment of institution applicable to LA	Valid N				1				1
	% of Total				3.3%				3.3%
GIS surveyors are essential for the proper implementation of LA	Valid N				2				2
	% of Total				6.7%				6.7%
Training in LA is the basis for sustainable development	Valid N				1				1
	% of Total				3.3%				3.3%
Most of the few professionals are moving for better pay	Valid N				2				2
	% of Total				6.7%				6.7%
Demand based training may increase professionals in LA	Valid N				1				1
	% of Total				3.3%				3.3%

The forthcoming training may produce competent land related professionals such as GIS experts	Valid N			1						1
	% of Total			3.3%						3.3%
To produce component land related professionals and property registration system	Valid N			2						2
	% of Total			6.7%						6.7%
In order to provide proper training and satisfy the market demand, high skilled instructors are needed	Valid N			1						1
	% of Total			3.3%						3.3%
In order to train students in LA, well trained, prepared and committed instructors are urgently needed	Valid N			1						1
	% of Total			3.3%						3.3%

C14.1.7 Reason for choosing UNIVERSITY and COLLEGE Instructors (continued)

		REGION								Total
		Tigray	Amhar a	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	
Instructors capacity should be upgraded	Valid N			1						1
	% of Total			3.3%						3.3%
Training opportunity will encourage the rapid implementation of the LA project	Valid N			1						1
	% of Total			3.3%						3.3%
Trained instructors can encourage students for advanced training in LA	Valid N			1						1
	% of Total			3.3%						3.3%
	Valid N				1					1

Universities can play a great role in capacity building, registration, compensation and certification	% of Total				3.3%					3.3%
LA needs massive number of know legible and experienced people	Valid N				1					1
	% of Total				3.3%					3.3%
Instructors on LA are needed from now and in the future	Valid N					1				1
	% of Total				3.3%					3.3%
Universities are expanding and have plans to run courses on LA but do not have instructors on LA	Valid N					1				1
	% of Total				3.3%					3.3%
LA in Ethiopia is new, and therefore need vast number of trained professionals in LA is essential	Valid N					1				1
	% of Total				3.3%					3.3%
To greater land administration, solving land related disputes	Valid N					1				1
	% of Total				3.3%					3.3%
LA is new, which require to fill the professional gaps by encouraging the supplier side	Valid N					1				1
	% of Total				3.3%					3.3%
The demand in LA is vast and require vast number of experts	Valid N						1			1
	% of Total						3.3%			3.3%
Highly skilled university and college instructors will play a great role in LA	Valid N						1			1
	% of Total						3.3%			3.3%
Low number of professionals is one of the constraints to the implementation of LA	Valid N							1		1
	% of Total							3.3%		3.3%
Total	Valid N	1	4	15	2	5	2	1		30

% of Total	3.3%	13.3%	50.0%	6.7%	16.7%	6.7%	3.3%		100.0%
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C14.1.8 Reason for choosing LAND ADMINISTRATION Specialists

		REGION								
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	Total
LA specialists are the engine to implement the law and regulations enacted by the government	Valid N	1								1
	% of Total	2.9%								2.9%
LA specialist can identify appropriate land tenure and use	Valid N	1								1
	% of Total	2.9%								2.9%
LA is timely and indispensable for land transaction, compensation, certification and taxation	Valid N		2							2
	% of Total		5.7%							5.7%
LA specialist help planners and policy-makers to come up with a clear and well planned LA system and use	Valid N		1							1
	% of Total		2.9%							2.9%
LA specialist can play a training and advising role	Valid N		1							1
	% of Total		2.9%							2.9%
Currently, land administrators are in a great demand in all regions	Valid N		1							1
	% of Total		2.9%							2.9%
Modern LA programme requires highly skilled land administration specialists	Valid N		1							1
	% of Total		2.9%							2.9%
No adequate and sufficient LA experts available in the country	Valid N		1							1
	% of Total		2.9%							2.9%

Without LA specialization, it is difficult to implement the already introduced programme	Valid N % of Total	2 5.7%							2 5.7%
2nd certification strategy is impossible without cadastral surveyors	Valid N % of Total		1 2.9%						1 2.9%
Land use manager is essential for the management of city land property value	Valid N % of Total		1 2.9%						1 2.9%
Through trained professional activities, LA programme will be accomplished	Valid N % of Total		1 2.9%						1 2.9%
Land lawyers and land managers are important in order to reduce conflict among land holders	Valid N % of Total		1 2.9%						1 2.9%
The country does not have land policy specialist , therefore need many	Valid N % of Total		1 2.9%						1 2.9%

C14.1.8 Reason for choosing LAND ADMINISTRATION Specialists (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	
Land use managers are wanted for sustainable LA programme and environmental management	Valid N % of Total			1 2.9%						1 2.9%
LA can provide job opportunity if the training proramme successfully implemented	Valid N % of Total			3 8.6%		1 2.9%				4 11.4%
Training in tenure, environmental and food security is essential	Valid N % of Total			1 2.9%						1 2.9%
Cadastral surveying is in high demand in all regions	Valid N % of Total				1 2.9%					1 2.9%

GIS is a tool for land administration and development	Valid N				1					1
	% of Total				2.9%					2.9%
Since land security is indispensable for the entire development, training on land issues is essential	Valid N					1				1
	% of Total					2.9%				2.9%
Solving border dispute is an urgent but has to be equipped with knowledge and experiences	Valid N					1				1
	% of Total					2.9%				2.9%
Land property lawyers are essential to ameliorate border dispute problems facing the country	Valid N					1				1
	% of Total					2.9%				2.9%
Because land should be administered by land specialists	Valid N					1				1
	% of Total					2.9%				2.9%
lack of land administration specialist	Valid N			1			2			3
	% of Total			2.9%			5.7%			8.6%
to manage land property and determine taxation issues	Valid N						1			1
	% of Total						2.9%			2.9%
GIS/LIS are relevant for the LA programme	Valid N							1		1
	% of Total							2.9%		2.9%
Training and upgrading land use management professionals can alleviate land and environmental degradation	Valid N							1		1
	% of Total							2.9%		2.9%
As a whole, there is a gap in LA at regional and national levels	Valid N							1		1
	% of Total							2.9%		2.9%
Total	Valid N	2	9	11	2	5	3	3		35
	% of Total	5.7%	25.7%	31.4%	5.7%	14.3%	8.6%	8.6%		100.0%

C14.1.9 Reason for choosing LAND PROPERTY Lawyers

		REGION							Total
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	SNNP	Harari	
Land property lawyers can ameliorate land dispute, litigation and unnecessary conflicts	Valid N % of Total	1 5.0%							1 5.0%
As a lawyer in LIB degree, a great number of land property lawyers should be assigned in all regions	Valid N % of Total		1 5.0%						1 5.0%
In order to reduce the present high demand, short- and long-term training in LA is important	Valid N % of Total		1 5.0%						1 5.0%
So far, there are no experts on LA and land use related issues	Valid N % of Total		1 5.0%						1 5.0%
Planners and tax experts are essential for the land property value and tax issues	Valid N % of Total			1 5.0%					1 5.0%
Knowledge of composition and valuation is timely, if LA is implemented properly	Valid N % of Total			1 5.0%					1 5.0%
In order to implement LA programme, universities and colleges are expected to produce experts on tenure security	Valid N % of Total			1 5.0%					1 5.0%
In order to solve land use disputes, property lawyers are greatly needed	Valid N % of Total			1 5.0%					1 5.0%
	Valid N			1					1

Land property lawyers are expected to conduct property valuation, compensation, certification and taxation	% of Total			5.0%				5.0%
The main duties of land property lawyers are border and use conflicts and land litigation	Valid N			1				1
	% of Total			5.0%				5.0%
Property land lawyers are few, need to be doubled in the coming academic years	Valid N			1				1
	% of Total			5.0%				5.0%
The real estate property lawyers are demanded in all regions	Valid N			1				1
	% of Total			5.0%				5.0%

C14.1.9 Reason for choosing LAND PROPERTY Lawyers (continued)

		REGION							
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	SNNP	Harari	Total
Boundary dispute can be solved through the implementation of the 2nd certificates	Valid N			1	1				2
	% of Total			5.0%	5.0%				10.0%
there is no land property lawyer , that is why the demand is high	Valid N					4			4
	% of Total					20.0%			20.0%
In order to manage the new land policy, professionals in LA are important	Valid N					1			1
	% of Total					5.0%			5.0%
All professions related to LA is in a high demand	Valid N						1		1
	% of Total						5.0%		5.0%
Total	Valid N	1	3	9	1	5	1		20

% of Total	5.0%	15.0%	45.0%	5.0%	25.0%	5.0%	100.0%
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C14.10.1 Reason for choosing LAND ADMINISTRATION Technicians

		REGION								
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	SNNP	Harari	Total
GIS experts provide technical support to land managers, and other experts in LA	Valid N	1	2			1				4
	% of Total	5.3%	10.5%			5.3%				21.1%
We need land technicians at the woreda and kebele levels	Valid N		1				1			2
	% of Total		5.3%				5.3%			10.5%
In order to solve land related disputes, land plots/parcels have to be measured in a proper manner	Valid N		1							1
	% of Total		5.3%							5.3%
Land administration technicians and consultants are in great need if the city land properly managed	Valid N			1		1				2
	% of Total			5.3%		5.3%				10.5%
A great number of land technicians are needed	Valid N			1						1
	% of Total			5.3%						5.3%
The proposed training in LA should be operational	Valid N			1						1
	% of Total			5.3%						5.3%
Surveying and registration at kebele and woreda levels are essential	Valid N			2						2
	% of Total			10.5%						10.5%

Surveying and GIS/LIS technologies are timely if are used by well trained professionals	Valid N			1						1
	% of Total			5.3%						5.3%
Professional demand on LA is growing since the introduction of the programme some years ago	Valid N			2						2
	% of Total			10.5%						10.5%
The demand on land managers is growing	Valid N				1					1
	% of Total				5.3%					5.3%
Land use and city planners are urgently needed if urban land is properly utilized	Valid N					1				1
	% of Total					5.3%				5.3%
professional gap have been observed at a local, regional and national levels	Valid N							1		1
	% of Total							5.3%		5.3%
Total	Valid N	1	4	8	1	3	1	1		19
	% of Total	5.3%	21.1%	42.1%	5.3%	15.8%	5.3%	5.3%		100.0%

C14.2 Level of demand for the (10 identified) professions in 5 years time

		REGION										
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total	
1) Land Surveyors	High	Valid N	8	13	23	1	3	4		3	1	56
		% of Total	10.4%	16.9%	29.9%	1.3%	3.9%	5.2%		3.9%	1.3%	72.7%
	Medium	Valid N	1	3	3		2	2	2	4		17
		% of Total	1.3%	3.9%	3.9%		2.6%	2.6%	2.6%	5.2%		22.1%
	Low	Valid N	2		1		1					4
		% of Total	2.6%		1.3%		1.3%					5.2%
	Total	Valid N	11	16	27	1	6	6	2	7	1	77
		% of Total	14.3%	20.8%	35.1%	1.3%	7.8%	7.8%	2.6%	9.1%	1.3%	100.0%

2) Land /Real Estate Appraisers and Tax Specialists	High	Valid N	3	5	13		2	3			26
		% of Total	5.9%	9.8%	25.5%		3.9%	5.9%			51.0%
	Medium	Valid N		6	8		2	1		1	18
		% of Total		11.8%	15.7%		3.9%	2.0%		2.0%	35.3%
	Low	Valid N	1	3	1		1	1			7
		% of Total	2.0%	5.9%	2.0%		2.0%	2.0%			13.7%
Total	Valid N	4	14	22		5	5		1	51	
	% of Total	7.8%	27.5%	43.1%		9.8%	9.8%		2.0%	100.0%	
3) GIS/LIS Specialists	High	Valid N	7	11	20	3	4	8	2	9	64
		% of Total	8.9%	13.9%	25.3%	3.8%	5.1%	10.1%	2.5%	11.4%	81.0%
	Medium	Valid No.	2	3	2		2			2	11
		% of Total	2.5%	3.8%	2.5%		2.5%			2.5%	13.9%
	Low	Valid N		1	2					1	4
		% of Total		1.3%	2.5%					1.3%	5.1%
Total	Valid N	9	15	24	3	6	8	2	12	79	
	% of Total	11.4%	19.0%	30.4%	3.8%	7.6%	10.1%	2.5%	15.2%	100.0%	
4) Land use Managers	High	Valid N	4	2	16	4	4	4	1	4	39
		% of Total	6.5%	3.2%	25.8%	6.5%	6.5%	6.5%	1.6%	6.5%	62.9%
	Medium	Valid N	1	8	7		2	1			19
		% of Total	1.6%	12.9%	11.3%		3.2%	1.6%			30.6%
	Low	Valid N		1	2					1	4
		% of Total		1.6%	3.2%					1.6%	6.5%
Total	Valid N	5	11	25	4	6	5	1	5	62	
	% of Total	8.1%	17.7%	40.3%	6.5%	9.7%	8.1%	1.6%	8.1%	100.0%	
5) Land use and City Planners	High	Valid N	5	5	13	2	2	2		3	32
		% of Total	10.2%	10.2%	26.5%	4.1%	4.1%	4.1%		6.1%	65.3%
	Medium	Valid N	1	3	6		1	3			14
		% of Total	2.0%	6.1%	12.2%		2.0%	6.1%			28.6%
	Low	Valid N	1					1		1	3
		% of Total	2.0%					2.0%		2.0%	6.1%
Total	Valid N	7	8	19	2	3	6		4	49	
	% of Total	14.3%	16.3%	38.8%	4.1%	6.1%	12.2%		8.2%	100.0%	

Note: % of Total refers to the total number of respondents in each category

C14.2 Level of demand of the (10 identified) professions in 5 years time (continued)

			REGION								
			Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
6) Land Policy Specialists	High	Valid N	3	2	10	1	1	2			19
		% of Total	7.5%	5.0%	25.0%	2.5%	2.5%	5.0%			47.5%
	Medium	Valid N		4	6		2	1			13
		% of Total		10.0%	15.0%		5.0%	2.5%			32.5%
	Low	Valid N	1	2	3		1			1	8
		% of Total	2.5%	5.0%	7.5%		2.5%			2.5%	20.0%
	Total	Valid N	4	8	19	1	4	3		1	40
% of Total		10.0%	20.0%	47.5%	2.5%	10.0%	7.5%		2.5%	100.0%	
7) University and College Instructors	High	Valid N	5	7	16	1	2	1	1	33	
		% of Total	10.2%	14.3%	32.7%	2.0%	4.1%	2.0%	2.0%	67.3%	
	Medium	Valid N		2	6		2		1	11	
		% of Total		4.1%	12.2%		4.1%		2.0%	22.4%	
	Low	Valid N	1	1	1		1		1	5	
		% of Total	2.0%	2.0%	2.0%		2.0%		2.0%	10.2%	
	Total	Valid N	6	10	23	1	5	1	3	49	
% of Total		12.2%	20.4%	46.9%	2.0%	10.2%	2.0%	6.1%	100.0%		
8) Land Administration Specialists	High	Valid N	3	10	16	2	4	3	2	40	
		% of Total	5.8%	19.2%	30.8%	3.8%	7.7%	5.8%	3.8%	76.9%	
	Medium	Valid N		2	2		2		1	7	
		% of Total		3.8%	3.8%		3.8%		1.9%	13.5%	
	Low	Valid N	1	1	2		1			5	
		% of Total	1.9%	1.9%	3.8%		1.9%			9.6%	
	Total	Valid N	4	13	20	2	7	3	3	52	
% of Total		7.7%	25.0%	38.5%	3.8%	13.5%	5.8%	5.8%	100.0%		
9) Land Property Lawyers	High	Valid N	2	3	11		2	5		23	
		% of Total	4.7%	7.0%	25.6%		4.7%	11.6%		53.5%	
	Medium	Valid N	1	5	7		2		1	16	
		% of Total	2.3%	11.6%	16.3%		4.7%		2.3%	37.2%	
	Low	Valid N	1	1	2					4	

	% of Total	2.3%	2.3%	4.7%						9.3%
Total	Valid N	4	9	20		4	5		1	43
	% of Total	9.3%	20.9%	46.5%		9.3%	11.6%		2.3%	100.0%
10) Land Administration Technicians	High	Valid N	3	3	16	1	2	1		26
		% of Total	7.5%	7.5%	40.0%	2.5%	5.0%	2.5%		65.0%
	Medium	Valid N		5	3		2			10
		% of Total		12.5%	7.5%		5.0%			25.0%
	Low	Valid N	1	1	1		1			4
		% of Total	2.5%	2.5%	2.5%		2.5%			10.0%
Total	Valid N	4	9	20	1	5	1		40	
	% of Total	10.0%	22.5%	50.0%	2.5%	12.5%	2.5%		100.0%	

Note: % of Total refers to the total number of respondents in each category

C14.3 Level of demand of the (10 identified) professions in 20 years time

			REGION								Total	
			Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
1) Land Surveyors	High	Valid N	3	2	7	1	5	4	1	1	24	
		% of Total	4.3%	2.9%	10.0%	1.4%	7.1%	5.7%	1.4%	1.4%	34.3%	
	Medium	Valid N	6	6	15			2	1	4	1	35
		% of Total	8.6%	8.6%	21.4%			2.9%	1.4%	5.7%	1.4%	50.0%
	Low	Valid N		7	2		1			1		11
		% of Total		10.0%	2.9%		1.4%			1.4%		15.7%
Total	Valid N	9	15	24	1	6	6	2	6	1	70	
	% of Total	12.9%	21.4%	34.3%	1.4%	8.6%	8.6%	2.9%	8.6%	1.4%	100.0%	
2) Land /Real Estate Appraisers and Tax Specialists	High	Valid N	1	8	9		4	2			24	
		% of Total	2.1%	16.7%	18.8%		8.3%	4.2%			50.0%	
	Medium	Valid N	2	5	8		1	2				18
		% of Total	4.2%	10.4%	16.7%		2.1%	4.2%				37.5%
	Low	Valid N	1	1	3					1		6
		% of Total	2.1%	2.1%	6.2%					2.1%		12.5%
Total	Valid N	4	14	20		5	4		1		48	
	% of Total	8.3%	29.2%	41.7%		10.4%	8.3%		2.1%		100.0%	
3) GIS/LIS Specialists	High	Valid N	6	6	12	1	5	6	1	3	40	

	% of Total	8.3%	8.3%	16.7%	1.4%	6.9%	8.3%	1.4%	4.2%		55.6%	
Medium	Valid N	1	5	8	2		1	1	6		24	
	% of Total	1.4%	6.9%	11.1%	2.8%		1.4%	1.4%	8.3%		33.3%	
Low	Valid N	1	3	2					2		8	
	% of Total	1.4%	4.2%	2.8%					2.8%		11.1%	
Total	Valid N	8	14	22	3	5	7	2	11		72	
	% of Total	11.1%	19.4%	30.6%	4.2%	6.9%	9.7%	2.8%	15.3%		100.0%	
4) Land use Managers	High	Valid N	5	7	9	5	1	1	1	3		32
		% of Total	8.3%	11.7%	15.0%	8.3%	1.7%	1.7%	1.7%	5.0%		53.3%
	Medium	Valid N	1	1	12		4	2		1		21
		% of Total	1.7%	1.7%	20.0%		6.7%	3.3%		1.7%		35.0%
	Low	Valid N		3	1		1	1		1		7
		% of Total		5.0%	1.7%		1.7%	1.7%		1.7%		11.7%
	Total	Valid N	6	11	22	5	6	4	1	5		60
		% of Total	10.0%	18.3%	36.7%	8.3%	10.0%	6.7%	1.7%	8.3%		100.0%
	5) Land use and City Planners	High	Valid N	4	5	8	2	2	2			23
			% of Total	9.1%	11.4%	18.2%	4.5%	4.5%	4.5%			
Medium		Valid N	2	3	7		1	2		3		18
		% of Total	4.5%	6.8%	15.9%		2.3%	4.5%		6.8%		40.9%
Low		Valid N			1			1		1		3
		% of Total			2.3%			2.3%		2.3%		6.8%
Total		Valid N	6	8	16	2	3	5		4		44
		% of Total	13.6%	18.2%	36.4%	4.5%	6.8%	11.4%		9.1%		100.0%

Note: % of Total refers to the total number of respondents in each category

C14.3 Level of demand of the (10 identified) professions in 20 years time (continued)

		(REGION)									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
6) Land Policy Specialists	High	Valid N	2	2	7	1	2	1			15
		% of Total	5.0%	5.0%	17.5%	2.5%	5.0%	2.5%			37.5%
	Medium	Valid N	3	6	7		2	2		1	21

		% of Total	7.5%	15.0%	17.5%		5.0%	5.0%		2.5%		52.5%
	Low	Valid N			3		1					4
		% of Total			7.5%		2.5%					10.0%
	Total	Valid N	5	8	17	1	5	3		1		40
		% of Total	12.5%	20.0%	42.5%	2.5%	12.5%	7.5%		2.5%		100.0%
7) University and College Instructors	High	Valid N	2	2	15	2	1	1				23
		% of Total	4.2%	4.2%	31.2%	4.2%	2.1%	2.1%				47.9%
	Medium	Valid N	2	6	4		4			3		19
		% of Total	4.2%	12.5%	8.3%		8.3%			6.2%		39.6%
	Low	Valid N	2	2	2							6
		% of Total	4.2%	4.2%	4.2%							12.5%
	Total	Valid N	6	10	21	2	5	1		3		48
		% of Total	12.5%	20.8%	43.8%	4.2%	10.4%	2.1%		6.2%		100.0%
8) Land Administration Specialists	High	Valid N	3	4	10	2	5	2		1		27
		% of Total	5.8%	7.7%	19.2%	3.8%	9.6%	3.8%		1.9%		51.9%
	Medium	Valid N	2	6	7		1	1		2		19
		% of Total	3.8%	11.5%	13.5%		1.9%	1.9%		3.8%		36.5%
	Low	Valid N		3	2		1					6
		% of Total		5.8%	3.8%		1.9%					11.5%
	Total	Valid N	5	13	19	2	7	3		3		52
		% of Total	9.6%	25.0%	36.5%	3.8%	13.5%	5.8%		5.8%		100.0%
9) Land Property Lawyers	High	Valid N	2	5	8		1	2				18
		% of Total	4.8%	11.9%	19.0%		2.4%	4.8%				42.9%
	Medium	Valid N	1	3	7		3	2		1		17
		% of Total	2.4%	7.1%	16.7%		7.1%	4.8%		2.4%		40.5%
	Low	Valid N	2	1	4							7
		% of Total	4.8%	2.4%	9.5%							16.7%
	Total	Valid N	5	9	19		4	4		1		42
		% of Total	11.9%	21.4%	45.2%		9.5%	9.5%		2.4%		100.0%
10) Land Administration Technicians	High	Valid N	1	4	12		4					21
		% of Total	2.4%	9.8%	29.3%		9.8%					51.2%
	Medium	Valid N	3	4	7	1		1				16
		% of Total	7.3%	9.8%	17.1%	2.4%		2.4%				39.0%
	Low	Valid N	1	1	1		1					4

	% of Total	2.4%	2.4%	2.4%		2.4%				9.8%
Total	Valid N	5	9	20	1	5	1			41
	% of Total	12.2%	22.0%	48.8%	2.4%	12.2%	2.4%			100.0%

Note: % of Total refers to the total number of respondents in each category

C14.4 Number of position needed for professions in 5 years time

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
1) LAND SURVEYORS	Minimum	185	500	260	10000	1500	40	10000	147	600	40
	Maximum	20000	60000	90000	44000	80000	30000	100000	20000	600	100000
	Mean	5549	16500	9391	27000	27473	10269	70000	9018	600	14489
	Std. D.	5494	17248	19033	24042	30881	12121	51962	7105		22188
	Sum	61035	280500	225382	54000	164840	61612	210000	72147	600	1130116
	Valid N	11	17	24	2	6	6	3	8	1	78
2) LAND/REAL ESTATE APPRISERS and TAX SPECIALISTS	Minimum	1000	45	19	.	500	45	.	1000	350	19
	Maximum	4000	18000	30000	.	10000	15000	.	1000	350	30000
	Mean	2500	3299	4917	.	5300	4881	.	1000	350	4171
	Std. D.	1291	5126	8770	.	3384	6062	.			6545
	Sum	10000	39585	98344	.	26500	24405	.	1000	350	200184
	Valid N	4	12	20	0	5	5	0	1	1	48
3) GIS/LIS SPECIALISTS	Minimum	74	10	180	3000	800	72	5000	136	500	10
	Maximum	10000	50000	20000	15000	90000	10000	100000	20000	500	100000
	Mean	5759	6847	3625	9333	21483	3766	68333	7714	500	9057
	Std. D.	3867	11761	4499	6028	34271	3731	54848	6056		18873
	Sum	46074	116400	83366	28000	128900	30132	205000	77136	500	715508
	Valid N	8	17	23	3	6	8	3	10	1	79
4) LAND USE MANAGERS	Minimum	3000	100	19	10000	700	360	5000	1000	200	19
	Maximum	20000	13000	30000	20000	100000	8000	5000	10000	200	100000

	Mean	8900	4344	3363	14300	34525	4162	5000	4800	200	8335
	Std. D.	5998	4110	6568	4324	46990	3799	.	3347	.	17410
	Sum	53400	39100	70614	71500	207150	20810	5000	24000	200	491774
	Valid N	6	9	21	5	6	5	1	5	1	59
5) LAND USE and CITY PLANNERS	Minimum	2000	45	19	10000	600	360	100000	3400	180	19
	Maximum	7000	8000	12000	10000	55000	12000	100000	10000	180	100000
	Mean	4167	3193	2360	10000	21867	4115	100000	5850	180	8795
	Std. D.	1722	2650	3386	0	29077	4483	0	2868	.	20878
	Sum	25000	25545	37759	20000	65600	24687	200000	23400	180	422171
	Valid N	6	8	16	2	3	6	2	4	1	48

C14.4 Number of position needed for professions in 5 years time (continued)

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
6) LAND POLICY SPECIALISTS	Minimum	2000	1900	100	10000	280	45	.	3100	180	45
	Maximum	5040	10000	15000	10000	14000	16000	.	3100	180	16000
	Mean	3520	3557	1744	10000	4045	5484	.	3100	180	3258
	Std. D.	2150	2888	4216	.	6659	7169	.	.	.	4554
	Sum	7040	24900	20930	10000	16180	21935	.	3100	180	104265
	Valid N	2	7	12	1	4	4	0	1	1	32
7) UNIVERSITY and COLLEGE INSTRUCTORS	Minimum	4000	300	40	10000	200	600	.	3200	180	40
	Maximum	8000	11000	9000	15000	20000	600	.	5000	180	20000
	Mean	5833	3086	1921	12500	7300	600	.	4100	180	3647
	Std. D.	2021	3841	2519	3536	8716	.	.	1273	.	4532
	Sum	17500	21600	32660	25000	29200	600	.	8200	180	134940
	Valid N	3	7	17	2	4	1	0	2	1	37
	Minimum	400	45	60	10000	500	1800	.	2000	250	45

8) LAND ADMINISTRATION SPECIALISTS	Maximum	6000	10000	20000	10000	6100	12000	.	6500	250	20000
	Mean	3200	3238	2620	10000	4000	6100	.	4250	250	3569
	Std. D.	3960	3455	4965	0	1894	5285	.	3182	.	4087
	Sum	6400	45335	44533	20000	28000	18300	.	8500	250	171318
	Valid N	2	14	17	2	7	3	0	2	1	48
9) LAND PROPERTY LAWYERS	Minimum	800	200	60	.	290	27	.	2111	.	27
	Maximum	5000	3000	20000	.	30000	12000	.	2111	.	30000
	Mean	2900	806	2372	.	8378	4677	.	2111	.	3096
	Std. D.	2970	872	4699	.	12475	5190	.	.	.	5866
	Sum	5800	7250	40325	.	41890	23387	.	2111	.	120763
Valid N	2	9	17	0	5	5	0	1	0	39	
10) LAND ADMINISTRATION TECHNICIANS	Minimum	300	100	200	10000	1000	81	.	.	250	81
	Maximum	4000	13000	50000	10000	10000	6000	.	.	250	50000
	Mean	2150	2903	6378	10000	4000	3041	.	.	250	4740
	Std. D.	2616	4387	12483	.	3536	4185	.	.	.	8888
	Sum	4300	23224	102051	10000	20000	6081	.	.	250	165906
Valid N	2	8	16	1	5	2	0	0	1	35	

C14.5 Number of position needed for professions in 20 years time.

	REGION										
	Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total	
1) LAND SURVEYORS	Minimum	2000	1000	245	5000	7840	288	6000	37	1500	37
	Maximum	10000	30000	50000	10000	50000	150000	60000	100000	1500	150000
	Mean	3625	7562	11330	7500	23968	31108	42000	21130	1500	14371
	Std. D.	2722	7348	12226	3536	16831	58720	31177	33100	.	23703

	Sum	29000	121000	237930	15000	119840	186648	126000	169037	1500	1005955
	Valid N	8	16	21	2	5	6	3	8	1	70
2) LAND/REAL ESTATE APPRIISERS and TAX SPECIALISTS	Minimum	1000	90	95	.	2000	180	.	3000	1800	90
	Maximum	5000	15000	20000	.	25000	90000	.	3000	1800	90000
	Mean	2500	3175	6394	.	7800	25545	.	3000	1800	6790
	Std. D.	1732	4115	6971	.	9834	43181	.	.	.	13918
	Sum	10000	41270	115095	.	39000	102180	.	3000	1800	312345
	Valid N	4	13	18	0	5	4	0	1	1	46
3) GIS/LIS SPECIALISTS	Minimum	1000	100	100	2000	4000	288	4000	136	2500	100
	Maximum	20000	16000	100000	10000	40000	100000	60000	40000	2500	100000
	Mean	6143	4519	12540	5667	13000	18413	34667	9403	2500	10867
	Std. D.	6362	4391	23179	4041	15588	36262	28378	11730	.	19031
	Sum	43000	67790	250805	17000	65000	128888	104000	103436	2500	782419
	Valid N	7	15	20	3	5	7	3	11	1	72
4) LAND USE MANAGERS	Minimum	1000	200	95	5000	1325	2000	6000	2000	2000	95
	Maximum	10000	15000	59000	17000	20000	40000	6000	15000	2000	59000
	Mean	5083	5610	7459	10000	7888	12545	6000	6600	2000	7310
	Std. D.	3293	5644	13755	4416	9386	18396	.	4930	.	9934
	Sum	30500	56100	134260	50000	47325	50180	6000	33000	2000	409365
	Valid N	6	10	18	5	6	4	1	5	1	56
5) LAND USE and CITY PLANNERS	Minimum	400	135	95	3000	5000	508	60000	2200	1000	95
	Maximum	6000	16000	18000	15000	12000	60000	60000	15000	1000	60000
	Mean	2880	6142	3277	9000	9000	15022	60000	9300	1000	8689
	Std. D.	2161	5172	4635	8485	3606	25288	0	6680	.	14681
	Sum	14400	49135	49150	18000	27000	75108	120000	37200	1000	390993

Valid N	5	8	15	2	3	5	2	4	1	45
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C14.5b Number of position needed for professions in 20 years time (continued)

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
6) LAND POLICY SPECIALISTS	Minimum	1000	50	100	5000	180	180	.	2000	1000	50
	Maximum	2900	5000	6000	5000	12000	80000	.	2000	1000	80000
	Mean	1950	1756	1914	5000	6045	21415	.	2000	1000	4901
	Std. D.	1344	1480	1975	.	5827	39099	.	.	.	13980
	Sum	3900	14050	21050	5000	24180	85660	.	2000	1000	156840
	Valid N	2	8	11	1	4	4	0	1	1	32
7) UNIVERSITY and COLLEGE INSTRUCTORS	Minimum	2000	400	200	2000	600	3000	.	2250	2000	200
	Maximum	3000	3000	16800	10000	15000	3000	.	20000	2000	20000
	Mean	2633	1829	3653	6000	7400	3000	.	11125	2000	4111
	Std. D.	551	1034	4079	5657	6385	.	.	12551	.	4688
	Sum	7900	12800	58440	12000	29600	3000	.	22250	2000	147990
	Valid N	3	7	16	2	4	1	0	2	1	36
8) LAND ADMINISTRATION SPECIALISTS	Minimum	200	200	200	5000	2000	720	.	2000	3000	200
	Maximum	3000	20000	100000	5000	5000	60000	.	10000	3000	100000
	Mean	1600	4672	10614	5000	3643	20840	.	6000	3000	7419
	Std. D.	1980	6760	24462	0	1180	33918	.	5657	.	16619
	Sum	3200	70075	169825	10000	25500	62520	.	12000	3000	356120

	Valid N	2	15	16	2	7	3	0	2	1	48
9) LAND PROPERTY LAWYERS	Minimum	400	100	34	.	280	108	.	2111	.	34
	Maximum	2000	2000	10000	.	18000	60000	.	2111	.	60000
	Mean	1200	925	2880	.	6856	16777	.	2111	.	4243
	Std. D.	1131	811	2966	.	7229	28886	.	.	.	9969
	Sum	2400	9250	46086	.	34280	67108	.	2111	.	161235
	Valid N	2	10	16	0	5	4	0	1	0	38
10) LAND ADMINISTRATION TECHNICIANS	Minimum	300	60	700	8000	500	324	.	.	3500	60
	Maximum	2000	27000	30000	8000	30000	30000	.	.	3500	30000
	Mean	1150	8223	8502	8000	8300	15162	.	.	3500	8203
	Std. D.	1202	9949	10337	.	12235	20984	.	.	.	10232
	Sum	2300	57560	127524	8000	41500	30324	.	.	3500	270708
	Valid N	2	7	15	1	5	2	0	0	1	33

C16 MAIN DUTIES OF THE PROFESSIONS^a

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Land survey specialist	Valid N	1	4	1			1			7
	% of Total	0.2%	0.9%	0.2%			0.2%			1.6%
Data processors	Valid N	2	2							4
	% of Total	0.4%	0.4%							0.9%
working in land property and land use planning assessment	Valid N	2	2							4
	% of Total	0.4%	0.4%							0.9%
Designing and proposing land use policies and regulations	Valid N	1	1				1			3
	% of Total	0.2%	0.2%				0.2%			0.7%

Monitoring and evaluation activities	Valid N	2							2
	% of Total	0.4%							0.4%
Preparing and producing cadastral survey based maps	Valid N	1	3			1			5
	% of Total	0.2%	0.7%			0.2%			1.1%
Consultant in rural road development project	Valid N	1							1
	% of Total	0.2%							0.2%
Monitoring activities	Valid N	1							1
	% of Total	0.2%							0.2%
Surveying in the resettlement areas using total station, GIS, etc	Valid N	1	1						2
	% of Total	0.2%	0.2%						0.4%
As a consultant, he is preparing cadastral based city maps	Valid N	1	1						2
	% of Total	0.2%	0.2%						0.4%
Working in finance and planning office	Valid N	1							1
	% of Total	0.2%							0.2%
(Self-employee and seeks employment	Valid N	1							1
	% of Total	0.2%							0.2%
General lawyer, working in the Municipality	Valid N	1							1
	% of Total	0.2%							0.2%
Farming activities	Valid N	1	1			1			3
	% of Total	0.2%	0.2%			0.2%			0.7%
Neither profession nor have jobs	Valid N	1	1						2
	% of Total	0.2%	0.2%						0.4%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

	REGION	Total
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		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
GIS/LIS specialists	Valid N	2	2			1	1				6
	% of Total	0.4%	0.4%			0.2%	0.2%				1.3%
Trainer in different subjects	Valid N	1									1
	% of Total	0.2%									0.2%
Project coordinator, working in a municipality	Valid N	1									1
	% of Total	0.2%									0.2%
Cadastral surveyor	Valid N	2					1				3
	% of Total	0.4%					0.2%				0.7%
He is working as city planner	Valid N	1					0				1
	% of Total	0.2%									0.2%
He is working as road sign designing expert	Valid N	1									1
	% of Total	0.2%									0.2%
lecturer	Valid N	1									12
	% of Total	0.2%									2.7%
Researcher	Valid N	1									1
	% of Total	0.2%									0.2%
Consultant	Valid N	2				1					3
	% of Total	0.4%				0.2%					0.7%
Working in land registration office	Valid N	1	6			1					14
	% of Total	0.2%	1.3%			0.2%					3.1%
Working in land administration office	Valid N	1	6			0					15
	% of Total	0.2%	1.3%			0.0%					3.3%
Dealing with conflict resolving activities	Valid N	1	3			1	1				6
	% of Total	0.2%	0.7%			0.2%	0.2%				1.3%
Dealing with research	Valid N	1	5				1				7

	% of Total	0.2%	1.1%				0.2%				1.6%
Dealing with research	Valid N	2	2								4
	% of Total	0.4%	0.4%								0.9%
Teacher	Valid N	2	0								2
	% of Total	0.4%	0.0%								0.4%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Extension worker	Valid N	1	0								1
	% of Total	0.2%	0.0%								0.2%
research and consultancy services	Valid N	0	2								2
	% of Total	0.0%	0.4%								0.4%
policy formulation and LA	Valid N	1	3				1				5
	% of Total	0.2%	0.7%				0.2%				1.1%
Identify available information through land use maps	Valid N	1	3				1				5
	% of Total	0.2%	0.7%				0.2%				1.1%
identify land for real estate developer	Valid N	1	2								3
	% of Total	0.2%	0.4%								0.7%
Collect data and process the collected data in land management office	Valid N	1	5								6
	% of Total	0.2%	1.1%								1.3%
Project specialist in LA programme	Valid N	1	0				1				2
	% of Total	0.2%	0.0%				0.2%				0.4%

In order to fill the professional demand or gap, he established a training centre	Valid N	1	0		1	1			3
	% of Total	0.2%	0.0%		0.2%	0.2%			0.7%
Administrator	Valid N	2	3		3	0			8
	% of Total	0.4%	0.7%		0.7%	0.0%			1.8%
Irrigation project advisor	Valid N		2						2
	% of Total		0.4%						0.4%
Worked at Agarfa Farmer Training Centre and now in one of the TVET Colleges	Valid N		1	1					2
	% of Total		0.2%	0.2%					0.4%
Currently, he works in one of the environmental Protection Offices	Valid N		1						1
	% of Total		0.2%						0.2%
He is looking employment	Valid N		1						1
	% of Total		0.2%						0.2%
Part time M.Sc student in GIS, and part time works at Debre Markos University	Valid N		2	1					3
	% of Total		0.4%	0.2%					0.7%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
M.Sc candidate in GIS and is also working as instructor in one of the colleges or AVETs	Valid N		3							3
	% of Total		0.7%							0.7%
Researcher in surveying equipments	Valid N		3							3
	% of Total		0.7%							0.7%
	Valid N		2							2

He is modeling and monitoring of surveying data	% of Total	0.4%							0.4%
	Valid N	1							1
He is studying Space Science	% of Total	0.2%							0.2%
	Valid N	1							1
Dealing with GPS application	% of Total	0.2%							0.2%
	Valid N	5		1	2	0	0	0	8
Developing a land use plan and land regulation	% of Total	1.1%		0.2%	0.4%	0.0%	0.0%	0.0%	1.8%
	Valid N	3							3
Developing land use plan and 2nd certificate programme	% of Total	0.7%							0.7%
	Valid N	3		1					4
He provides LA and use related advice to policy-makers and land use planners	% of Total	0.7%		0.2%					0.9%
	Valid N	3			1				4
His main duties is to define and understand the role of cadastral survey in LA and use	% of Total	0.7%			0.2%				0.9%
	Valid N	3							3
conducting a training project	% of Total	0.7%							0.7%
	Valid N	7							7
teaching, research, giving training, data encoder	% of Total	1.6%							1.6%
	Valid N	1		1			1		3
Data analyst	% of Total	0.2%		0.2%			0.2%		0.7%
	Valid N	2	1						3
Remote sensing and aerial photo specialist	% of Total	0.4%	0.2%						0.7%
	Valid N	5		1					6
GIS specialist	% of Total	1.1%		0.2%					1.3%
	Valid N	1		1					1
Tax specialists	% of Total			0.2%					0.2%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Works as GIS specialist	Valid N		4				1				5
	% of Total		0.9%				0.2%				1.1%
Data processor using GIS	Valid N			1							1
	% of Total			0.2%							0.2%
Works in urban development using ESRI, ARC GIS APIS	Valid N			1							1
	% of Total			0.2%							0.2%
Developing a method regarding conflict resolution	Valid N			1							1
	% of Total			0.2%							0.2%
Conduct training GIS application for field technicians o	Valid N			3							3
	% of Total			0.7%							0.7%
He works in land registration and data recording office	Valid N			1							1
	% of Total			0.2%							0.2%
Investor in agriculture sector	Valid N			3							3
	% of Total			0.7%							0.7%
Conduct a study on regional land administration and use	Valid N			1							4
	% of Total			0.2%							0.9%
conduct land certification, registration and surveying	Valid N			2							2
	% of Total			0.4%							0.4%
Provide training on LA	Valid N			2							2
	% of Total			0.4%							0.4%
Gathering land information, organizing and processing data	Valid N			3							3
	% of Total			0.7%							0.7%

Preparing development plan and participating in capacity building	Valid N			1						1
	% of Total			0.2%						0.2%
Works as GIS / LIS specialist, land use management and land policy specialist	Valid N			4						4
	% of Total			0.9%						0.9%
Participates in ortho-photo map survey and works as registrar in different regions	Valid N		1	4						5
	% of Total		0.2%	0.9%						1.1%
Providing GIS/GPS training for woreda and regional experts in GIS/GPS	Valid N			2						2
	% of Total			0.4%						0.4%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Provides general supervision and recording land use/conver data	Valid N			6							6
	% of Total			1.3%							1.3%
Carry out cadastral surveying and mapping, real State valuation, map preparation and interpretation	Valid N			1							1
	% of Total			0.2%							0.2%
Works as land surveyor, property valuator, land administrator and manager	Valid N			6							6
	% of Total			1.3%							1.3%
Boundary demarcation, recording and land property valuation	Valid N			3							3
	% of Total			0.7%							0.7%
Preparing maps, undertake real state valuation and prepare land use plan	Valid N			2							2
	% of Total			0.4%							0.4%

Caring out cadastral surveying and mapping, real state valuation, map preparation and interpretation	Valid N			3						3
	% of Total			0.7%						0.7%
Land law lecturer, GIS instructor and remote sensing	Valid N			3						3
	% of Total			0.7%						0.7%
Works as natural resource manager, coordinates and land use team leader	Valid N			1	6					7
	% of Total			0.2%	1.3%					1.6%
Works as site supervisor	Valid N			0	3					3
	% of Total			0.0%	0.7%					0.7%
As environmental specialist and trainer in GIS	Valid N			1	2					3
	% of Total			0.2%	0.4%					0.7%
Prepare local development plan	Valid N			3						3
	% of Total			0.7%						0.7%
Perform development strategies	Valid N			1						1
	% of Total			0.2%						0.2%
Participate in capacity building program	Valid N			3						3
	% of Total			0.7%						0.7%
Digitalizing maps	Valid N			1						1
	% of Total			0.2%						0.2%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Give service delivery system	Valid N			1							1
	% of Total			0.2%							0.2%

Identify squatter delivery system areas	Valid N	1				1
	% of Total	0.2%				0.2%
Prepare quarterly plan	Valid N	1				1
	% of Total	0.2%				0.2%
Engage on cadastral survey, resolve land dispute and improve environmental problems	Valid N		3			3
	% of Total		0.7%			0.7%
Land surveying, registration and certification	Valid N		1	1		2
	% of Total		0.2%	0.2%		0.4%
Drafting policies regarding to LA, land use planning and training experts on specific areas	Valid N	1	1			2
	% of Total	0.2%	0.2%			0.4%
Studying basic principle of LA regarding market value and resolving land dispute	Valid N		2	1		3
	% of Total		0.4%	0.2%		0.7%
Resolving land disputes, estimating the value of the land, preparing 1st and 2nd level certificates	Valid N		5			5
	% of Total		1.1%			1.1%
Working on land resources for efficient utilization and protection	Valid N		2	1		3
	% of Total		0.4%	0.2%		0.7%
Working on land use plan, gather land information and developing land use maps	Valid N		3		4	7
	% of Total		0.7%		0.9%	1.6%
Conducting cadastral survey and mapping, evaluate and resolve land related dispute	Valid N		2	2		4
	% of Total		0.4%	0.4%		0.9%
Collecting and studying urban land related policies	Valid N		1	4		5
	% of Total		0.2%	0.9%		1.1%
urban planning and drafting urban management strategies	Valid N			4		4
	% of Total			0.9%		0.9%

Advising planners how to solve construction problems facing by city planners	Valid N				1	4			5
	% of Total				0.2%	0.9%			1.1%
GIS expert and designer	Valid N					2			2
	% of Total					0.4%			0.4%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
working as urban and regional planner	Valid N						1			1
	% of Total						0.2%			0.2%
As surveyor	Valid N						4			4
	% of Total						0.9%			0.9%
land and site preparation, providing training on land development for the city developers	Valid N					1	2			3
	% of Total					0.2%	0.4%			0.7%
works as city planner, provide building permit and land bank transfer	Valid N					1	5			6
	% of Total					0.2%	1.1%			1.3%
Perform land development works	Valid N									3
	% of Total									0.7%
Participate in urban planning activities	Valid N			2						2
	% of Total			0.4%						0.4%
Design and test GIS applications	Valid N			1						1
	% of Total			0.2%						0.2%
Drafting documents related to land administration	Valid N			1						1
	% of Total			0.2%						0.2%
	Valid N			2						2

Working in managing land administration program	% of Total			0.4%						0.4%
	Valid N			1						1
Participate in USAID project	% of Total			0.2%						0.2%
	Valid N			1				1		2
Provide assistance for LA program of world bank	% of Total			0.2%				0.2%		0.4%
	Valid N			2						2
Propose land policy making analysis	% of Total			0.4%						0.4%
	Valid N			3						3
Evaluate land related property	% of Total			0.7%						0.7%
	Valid N			2						2
Administer and manage urban land	% of Total			0.4%						0.4%
	Valid N			2						2
Advice on issues related to urban development	% of Total			0.4%						0.4%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Cadastral surveying	Valid N			1							1
	% of Total			0.2%							0.2%
Managing real property registration	Valid N			2							2
	% of Total			0.4%							0.4%
Construction	Valid N							5	2		7
	% of Total							1.1%	0.4%		1.6%

Bridge maintenance	Valid N						1		1
	% of Total						0.2%		0.2%
Urban planning, design and construction	Valid N						1	1	2
	% of Total						0.2%	0.2%	0.4%
Land surveying	Valid N						3	3	6
	% of Total						0.7%	0.7%	1.3%
Cartography work	Valid N							1	1
	% of Total							0.2%	0.2%
Pastoralist development expert	Valid N						1		1
	% of Total						0.2%		0.2%
Finance officer	Valid N						1		1
	% of Total						0.2%		0.2%
Register land parcel and ownership information	Valid N							1	1
	% of Total							0.2%	0.2%
Data processing	Valid N								1
	% of Total								0.2%
Provide training about cadastral survey	Valid N							5	5
	% of Total							1.1%	1.1%
Environmental impact assessment and policy control	Valid N							1	1
	% of Total							0.2%	0.2%
Land and environmental data management	Valid N							1	1
	% of Total							0.2%	0.2%
Land use conservation expert	Valid N							3	3
	% of Total							0.7%	0.7%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Dealing with land related issues for development	Valid N								1		1
	% of Total								0.2%		0.2%
Teaching GIS courses	Valid N								2		2
	% of Total								0.4%		0.4%
Guide students to field work	Valid N								1		1
	% of Total								0.2%		0.2%
Conduct GIS related research	Valid N								1		1
	% of Total								0.2%		0.2%
conduct short term training	Valid N								1		1
	% of Total								0.2%		0.2%
Land integrated information record project	Valid N								2		2
	% of Total								0.4%		0.4%
Works in a municipality	Valid N								4		4
	% of Total								0.9%		0.9%
Works in agricultural bureau	Valid N								1		1
	% of Total								0.2%		0.2%
Urban planning institute	Valid N								1		1
	% of Total								0.2%		0.2%
GIS and remote sensing	Valid N									1	1
	% of Total									0.2%	0.2%
Teaching geography	Valid N									1	1
	% of Total									0.2%	0.2%

Works as oil development expert	Valid N						0	2	2
	% of Total							0.4%	0.4%
Works as range land expert	Valid N							1	1
	% of Total							0.2%	0.2%
Undertake real estate valuation and estimation	Valid N			1					1
	% of Total			0.2%					0.2%
Preparing digital land information system	Valid N			1					1
	% of Total			0.2%					0.2%

C16 MAIN DUTIES OF THE PROFESSIONS (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Managing utilization of land	Valid N			1						1
	% of Total			0.2%						0.2%
Prepare land use plan	Valid N			3						3
	% of Total			0.7%						0.7%
Formulate and implement land policies at national and regional levels	Valid N			2						2
	% of Total			0.4%						0.4%
Administer land related dispute resolution	Valid N			1						1
	% of Total			0.2%						0.2%
Collecting data on LA	Valid N			1						1
	% of Total			0.2%						0.2%
Research and community service in LA and policy	Valid N			1						1
	% of Total			0.2%						0.2%
Delivering TOT for regional experts	Valid N			1						1

	% of Total			0.2%						0.2%	
M & E of land administration activities	Valid N			1					1	2	
	% of Total			0.2%					0.2%	0.4%	
Work in dispute resolution	Valid N							1		1	
	% of Total							0.2%		0.2%	
Work as an expert in apprising tax and service payments	Valid N								1	1	
	% of Total								0.2%	0.2%	
Total	Valid N	47	112	109	14	38	45	16	64	3	448
	% of Total	10.5%	25.0%	24.3%	3.1%	8.5%	10.0%	3.6%	14.3%	0.7%	100.0%

Percentages and totals are based on responses.

C17.0 Is adequate training available for the professions in the country?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	3	12	2	1	3	7	1	4	2	35
	% of Total	2.4%	9.7%	1.6%	0.8%	2.4%	5.6%	0.8%	3.2%	1.6%	28.2%
No	Valid N	4	5	7	12	2	1	2	8	2	43
	% of Total	3.2%	4.0%	5.6%	9.7%	1.6%	0.8%	1.6%	6.5%	1.6%	34.7%
Partial	Valid N	7	9	16		3	1	3	7		46
	% of Total	5.6%	7.3%	12.9%		2.4%	0.8%	2.4%	5.6%		37.1%
Total	Valid N	14	26	25	13	8	9	6	19	4	124
	% of Total	11.3%	21.0%	20.2%	10.5%	6.5%	7.3%	4.8%	15.3%	3.2%	100.0%

C17.1 If there is no adequate training or partially available identify the most significant needs^a

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
About parcel and cadastral survey	Valid N	2	2								4
	% of Total	1.9%	1.9%								3.8%
Land policy and land lawyer	Valid N	1									1
	% of Total	1.0%									1.0%
Land registration, compensation and valuation	Valid N	1									1
	% of Total	1.0%									1.0%
Rural and urban land use planning	Valid N	2									2
	% of Total	1.9%									1.9%
Cadastral survey, GIS/LIS and land use planning	Valid N	1									1
	% of Total	1.0%									1.0%
LA and environmental conservation	Valid N	1									1
	% of Total	1.0%									1.0%
Land use and city planning	Valid N	1	2								3
	% of Total	1.0%	1.9%								2.9%
Modalities and technique change related to LA policy issue	Valid N	1	1	6	5	1		5	1		20
	% of Total	1.0%	1.0%	5.8%	4.8%	1.0%		4.8%	1.0%		19.2%
Developing LA methods	Valid N	1									1
	% of Total	1.0%									1.0%
Land management and GIS technique	Valid N	1	1								2
	% of Total	1.0%	1.0%								1.9%
Parcels and cadastral survey	Valid N		1								1

	% of Total		1.0%							1.0%
Training on software such as GPS, GIS, AutoCAD and net working	Valid N	1	2							3
	% of Total	1.0%	1.9%							1.9%
Data base and cadastral information linkage	Valid N		1							1
	% of Total		1.0%							1.0%
Knowledge and skill training in real estate value	Valid N	1	3							4
	% of Total	1.0%	2.9%							3.8%
GIS/LIS technology and its practical application	Valid N		2							2
	% of Total		1.9%							1.9%

C17.1 If there is no adequate training or partially available identify the most significant needs (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Land policy issues and applied information system	Valid N		1								1
	% of Total		1.0%								1.0%
GIS and spatial analytical functions	Valid N		1	1							2
	% of Total		1.0%	1.0%							1.9%
cadastral surveyors, GIS and land use planning	Valid N			1							1
	% of Total			1.0%							1.0%
Soil and environmental conservation	Valid N			2							2
	% of Total			1.9%							1.9%
training on tenure security , valuation and compensation	Valid N			2							2
	% of Total			1.9%							1.9%
	Valid N			1							1

Awareness creation methods and techniques	% of Total			1.0%						1.0%
	Valid N			1						1
GPs, surveying techniques and modeling	% of Total			1.0%						1.0%
	Valid N			1						1
LA and use legislation	% of Total			1.0%						1.0%
	Valid N			1						1
land use planning, land management and land valuation.	% of Total			1.0%						1.0%
	Valid N			1						1
Graduates and technical personnel	% of Total			1.0%						1.0%
	Valid N			2						2
land surveyors, land policy specialist and lecturers	% of Total			1.9%						1.9%
	Valid N			1						1
Limited knowledge in GIS/LIS application	% of Total			1.0%						1.0%
	Valid N				2					2
Land use rights, certification and transactions	% of Total			1.9%						1.9%
	Valid N			1	0					1
Field level adjudication, demarcation and registration	% of Total			1.0%	0.0%					1.0%
	Valid N				4					4
Land Administration and certification	% of Total			3.8%						3.8%

C17.1 If there is no adequate training or partially available identify the most significant needs (continued)

REGION									Total
Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	

The linkage between certification and taxation	Valid N % of Total		1 1.0%					1 1.0%
Land resource valuation and compensation methods	Valid N % of Total	1 1.0%						1 1.0%
Land use planning and analysis	Valid N % of Total	2 1.9%						2 1.9%
Land law and policy	Valid N % of Total	2 1.9%						2 1.9%
No adequate training despite there is a need in land policy , land use management, land information system	Valid N % of Total			1 1.0%				1 1.0%
Property value appraisal	Valid N % of Total			1 1.0%				1 1.0%
Advanced training for universities and college instructors	Valid N % of Total			2 1.9%				2 1.9%
How to resolve land use conflict and litigation cases	Valid N % of Total				1 1.0%			1 1.0%
Training and research relevant for policy matter	Valid N % of Total	1 1.0%	1 1.0%	1 1.0%			1 1.0%	4 3.8%
GIS and photo-grammetry techniques	Valid N % of Total					1 1.0%		1 1.0%
GIS, aerial photos, satellite images interpretation	Valid N % of Total					1 1.0%		1 1.0%
Inadequate training specially in adjudication, registration and certification	Valid N % of Total					2 1.9%	1 1.0%	3 2.9%
Land survey and management	Valid N % of Total						1 1.0%	1 1.0%

The management and storage data	Valid N								1	1
	% of Total								1.0%	1.0%

C17.1 If there is no adequate training or partially available identify the most significant needs (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Need professionals in land use practices and sustainable natural resource and environmental management	Valid N								1	1
	% of Total								1.0%	1.0%
Cadastral survey, map reading (geo-reference)	Valid N								1	1
	% of Total								1.0%	1.0%
GIS based knowledge for natural resource management and socio-economic development	Valid N			2					1	3
	% of Total			1.9%					1.0%	2.9%
Photogrammetric and in handling equipments such as Large scale GPS, Total Station,	Valid N								2	2
	% of Total								1.9%	1.9%
Land identification, certification and investment	Valid N								1	1
	% of Total								1.0%	1.0%
Customary law and land reform	Valid N								1	2
	% of Total								1.0%	1.9%
This profession is a new field and hence it needs lots of training	Valid N			1						1
	% of Total			1.0%						1.0%

Total	Valid N	14	17	30	12	6	2	5	16	2	104
	% of Total	13.5%	16.3%	28.8%	11.5%	5.8%	1.9%	4.8%	15.4%	1.9%	100.0%

Percentages and totals are based on responses.

C18 How closely are the professions related to the education available in the country?

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Directly Related	Valid N	1	11	3	1	2	7		2		27
	% of Total	1.9%	20.8%	5.7%	1.9%	3.8%	13.2%		3.8%		50.9%
Somewhat Related	Valid N	3	6	6	5	1	2	1	1	1	26
	% of Total	5.7%	11.3%	11.3%	9.4%	1.9%	3.8%	1.9%	1.9%	1.9%	49.1%
Total	Valid N	4	17	9	6	3	9	1	3	1	53
	% of Total	7.5%	32.1%	17.0%	11.3%	5.7%	17.0%	1.9%	5.7%	1.9%	100.0%

C19 Is your profession related to your career interest?

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Yes	Valid N	10	20	22	13	5	6	6	14	4	100
	% of Total	7.9%	15.9%	17.5%	10.3%	4.0%	4.8%	4.8%	11.1%	3.2%	79.4%

No	Valid N	4	6	3	3	3	2		5		26
	% of Total	3.2%	4.8%	2.4%	2.4%	2.4%	1.6%		4.0%		20.6%
Total	Valid N	14	26	25	16	8	8	6	19	4	126
	% of Total	11.1%	20.6%	19.8%	12.7%	6.3%	6.3%	4.8%	15.1%	3.2%	100.0%

C20 How did you find your current job?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Newspaper	Valid N	5	3	10		5	1		3		27
	% of Total	4.1%	2.5%	8.3%		4.1%	0.8%		2.5%		22.3%
Profession training institution/Job board	Valid N	7	18	2	13	2	5	6	10		63
	% of Total	5.8%	14.9%	1.7%	10.7%	1.7%	4.1%	5.0%	8.3%		52.1%
Internship	Valid N			2			1				3
	% of Total			1.7%			0.8%				2.5%
Friends	Valid N		1	4		1	1		2		9
	% of Total		0.8%	3.3%		0.8%	0.8%		1.7%		7.4%
Internet	Valid N			2							2
	% of Total			1.7%							1.7%
Transfer from other organization	Valid N			1						1	2
	% of Total			0.8%						0.8%	1.7%
Assigned/appointed by government/institution/authority	Valid N	1	1			1	1				4
	% of Total	0.8%	0.8%			0.8%	0.8%				3.3%
Through vacancy announcement	Valid N	1	1	1	3					1	7
	% of Total	0.8%	0.8%	0.8%	2.5%					0.8%	5.8%

Direct contact with the office	Valid N			1	1				1	1	4
	% of Total			0.8%	0.8%				0.8%	0.8%	3.3%
Total	Valid N	14	24	23	17	9	9	6	16	3	121
	% of Total	11.6%	19.8%	19.0%	14.0%	7.4%	7.4%	5.0%	13.2%	2.5%	100.0%

C21 How long after graduation do you think it will take to find a job for these professions? - No. of MONTH

	REGION									
	Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Minimum	1	1	0	2	3	6	.	1	1	0
Maximum	24	24	12	7	24	60	.	6	36	60
Mean	7	8	4	4	12	21	.	2	13	7
Std. D.	7	7	3	2	9	26	.	2	20	9
Valid N	10	19	24	8	7	4		8	3	83

C22A Are most of the professionals identified working in PRIVATE sector?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	3	6	9	4	3	4	2	4	2	37
	% of Total	2.4%	4.8%	7.3%	3.2%	2.4%	3.2%	1.6%	3.2%	1.6%	29.8%
No	Valid N	12	17	18	9	6	5	4	15	1	87

	% of Total	9.7%	13.7%	14.5%	7.3%	4.8%	4.0%	3.2%	12.1%	0.8%	70.2%
Total	Valid N	15	23	27	13	9	9	6	19	3	124
	% of Total	12.1%	18.5%	21.8%	10.5%	7.3%	7.3%	4.8%	15.3%	2.4%	100.0%

C22B If Yes, which professions are working in PRIVATE sector?^a

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Land survey, land use and city planning	Valid N	2	2	1				1		1	7
	% of Total	3.9%	3.9%	2.0%				2.0%		2.0%	13.7%
Consultancy	Valid N	1		1							2
	% of Total	2.0%		2.0%							3.9%
GIS and Remote Sensing	Valid N	1	3	3		1	1		1		10
	% of Total	2.0%	5.9%	5.9%		2.0%	2.0%		2.0%		19.6%
Land survey	Valid N		2			1	3				6
	% of Total		3.9%			2.0%	5.9%				11.8%
Land use planning	Valid N	1	1								2
	% of Total	2.0%	2.0%								3.9%
City/urban planner	Valid N	1	1				1				3
	% of Total	2.0%	2.0%				2.0%				5.9%
Land information system	Valid N	1									1
	% of Total	2.0%									2.0%
Construction	Valid N	1									1
	% of Total	2.0%									2.0%
Engineering	Valid N			3							3

	% of Total		5.9%						5.9%
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C22B If Yes, which professions are working in PRIVATE sector? (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Cadastral survey	Valid N									1	1
	% of Total									2.0%	2.0%
Construction	Valid N					1					1
	% of Total					2.0%					2.0%
Urban land management	Valid N						1				1
	% of Total						2.0%				2.0%
Engineering	Valid N			1			1				2
	% of Total			2.0%			2.0%				3.9%
Construction	Valid N			2					1		3
	% of Total			3.9%					2.0%		5.9%
Teaching	Valid N				1			1			2
	% of Total				2.0%			2.0%			3.9%
Training service	Valid N				1						1
	% of Total				2.0%						2.0%
GIS and LIS related professions	Valid N				2				2		4
	% of Total				3.9%				3.9%		7.8%
Real estate appraising	Valid N									1	1
	% of Total									2.0%	2.0%

Total	Valid N	8	9	11	4	3	7	2	4	3	51
	% of Total	15.7%	17.6%	21.6%	7.8%	5.9%	13.7%	3.9%	7.8%	5.9%	100.0%

Percentages and totals are based on responses.

C23A Are most of the professionals identified employed in PUBLIC sector?

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Yes	Valid N	11	23	22	10	7	6	2	8	3	92
	% of Total	9.0%	18.9%	18.0%	8.2%	5.7%	4.9%	1.6%	6.6%	2.5%	75.4%
No	Valid N	4	1	5	3	2	3	2	10		30
	% of Total	3.3%	0.8%	4.1%	2.5%	1.6%	2.5%	1.6%	8.2%		24.6%
Total	Valid N	15	24	27	13	9	9	4	18	3	122
	% of Total	12.3%	19.7%	22.1%	10.7%	7.4%	7.4%	3.3%	14.8%	2.5%	100.0%

C23B If Yes, identify the professions with the highest number of jobs^a

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Land surveying	Valid N	2	8	2		4	2			2	20
	% of Total	1.7%	6.7%	1.7%		3.4%	1.7%			1.7%	16.8%
Consultancy	Valid N	1									1
	% of Total	0.8%									0.8%
Urban planning and administration	Valid N	3	2	2			3		1		11
	% of Total	2.5%	1.7%	1.7%			2.5%		0.8%		9.2%

Agriculture	Valid N	2		2					2		6
	% of Total	1.7%		1.7%					1.7%		5.0%
Land administration	Valid N	1	5	4					1	1	12
	% of Total	0.8%	4.2%	3.4%					0.8%	0.8%	10.1%
Construction	Valid N	1									1
	% of Total	0.8%									0.8%
GIS and Land Information	Valid N	2	6	4	2	3	0	0	0	0	17
	% of Total	1.7%	5.0%	3.4%	1.7%	2.5%	0.0%	0.0%	0.0%	0.0%	14.3%
Land registration	Valid N		1								1
	% of Total		0.8%								0.8%
Civil engineer and computer science	Valid N		1								1
	% of Total		0.8%								0.8%
Accountant	Valid N		1								1
	% of Total		0.8%								0.8%
Land administration and land development	Valid N		4								4
	% of Total		3.4%								3.4%
Land management	Valid N	1	2							1	4
	% of Total	0.8%	1.7%							0.8%	3.4%
Land information system	Valid N	3	1								4
	% of Total	2.5%	0.8%								3.4%
Finance	Valid N	1									1
	% of Total	0.8%									0.8%
Land use planning	Valid N	2	1							1	4
	% of Total	1.7%	0.8%							0.8%	3.4%

C23B If Yes, identify the professions with the highest number of jobs (continued)

		REGION								Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Urban /city planning	Valid N	2	1	1		2				6
	% of Total	1.7%	0.8%	0.8%		1.7%				5.0%
Land compensation and certification	Valid N	2								2
	% of Total	1.7%								1.7%
Education/teaching	Valid N		2			2		1		5
	% of Total		1.7%			1.7%		0.8%		4.2%
Computer science	Valid N		1							1
	% of Total		0.8%							0.8%
Resource management	Valid N		2				1			3
	% of Total		1.7%				0.8%			2.5%
Economics	Valid N		1							1
	% of Total		0.8%							0.8%
Cadastral survey	Valid N		1			1		1		3
	% of Total		0.8%			0.8%		0.8%		2.5%
Land surveyor and land administration technique	Valid N			1						1
	% of Total			0.8%						0.8%
Public health	Valid N			4						4
	% of Total			3.4%						3.4%
Land policy specialist	Valid N			1						1
	% of Total			0.8%						0.8%
Natural resource management	Valid N			2				1		3

	% of Total			1.7%				0.8%			2.5%
Agronomy	Valid N								1		1
	% of Total								0.8%		0.8%
Total	Valid N	23	40	23	2	12	6	1	7	5	119
	% of Total	19.3%	33.6%	19.3%	1.7%	10.1%	5.0%	0.8%	5.9%	4.2%	100.0%

Percentages and totals are based on responses.

C24A Do the professionals employed perform to the needs and satisfaction of the employer

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	9	6	5	4			4	5		33
	% of Total	10.2%	6.8%	5.7%	4.5%			4.5%	5.7%		37.5%
No	Valid N	5	8	10	6	7	9	1	9		55
	% of Total	5.7%	9.1%	11.4%	6.8%	8.0%	10.2%	1.1%	10.2%		62.5%
Total	Valid N	14	14	15	10	7	9	5	14		88
	% of Total	15.9%	15.9%	17.0%	11.4%	8.0%	10.2%	5.7%	15.9%		100.0%

C24B If No, what are the gaps/deficiencies of the employees?^a

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Due to poor training in tenure security and incentive	Valid N	1	1		1		2				5
	% of Total	1.7%	1.7%		1.7%		3.4%				8.5%
Their professions do not fit to land administration related activities	Valid N	1		1							2
	% of Total	1.7%		1.7%							3.4%
Although professionals in land administration is high, employers don't find the right trained persons	Valid N	1		1							2
	% of Total	1.7%		1.7%							3.4%
Lack of trained professionals made most of the employers dissatisfied	Valid N	2	1	6	5						14
	% of Total	3.4%	1.7%	10.2%	8.5%						23.7%
Poor working environment, the employees don't provide satisfactory services to their employers	Valid N		1								1
	% of Total		1.7%								1.7%
Lack of high skilled professionals and low payment, the employees do not perform well	Valid N		1								1
	% of Total		1.7%								1.7%
The demand is high, due to few professionals in land administration	Valid N		1								1
	% of Total		1.7%								1.7%
High demand, less supply due to shortage of training institutions	Valid N		1								1
	% of Total		1.7%								1.7%
Handful professionals can't satisfy the high demand in land administration	Valid N		1			1					2
	% of Total		1.7%			1.7%					3.4%
There is a high demand in LA, despite some of the positions are taken by non LA professionals	Valid N		2			0					2
	% of Total		3.4%			0.0%					3.4%
	Valid N		1			0					1

Graduates in land security, land registration, compensation and certification are very few in all the regions	% of Total	1.7%			0.0%					1.7%
Inappropriate training in LA	Valid N	0	1	0	0					1
	% of Total	0.0%	1.7%	0.0%	0.0%					1.7%
The number of professionals in GIS are not many	Valid N							1		1
	% of Total							1.7%		1.7%
Practical training is lacking	Valid N							1		1
	% of Total							1.7%		1.7%
Security problem in pastoralist areas	Valid N							1		1
	% of Total							1.7%		1.7%

C24B If No, what are the gaps/deficiencies of the employees? (continued)

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
LA professionals in the country are few	Valid N								1		1
	% of Total								1.7%		1.7%
Most staff lack specialized technical skills in LA	Valid N					1	1		1		3
	% of Total					1.7%	1.7%		1.7%		5.1%
LA related knowledge and skills are not available in most of the regions	Valid N					1					1
	% of Total					1.7%					1.7%
Employers do not provide adequate services and incentives to their employees	Valid N					1	1				2
	% of Total					1.7%	1.7%				3.4%
Poor practical experiences on the employees side	Valid N					1					1
	% of Total					1.7%					1.7%

Most of the employees come from related fields but lack skills in LA	Valid N					1					1
	% of Total					1.7%					1.7%
Poor appropriate working environment and low salary	Valid N							2			2
	% of Total							3.4%			3.4%
Lack of training and lack of transparency	Valid N							2		1	3
	% of Total							3.4%		1.7%	5.1%
Lack of facilities, promotion, information and salary	Valid N							2			2
	% of Total							3.4%			3.4%
Computer software and certain skill gaps are lacking	Valid N							1			1
	% of Total							1.7%			1.7%
Poor knowledge and skills	Valid N			1		1			1	1	4
	% of Total			1.7%		1.7%			1.7%	1.7%	6.8%
Lack of capacity building and digital mapping equipments	Valid N									1	1
	% of Total									1.7%	1.7%
Insufficient income and absence of appropriate software	Valid N									1	1
	% of Total									1.7%	1.7%
Total	Valid N	5	10	10	6	7	11	1	9		59
	% of Total	8.5%	16.9%	16.9%	10.2%	11.9%	18.6%	1.7%	15.3%		100.0%

Percentages and totals are based on responses.

SECTION D - Salaries and Benefits

D01. What is the monthly salary for these professions (in Local Currency)?

	REGION
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		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
1) Land Surveyor (Parcel and cadastral surveyor)	Mean	3883	2803	4039	4467	2680	2848	4100	3709	2582	3517
	Minimum	1718	1172	885	1500	1719	1675	2600	1499	2200	885
	Maximum	10000	5000	15000	14000	5000	5000	7500	8000	2964	15000
	St. Deviation	2223	1261	3298	4980	1566	1110	1865	1635	540	2311
	Valid N	11	20	16	6	4	8	6	17	2	90
2) Land /Real Estate Appraisers and Tax specialist	Mean	.	2665	2645	3000	1250	3071	4250	3893	.	2958
	Minimum	.	1112	570	3000	1250	2249	2500	2100	.	570
	Maximum	.	5000	4605	3000	1250	3800	6000	7000	.	7000
	St. Deviation	.	1368	1341	.	.	660	2475	1679	.	1431
	Valid N	0	11	12	1	1	4	2	6	0	37
3) GIS/LIS Specialist (Applied information system)	Mean	3518	4561	5458	3067	2534	3386	4750	3811	.	4241
	Minimum	2250	1172	1449	1700	1499	2500	3000	1500	.	1172
	Maximum	5211	15000	28000	5500	4605	5400	6500	8000	.	28000
	St. Deviation	1171	3854	6435	2113	1793	998	1555	1669	.	3771
	Valid N	5	11	15	3	3	8	4	11	0	60
4) Land use Manager (Land conservation & environmental planner)	Mean	.	3131	3596	.	.	3019	4000	2322	.	3183
	Minimum	.	1172	1449	.	.	2900	4000	1419	.	1172
	Maximum	.	4605	6100	.	.	3334	4000	3348	.	6100
	St. Deviation	.	1431	1618	.	.	211	.	970	.	1291
	Valid N	0	9	7	0	0	4	1	3	0	24
5) Land use and City Planner	Mean	3708	3836	6076	3200	1449	2954	3500	3231	.	3941
	Minimum	2200	1114	1700	1500	1449	1900	3500	1500	.	1114
	Maximum	5211	7000	28000	7000	1449	4600	3500	4605	.	28000
	St. Deviation	1233	2177	7891	2568	.	945	.	1159	.	4002

Valid N	4	9	10	4	1	8	1	8	0	45
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D01. What is the monthly salary for these professions (in Local Currency)? _Continued

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
6) Land Policy Specialist	Mean	.	2947	4390	.	.	.	.	.	.	3748
	Minimum	.	1172	1700	.	.	.	.	.	.	1172
	Maximum	.	5000	7000	.	.	.	.	.	.	7000
	St. Deviation	.	2062	2530	.	.	.	.	.	.	2318
	Valid N	0	4	5	0	0	0	0	0	0	9
7) University and College Instructor	Mean	4372	3129	5403	1900	.	3659	.	3238	.	4081
	Minimum	4343	1172	600	1900	.	3500	.	1500	.	600
	Maximum	4400	4605	20000	1900	.	3817	.	4605	.	20000
	St. Deviation	40	1388	6176	.	.	224	.	1287	.	3820
	Valid N	2	5	8	1	0	2	0	4	0	22
8) Land Administration Specialist	Mean	.	.	7550	.	.	.	.	.	.	7550
	Minimum	.	.	4000	.	.	.	.	.	.	4000
	Maximum	.	.	17000	.	.	.	.	.	.	17000
	St. Deviation	.	.	6306	.	.	.	.	.	.	6306
	Valid N	0	0	4	0	0	0	0	0	0	4
9) Land Property Lawyer	Mean	8106	.	8400	2000	.	4059	.	3133	.	5979
	Minimum	5211	.	4000	2000	.	3817	.	2200	.	2000
	Maximum	11000	.	17000	2000	.	4300	.	3700	.	17000
	St. Deviation	4093	.	4980	.	.	342	.	814	.	4116
	Valid N	2	0	5	1	0	2	0	3	0	13

10) Land Administration Technician	Mean	3853	.	2925	.	.	.	.	.	.	3111
	Minimum	3853	.	1700	.	.	.	.	.	.	1700
	Maximum	3853	.	4000	.	.	.	.	.	.	4000
	St. Deviation	.	.	1028	.	.	.	.	.	.	982
	Valid N	1	0	4	0	0	0	0	0	0	5

D02 What job benefits do you anticipate these professions are entitled to?

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Medical/health Insurance	Valid N	5	14	15		5	4		2	2	47
	% of Total	1.2%	3.3%	3.6%		1.2%	0.9%		0.5%	0.5%	11.1%
Housing Allowance	Valid N	6	19	14	1	6	4	1	6		57
	% of Total	1.4%	4.5%	3.3%	0.2%	1.4%	0.9%	0.2%	1.4%		13.5%
Transport Allowance	Valid N	8	15	17	2	7	4	6	7	2	68
	% of Total	1.9%	3.6%	4.0%	0.5%	1.7%	0.9%	1.4%	1.7%	0.5%	16.1%
Communication Allowance	Valid N	7	10	13	1	5	3	1		2	42
	% of Total	1.7%	2.4%	3.1%	0.2%	1.2%	0.7%	0.2%		0.5%	10.0%
Life Insurance	Valid N	3	8	7	1	4	3			2	28
	% of Total	0.7%	1.9%	1.7%	0.2%	0.9%	0.7%			0.5%	6.6%
Paid Vacation	Valid N	9	9	7	1	3	2	2			33
	% of Total	2.1%	2.1%	1.7%	0.2%	0.7%	0.5%	0.5%			7.8%
Paid personal leave	Valid N	2	8	10		2	2		1		25
	% of Total	0.5%	1.9%	2.4%		0.5%	0.5%		0.2%		5.9%

Paid sick Leave	Valid N	6	12	17	1	4	2	4			46
	% of Total	1.4%	2.8%	4.0%	0.2%	0.9%	0.5%	0.9%			10.9%
Pension	Valid N	7	16	17	3	2	3	6	5	1	60
	% of Total	1.7%	3.8%	4.0%	0.7%	0.5%	0.7%	1.4%	1.2%	0.2%	14.2%
Tuition reimbursement	Valid N	4	4	5		1	2				16
	% of Total	0.9%	0.9%	1.2%		0.2%	0.5%				3.8%
Total	Valid N	57	115	122	10	39	29	20	21	9	422
	% of Total	13.5%	27.3%	28.9%	2.4%	9.2%	6.9%	4.7%	5.0%	2.1%	100.0%

Percentages and totals are based on responses.

D03 Identify one of the professions you represent

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Land Surveyor (Parcel and cadastral surveyor)	Valid N	4	9	8	2	1	1	2	6	1	34
	% of Total	1.9%	4.3%	3.8%	0.9%	0.5%	0.5%	0.9%	2.8%	0.5%	16.1%
Land /Real Estate Appraisers and Tax specialist	Valid N		5	4					2		11
	% of Total		2.4%	1.9%					0.9%		5.2%
GIS/LIS Specialist (Applied information system)	Valid N	5	10	9	3	2	3	1	8		41
	% of Total	2.4%	4.7%	4.3%	1.4%	0.9%	1.4%	0.5%	3.8%		19.4%
Land use Manager (Land conservation & environmental planner)	Valid N	4	7	6	5	3	1	1	5		32
	% of Total	1.9%	3.3%	2.8%	2.4%	1.4%	0.5%	0.5%	2.4%		15.2%

Land use and City Planner	Valid N	3	3	4	2		3	2	3		20
	% of Total	1.4%	1.4%	1.9%	0.9%		1.4%	0.9%	1.4%		9.5%
Land Policy Specialist	Valid N	0	6	2	1		1		2		12
	% of Total	0.0%	2.8%	0.9%	0.5%		0.5%		0.9%		5.7%
University and College Instructor	Valid N	3	3	7	2	4			2		21
	% of Total	1.4%	1.4%	3.3%	0.9%	1.9%			0.9%		10.0%
Land Administration Specialist	Valid N		11	3	4		2		4	1	25
	% of Total		5.2%	1.4%	1.9%		0.9%		1.9%	0.5%	11.8%
Land Property Lawyer	Valid N		3		1		1		3		8
	% of Total		1.4%		0.5%		0.5%		1.4%		3.8%
Land Administration Technician	Valid N		3				2		2		7
	% of Total		1.4%				0.9%		0.9%		3.3%
Total	Valid N	19	60	43	20	10	14	6	37	2	211
	% of Total	9.0%	28.4%	20.4%	9.5%	4.7%	6.6%	2.8%	17.5%	0.9%	100.0%

Note: Although the question requires only one response, multiple answers are given by the respondents and thus the total number of responses exceeds the number of interviewees.

D04a.1 How satisfied currently are you on - Job duties and skill required?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N		2	3					1		6
	% of Total		1.8%	2.8%					0.9%		5.5%
Somewhat Dissatisfied	Valid N	2	2	4	3	3	3	3	5	1	26
	% of Total	1.8%	1.8%	3.7%	2.8%	2.8%	2.8%	2.8%	4.6%	0.9%	23.9%
Somewhat Satisfied	Valid N	10	12	13	6	4	4	2	6		57
	% of Total	9.2%	11.0%	11.9%	5.5%	3.7%	3.7%	1.8%	5.5%		52.3%
Very Satisfied	Valid N	1	6	4	2		1	1	4	1	20
	% of Total	0.9%	5.5%	3.7%	1.8%		0.9%	0.9%	3.7%	0.9%	18.3%
Total	Valid N	13	22	24	11	7	8	6	16	2	109
	% of Total	11.9%	20.2%	22.0%	10.1%	6.4%	7.3%	5.5%	14.7%	1.8%	100.0%

D04a.2 Comments for dissatisfaction on "Job duties and skill required"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
We do not fulfill our duties because of low payment	Valid N		2								2
	% of Total		7.7%								7.7%
There are skilled manpower and duties but the salaries are not satisfactory	Valid N	1	1								2
	% of Total	3.8%	3.8%								7.7%
Training on land related statistics and taxation issues is not adequate	Valid N			1							1
	% of Total			3.8%							3.8%
Real estates property appraisers and tax specializing knowledge is needed	Valid N			1							1
	% of Total			3.8%							3.8%
Job duties are not related to our carriers	Valid N			2							2
	% of Total			7.7%							7.7%
Cadastral survey is one of the most important skills required for 2nd level certificate	Valid N			1							1
	% of Total			3.8%							3.8%
GIS training relevant for land use/cover changes in the pastoralist regions	Valid N				1						1
	% of Total				3.8%						3.8%
Training with necessary equipments will help for the implementation of the LA programme	Valid N					1		3			4
	% of Total					3.8%		11.5%			15.4%
Planners need to upgrade their knowledge in GIS/LIS and related professions	Valid N				1						1
	% of Total				3.8%						3.8%
Training in GIS and land information specialists are badly needed to fulfill our duties in LA	Valid N					1					1
	% of Total					3.8%					3.8%
I am not satisfied due to poor job benefits and advanced training	Valid N					1					1
	% of Total					3.8%					3.8%

Skilled instructors are not available in most universities and colleges	Valid N							1	1	2
	% of Total							3.8%	3.8%	7.7%
Continuous capacity building opportunities is lacking	Valid N			1			1			2
	% of Total			3.8%			3.8%			7.7%
There are no many highly skilled and responsible instructors in our universities	Valid N						1			1
	% of Total						3.8%			3.8%
The right persons on the right place should be assigned	Valid N								1	1
	% of Total								3.8%	3.8%
Carrier upgrading is needed	Valid N							1		1
	% of Total							3.8%		3.8%
Upgrading my profession is important for salary increment	Valid N							1		1
	% of Total							3.8%		3.8%
Inadequate skills on cadastral survey has become one of the hindrances for the implementation of LA	Valid N								1	1
	% of Total								3.8%	3.8%
Total	Valid N	1	3	6	2	3	2	3	6	26
	% of Total	3.8%	11.5%	23.1%	7.7%	11.5%	7.7%	11.5%	23.1%	100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Job duties and skill required

D04a.2 Comments for your satisfaction on "Job duties and skill required"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Inappropriate working conditions and poor working environment	Valid N	1									1
	% of Total	1.9%									1.9%
Land use planning skill is required	Valid N	1									1
	% of Total	1.9%									1.9%
The already skilled manpower are moving to private sector due to poor incentive	Valid N	2									2
	% of Total	3.8%									3.8%

Need skilled and experienced urban planners	Valid N	2							2
	% of Total	3.8%							3.8%
Skilled man power, appropriate salaries and good working environment attract professionals in land administration	Valid N								
	% of Total								
Most of the skills do not match to the implementation of the land administration programme	Valid N	1	2						3
	% of Total	1.9%	3.8%						5.7%
Land administration related skills require for their duties on the subject matter	Valid N	1							1
	% of Total	1.9%							1.9%
We do not fulfill our duties because of low payment	Valid N		1						1
	% of Total		1.9%						1.9%
Skills and duties are sometimes ireconcile	Valid N	1	2						3
	% of Total	1.9%	3.8%						5.7%
Require high skills in LA, which lead to salary increase	Valid N		7						7
	% of Total		13.2%						13.2%
There are skilled manpower and duties but the salaries are not satisfactory	Valid N		3						3
	% of Total		5.7%						5.7%
Long term training on tenure and food security is needed	Valid N		1						1
	% of Total		1.9%						1.9%
GIS application development training is required	Valid N				2				2
	% of Total				3.8%				3.8%
Adequate equipments such as advanced GPS, GIS, etc required to fulfill our duties	Valid N	1							1
	% of Total	1.9%							1.9%
Training on land related statistics and taxation issues is not adequate	Valid N								
	% of Total								
Real estates property appraisers and tax specializing knowledge is needed	Valid N								
	% of Total								
Since my duty is within the field of LA, relevant skills are indispensable	Valid N				1				1
	% of Total				1.9%				1.9%
Job duties are not related to our carriers	Valid N								

	% of Total									
Cadastral survey is one of the most important skills required for 2nd level certificate	Valid N			1						1
	% of Total			1.9%						1.9%
Skills required most are land use planning, cadastral survey and GIS	Valid N			1						1
	% of Total			1.9%						1.9%
GIS training relevant for land use/cover changes in the pastoralist regions	Valid N									
	% of Total									
Land administration and use training is relevant to our current job in LA	Valid N			2						2
	% of Total			3.8%						3.8%
Training with necessary equipments will help for the implementation of the LA programme	Valid N			1		1	1	3		6
	% of Total			1.9%		1.9%	1.9%	5.7%		11.3%

D04a.2 Comments for your satisfaction on "Job duties and skill required"_ Continued

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Practical training can solve socio-economic problems that we are facing today	Valid N				1						1
	% of Total				1.9%						1.9%
Training in waste management is vital in all urban sites	Valid N				1						1
	% of Total				1.9%						1.9%
Planners need to upgrade their knowledge in GIS/LIS and related professions	Valid N										
	% of Total										
Training in GIS and land information specialists are badly needed to fulfill our duties in LA	Valid N					1					1
	% of Total										

Training in land property valuation can add to our knowledge	% of Total				1.9%				1.9%
Training on job opportunities promotion is required	Valid N % of Total				1 1.9%				1 1.9%
I am not satisfied due to poor job benefits and advanced training	Valid N % of Total								
Skilled instructors are not available in most universities and colleges	Valid N % of Total				1 1.9%				1 1.9%
Continuous capacity building opportunities is lacking	Valid N % of Total								
There are no many highly skilled and responsible instructors in our universities	Valid N % of Total					2 3.8%			2 3.8%
The right persons on the right place should be assigned	Valid N % of Total								
Carrier upgrading is needed	Valid N % of Total								
Upgrading my profession is important for salary increment	Valid N % of Total						1 1.9%		1 1.9%
LA related training can create responsibility and sense of duty	Valid N % of Total						1 1.9%		1 1.9%
Knowledge on LA and global information system is required	Valid N % of Total							1 1.9%	1 1.9%
Additional training on land management is necessary for my current job	Valid N % of Total							1 1.9%	1 1.9%
Skills on environmental and biodiversity protection are hardly available	Valid N % of Total							1 1.9%	1 1.9%
Inadequate skills on cadastral survey has become one of the hindrances for the implementation of LA	Valid N % of Total								
Land property valuation and tax specialist training are needed	Valid N % of Total								

Upgrading my vocational training help me to perform my duties properly	Valid N								1	1
	% of tTotal								1.9%	1.9%
We need knowledge upgrading in environmental conservation	Valid N								1	1
	% of Total								1.9%	1.9%
Total	Valid N	10	16	4	6	3	3	3	8	53
	% of Total	18.9%	30.2%	7.5%	11.3%	5.7%	5.7%	5.7%	15.1%	100.0%

Note: The comments are given by the people who are VERY SATISFIED and SOMEWHAT SATISFIED on Job duties and skill required

D04b.1 How satisfied currently are you on - Work environment (atmosphere, pressure, facilities, etc ...)?

		REGION									
		Tigray	Amhara	Add is Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N	1	6	1			3	2	5	2	20
	% of Total	1.0%	5.9%	1.0%			3.0%	2.0%	5.0%	2.0%	19.8%
Somewhat Dissatisfied	Valid N	3	4	2	2	2	3	2	5	1	24
	% of Total	3.0%	4.0%	2.0%	2.0%	2.0%	3.0%	2.0%	5.0%	1.0%	23.8%
Somewhat Satisfied	Valid N	5	9	13	8	4	2	1	3		45
	% of Total	5.0%	8.9%	12.9%	7.9%	4.0%	2.0%	1.0%	3.0%		44.6%
Very Satisfied	Valid N	1	1	3	5				2		12
	% of Total	1.0%	1.0%	3.0%	5.0%				2.0%		11.9%
Total	Valid N	10	20	19	15	6	8	5	15	3	101
	% of Total	9.9%	19.8%	18.8%	14.9%	5.9%	7.9%	5.0%	14.9%	3.0%	100.0%

D04b.2 Comments for dissatisfaction on " Work environment (atmosphere, pressure, facilities, etc ...)"

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Transportation problems	Valid N	1									1
	% of Total	2.5%									2.5%
Shortage of computer, soft ware and related materials	Valid N	2	1			1					4
	% of Total	5.0%	2.5%			2.5%					10.0%
Working load but no benefit except small salary	Valid N		1								1
	% of Total		2.5%								2.5%
The work load and poor payment discourage me from giving satisfactory services	Valid N		1								1
	% of Total		2.5%								2.5%
Since my work is time demanding, I am forced to work more than I I am expected	Valid N	1	1	1							3
	% of Total	2.5%	2.5%	2.5%							7.5%
I am competent enough but I don't get good salary	Valid N		2								2
	% of Total		5.0%								5.0%
I don't have motivation and enjoyment despite working load	Valid N		1								1
	% of Total		2.5%								2.5%
If facilities and materials were available, the work load would have been easier	Valid N		1	1							2
	% of Total		2.5%	2.5%							5.0%
Working environment is unpleasant	Valid N			1							1
	% of Total			2.5%							2.5%
Neither internet accessory nor modern equipments such as GIS, GPS is available	Valid N				1						1
	% of Total				2.5%						2.5%
Though most educated persons has got job working condition is not satisfied	Valid N				1						1
	% of Total				2.5%						2.5%
	Valid N		1								1

The working environment is somewhat good but there is no office , transport and computer facilities	% of Total		2.5%									2.5%
House rent is very high, salary is small which stress me a lot	Valid N					1			1			2
	% of Total					2.5%			2.5%			5.0%
Poor incentive discourages me from doing well	Valid N						1					1
	% of Total					2.5%						2.5%
Work burden and inadequate salary	Valid N						1					1
	% of Total					2.5%						2.5%
There is no pressure in my work place but small payment discourages me a lot	Valid N						1					1
	% of Total					2.5%						2.5%
Working environment is not satisfactory due to lack of facilities	Valid N						3		1			4
	% of Total					7.5%			2.5%			10.0%
Scanty salary and inadequate necessary equipments and materials discourage me significantly	Valid N							1	1			2
	% of Total							2.5%	2.5%			5.0%
We need facilities in order to protect ourselves from being exposed to climate change induced atmosphere	Valid N							1				1
	% of Total							2.5%				2.5%
Poor GIS availability discourages us from being animated surveyors	Valid N							2	1			3
	% of Total							5.0%	2.5%			7.5%
The unpleasant environment our office has created poor incentive	Valid N								1			1
	% of Total								2.5%			2.5%
Both work atmosphere and facilities are not conducive to perform our job properly	Valid N								3	1		4
	% of Total								7.5%	2.5%		10.0%
We do not have computer access nor is housing facilities, despite harsh environment in our region	Valid N								1			1
	% of Total								2.5%			2.5%
Total	Valid N	4	9	3	2	2	6	4	9	1		40
	% of Total	10.0%	22.5%	7.5%	5.0%	5.0%	15.0%	10.0%	22.5%	2.5%		100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Work environment (atmosphere, pressure, facilities, etc ...)

D04b.2 Comments for satisfaction on "Work environment (atmosphere, pressure, facilities, etc ...)"

		REGION								
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Shortage of computer, soft ware and related materials	Valid N	1	1	1		1				4
	% of Total	2.6%	2.6%	2.6%		2.6%				10.3%
Poor atmosphere in my working area	Valid N	1								1
	% of Total	2.6%								2.6%
Administrative problem	Valid N	1								1
	% of Total	2.6%								2.6%
I have good working environment	Valid N	2	3							5
	% of Total	5.1%	7.7%							12.8%
The environmental condition is somewhat satisfactory	Valid N	1								1
	% of Total	2.6%								2.6%
Since my work is time demanding, I am forced to work more than I I am expected	Valid N		2							2
	% of Total		5.1%							5.1%
I am competent enough but I don't get good salary	Valid N		1							1
	% of Total		2.6%							2.6%
I don't have motivation and enjoyment despite working load	Valid N			1		1				2
	% of Total			2.6%		2.6%				5.1%
If facilities and materials were available, the work load would have been easier	Valid N			1						1
	% of Total			2.6%						2.6%
Budgetary and logistic facility constrains	Valid N			1						1
	% of Total			2.6%						2.6%
	Valid N			1	5					6

Good working atmosphere but facilities are not available	% of Total			2.6%	12.8%						15.4%
Teaching load is very high, but no time for consultancy and research activities	Valid N			2	1						3
	% of Total			5.1%	2.6%						7.7%
Too many staff in our working room in addition to the work load	Valid N				1						1
	% of Total				2.6%						2.6%
Neither internet accessory nor modern equipments such as GIS, GPS is available	Valid N				1						1
	% of Total				2.6%						2.6%
Climate change in our lowland area creates nervous tension	Valid N				1						1
	% of Total				2.6%						2.6%
Construction sector pays me well but creates extra load	Valid N				1						1
	% of Total				2.6%						2.6%
The working environment is somewhat good but there is no office , transport and computer facilities	Valid N	1				1					2
	% of Total	2.6%				2.6%					5.1%
Working environment is not satisfactory due to lack of facilities	Valid N						1				1
	% of Total						2.6%				2.6%
Working load and small salary push employees to other sectors	Valid N							1			1
	% of Total							2.6%			2.6%
Working environment is very good in our office	Valid N								1		1
	% of Total								2.6%		2.6%
Both work atmosphere and facilities are not conducive to perform our job properly	Valid N								1		1
	% of Total								2.6%		2.6%
The working environment is not bad, but working pressure and salary created poor incentive	Valid N								1		1
	% of Total								2.6%		2.6%
Total	Valid N	6	8	7	10	3	1	1	3		39
	% of Total	15.4%	20.5%	17.9%	25.6%	7.7%	2.6%	2.6%	7.7%		100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Work environment (atmosphere, pressure, facilities, etc ...)

D04c.1 How satisfied currently are you on - Relationship with co-workers?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N			1					1	1	3
	% of Total			1.0%					1.0%	1.0%	3.0%
Somewhat Dissatisfied	Valid N	1		2	2	1	1		1	1	9
	% of Total	1.0%		2.0%	2.0%	1.0%	1.0%		1.0%	1.0%	8.9%
Somewhat Satisfied	Valid N	5	10	10	6	1	2	5	6		45
	% of Total	5.0%	9.9%	9.9%	5.9%	1.0%	2.0%	5.0%	5.9%		44.6%
Very Satisfied	Valid N	3	11	10	6	2	4		7	1	44
	% of Total	3.0%	10.9%	9.9%	5.9%	2.0%	4.0%		6.9%	1.0%	43.6%
Total	Valid N	9	21	23	14	4	7	5	15	3	101
	% of Total	8.9%	20.8%	22.8%	13.9%	4.0%	6.9%	5.0%	14.9%	3.0%	100.0%

D04c.2 Comments for dissatisfaction on " Relationship with co-workers"

		REGION									
		Tigray	Amhar a	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Not satisfactory due to lack of understanding among workers	Valid N % of Total	1 11.1%									1 11.1%
The good leadership's approach created good cooperation among workers	Valid N % of Total				2 22.2%						2 22.2%
Our project manager is a role model to my working cooperation with workers and other stakeholders	Valid N % of Total			1 11.1%							1 11.1%
We do have professional relationship	Valid N % of Total			1 11.1%							1 11.1%
Unsatisfactory relationship due to incompetent leadership	Valid N % of Total					1 11.1%					1 11.1%
Not good relationship which create poor working environment	Valid N % of Total						1 11.1%				1 11.1%
Bad relationship with the leadership but positive with others	Valid N % of Total							1 11.1%			1 11.1%
There is a problem with co-workers in the office	Valid N % of Total							1 11.1%			1 11.1%
Total	Valid N	1		2	2	1	1	2			9

% of Total	11.1%	22.2%	22.2%	11.1%	11.1%	22.2%	100.0%
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Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Relationship with co-workers

D04c.2 Comments for satisfaction on " Relationship with co-workers"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
I have good relationship	Valid N	2	6								8
	% of Total	3.3%	10.0%								13.3%
Not so strong due to different background	Valid N	1									1
	% of Total	1.7%									1.7%
Good relationship since we came from the same educational background	Valid N	1	2								3
	% of Total	1.7%	3.3%								5.0%
Ideological deference created poor cooperation	Valid N		2								2
	% of Total		3.3%								3.3%
The good leadership's approach created good cooperation among workers	Valid N	1	5	3	6	1	4	1	1		22
	% of Total	1.7%	8.3%	5.0%	10.0%	1.7%	6.7%	1.7%	1.7%		36.7%
Good working relationship has created technological development	Valid N		1								1
	% of Total		1.7%								1.7%
The role of high quality management in our office contributes to our good relationship among workers	Valid N			1							1
	% of Total			1.7%							1.7%
	Valid N			1	1						2

Similar age and good working environment have created excellent relationship with co-workers	% of Total			1.7%	1.7%						3.3%
	Valid N			2							2
We do have professional relationship	% of Total			3.3%							3.3%
	Valid N			1							1
I have positive relationship with co-workers and stakeholders	% of Total			1.7%							1.7%
	Valid N				1						1
Partly good and partly not	% of Total				1.7%						1.7%
	Valid N						1				1
Unsatisfactory relationship due to incompetent leadership	% of Total						1.7%				1.7%
	Valid N							5	7		12
We have good relationship with the managing director	% of Total							8.3%	11.7%		20.0%
	Valid N								3		3
Very good team work resulted from positive relationship	% of Total								5.0%		5.0%
	Valid N	5	16	8	8	1	5	5	11	1	60
Total	% of Total	8.3%	26.7%	13.3%	13.3%	1.7%	8.3%	8.3%	18.3%	1.7%	100.0%

Note: The comments are given by the people who are VERY SATISFIED and SOMEWHAT SATISFIED on Relationship with co-workers

D04d.1 How satisfied currently are you on - Work hours?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N	3		2			2		2	1	10

	% of Total	3.8%		2.6%			2.6%		2.6%	1.3%	12.8%
Somewhat Dissatisfied	Valid N		3	2	2				1	1	9
	% of Total		3.8%	2.6%	2.6%				1.3%	1.3%	11.5%
Somewhat Satisfied	Valid N	4	10	8	6	1	1		2		32
	% of Total	5.1%	12.8%	10.3%	7.7%	1.3%	1.3%		2.6%		41.0%
Very Satisfied	Valid N	3	6	8	5	3	1		1		27
	% of Total	3.8%	7.7%	10.3%	6.4%	3.8%	1.3%		1.3%		34.6%
Total	Valid N	10	19	20	13	4	4		6	2	78
	% of Total	12.8%	24.4%	25.6%	16.7%	5.1%	5.1%		7.7%	2.6%	100.0%

D04d.2 Comments for dissatisfaction on "Work hours"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
As a responsible person, I am obliged to work more than 8 hours	Valid N				1						1
	% of Total				6.7%						6.7%
As a researcher and civil servant, I work more than 9 hours	Valid N	2	2								4
	% of Total	13.3%	13.3%								26.7%
I work more than 8 hours without extra payment apart from my monthly salary	Valid N		1						2		3
	% of Total		6.7%						13.3%		20.0%
More than 8 hours without benefit	Valid N			2							2
	% of Total			13.3%							13.3%
	Valid N				1						1

If I don't work more than 10 hours, I can't pay my bills	% of Total				6.7%					6.7%
Due to transport problem, we do not work even the regular work hours	Valid N						2			2
	% of Total						13.3%			13.3%
Due to working load in my office, I am obliged to work 10 hours	Valid N	1								1
	% of Total	6.7%								6.7%
I work beyond the regular working hour for I have paid extra hours	Valid N							1		1
	% of Total							6.7%		6.7%
Total	Valid N	3	3	2	2		2	3		15
	% of Total	20.0%	20.0%	13.3%	13.3%		13.3%	20.0%		100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Work hours

D04d.2 Comments for satisfaction on "Work hours"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
I work more than 14 hours	Valid N	1									1
	% of Total	3.7%									3.7%
As a responsible person, I am obliged to work more than 8 hours	Valid N	1			1						2
	% of Total	3.7%			3.7%						7.4%
As a researcher and civil servant, I work more than 9 hours	Valid N				1						1
	% of Total				3.7%						3.7%
	Valid N	3	9	2	4				1		19

The working hours are according to the civil service rule, which is 8 hours	% of Total	11.1%	33.3%	7.4%	14.8%				3.7%	70.4%
I work more than 8 hours without extra payment apart from my monthly salary	Valid N			1						1
	% of Total			3.7%						3.7%
If I don't work more than 10 hours, I can't pay my bills	Valid N				1					1
	% of Total				3.7%					3.7%
I would like to work more than 8 hours but the conditions do not allow me to do so	Valid N					1				1
	% of Total					3.7%				3.7%
Due to working load in my office, I am obliged to work 10 hours	Valid N						1			1
	% of Total						3.7%			3.7%
Total	Valid N	5	9	3	7	1	1		1	27
	% of Total	18.5%	33.3%	11.1%	25.9%	3.7%	3.7%		3.7%	100.0%

Note: The comments are given by the people who are VERY SATISFIED and SOMEWHAT SATISFIED on Work hours

D04e.1 How satisfied currently are you on - Wage and benefits?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N	3	14	9	1	1	5	2	3	3	41
	% of Total	3.1%	14.3%	9.2%	1.0%	1.0%	5.1%	2.0%	3.1%	3.1%	41.8%
Somewhat Dissatisfied	Valid N	3	8	9	2	2	1	1	7	1	34

	% of Total	3.1%	8.2%	9.2%	2.0%	2.0%	1.0%	1.0%	7.1%	1.0%	34.7%
Somewhat Satisfied	Valid N	2		4	6	2			1		15
	% of Total	2.0%		4.1%	6.1%	2.0%			1.0%		15.3%
Very Satisfied	Valid N	1	1	1	3	1	1				8
	% of Total	1.0%	1.0%	1.0%	3.1%	1.0%	1.0%				8.2%
Total	Valid N	9	23	23	12	6	7	3	11	4	98
	% of Total	9.2%	23.5%	23.5%	12.2%	6.1%	7.1%	3.1%	11.2%	4.1%	100.0%

D04e.2 Comments for dissatisfaction on "Wage and benefits"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Except salary, no benefits	Valid N	1	1	4	2						8
	% of Total	1.6%	1.6%	6.2%	3.1%						12.5%
The salary is not relevant for my position (experience and qualification)	Valid N	1						2			3
	% of Total	1.6%						3.1%			4.7%
My monthly salary is not satisfactory relative to my job/work load	Valid N	3	10					2	4		19
	% of Total	4.7%	15.6%					3.1%	6.2%		29.7%
I am paid the small salary and field work allowance	Valid N		1								1
	% of Total		1.6%								1.6%
The salary is not enough to cover our basic expenses/monthly expense	Valid N		9	5		1		1		1	17
	% of Total		14.1%	7.8%		1.6%		1.6%		1.6%	26.6%
I get enough salary and field work allowance	Valid N			2							2
	% of Total			3.1%							3.1%
I make more salary now than I used to earn from my previous employer	Valid N			1							1
	% of Total			1.6%							1.6%
I have paid enough salary	Valid N			1							1
	% of Total			1.6%							1.6%

I earn very little salary; no benefits	Valid N				1					1	2
	% of Total				1.6%					1.6%	3.1%
Although my work place is risky, I don't have extra payment	Valid N					1					1
	% of Total					1.6%					1.6%
The government salary is very little	Valid N						6				6
	% of Total						9.4%				9.4%
I get small salary although I work hard and extra time	Valid N							1			1
	% of Total							1.6%			1.6%
It is not good payment compared to the present standard of living	Valid N								1		1
	% of Total								1.6%		1.6%
Not in line with the current inflation	Valid N								1		1
	% of Total								1.6%		1.6%
Total	Valid N	5	21	13	3	2	6	3	9	2	64
	% of Total	7.8%	32.8%	20.3%	4.7%	3.1%	9.4%	4.7%	14.1%	3.1%	100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Wage and benefits

D04e.2 Comments for satisfaction on "Wage and benefits"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Except salary, no benefits	Valid N	1									1
	% of Total	8.3%									8.3%
My monthly salary is not satisfactory relative to my job/work load	Valid N		1		1						2
	% of Total		8.3%		8.3%						16.7%
I am paid the small salary and field work allowance	Valid N				1						1
	% of Total				8.3%						8.3%
	Valid N			1							1

The salary is not enough to cover our basic expenses/monthly expense	% of Total			8.3%						8.3%
I have paid enough salary	Valid N				3					3
	% of Total				25.0%					25.0%
Allowance and the salary is very low	Valid N			1						1
	% of Total			8.3%						8.3%
I earn very little salary; no benefits	Valid N				1					1
	% of Total				8.3%					8.3%
I get relatively good salary	Valid N					1	1			2
	% of Total					8.3%	8.3%			16.7%
Total	Valid N	1	1	2	6	1	1			12
	% of Total	8.3%	8.3%	16.7%	50.0%	8.3%	8.3%			100.0%

Note: The comments are given by the people who are VERY SATISFIED and SOMEWHAT SATISFIED on Wage and benefits

D04f.1 How satisfied currently are you on - Opportunities to gain new skills and advanced training?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Very Dissatisfied	Valid N	4	7	8	1	2	3		2	2	29

	% of Total	3.9%	6.9%	7.8%	1.0%	2.0%	2.9%		2.0%	2.0%	28.4%
Somewhat Dissatisfied	Valid N	3	6	3	2	2	2	1	4	1	24
	% of Total	2.9%	5.9%	2.9%	2.0%	2.0%	2.0%	1.0%	3.9%	1.0%	23.5%
Somewhat Satisfied	Valid N	2	6	9	8	3	1		1		30
	% of Total	2.0%	5.9%	8.8%	7.8%	2.9%	1.0%		1.0%		29.4%
Very Satisfied	Valid N	2	2	3	5	1	1	1	4		19
	% of Total	2.0%	2.0%	2.9%	4.9%	1.0%	1.0%	1.0%	3.9%		18.6%
Total	Valid N	11	21	23	16	8	7	2	11	3	102
	% of Total	10.8%	20.6%	22.5%	15.7%	7.8%	6.9%	2.0%	10.8%	2.9%	100.0%

D04f.2 Comments for dissatisfaction on "Opportunities to gain new skills and advanced training"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
There is no opportunities at all to gain advanced training	Valid N	1		3					3		7
	% of Total	2.3%		6.8%					6.8%		15.9%
No opportunity to gain new skill due to poor transparency	Valid N	1									1
	% of Total	2.3%									2.3%
I do not expect advanced training, even in the future	Valid N	2	4							1	7
	% of Total	4.5%	9.1%							2.3%	15.9%
The training criteria does not fit to my situation	Valid N	1									1
	% of Total	2.3%									2.3%
No opportunities in all types of training	Valid N	1	6								7
	% of Total	2.3%	13.6%								15.9%
	Valid N		1								1

Neither advanced nor is medium training will be given to me	% of Total	2.3%									2.3%
Few people get advanced training in our office, due to nepotism	Valid N	1									1
	% of Total	2.3%									2.3%
Short and long-term advanced training and skills are available	Valid N	1									1
	% of Total	2.3%									2.3%
Short term training sometimes available	Valid N		1								1
	% of Total		2.3%								2.3%
There is possibility of getting training at some time interval /periodically	Valid N		1		1						2
	% of Total		2.3%		2.3%						4.5%
Advanced training is available, there is no equal chance to all staff to acquire it	Valid N		2				1		1		4
	% of Total		4.5%				2.3%		2.3%		9.1%
New skills and advanced training available but not on the issues of LA	Valid N			1							1
	% of Total			2.3%							2.3%
Due to lack of time, I have not got chance to participate in advanced training	Valid N			1							1
	% of Total			2.3%							2.3%
Although there is high demand on advanced training, financial constraint has become the main obstacle	Valid N			1							1
	% of Total			2.3%							2.3%
There are opportunities if I am given equal chance	Valid N				1	1					2
	% of Total				2.3%	2.3%					4.5%
No advanced training in our school apart from the normal courses	Valid N					1					1
	% of Total					2.3%					2.3%
There is no training opportunity to gain new skill and knowledge in our department	Valid N				1	3					4
	% of Total				2.3%	6.8%					9.1%
No opportunity in new skills regarding to LA in our university	Valid N								1		1
	% of Total								2.3%		2.3%
Total	Valid N	6	13	7	3	3	5	1	5	1	44
	% of Total	13.6%	29.5%	15.9%	6.8%	6.8%	11.4%	2.3%	11.4%	2.3%	100.0%

Note: The comments are given by the people who are VERY DISSATISFIED and SOMEWHAT DISSATISFIED on Opportunities to gain new skills and advanced training

D04f.2 Comments for satisfaction on "Opportunities to gain new skills and advanced training"

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
There is no opportunities at all to gain advanced training	Valid N	1		1							2
	% of Total	2.6%		2.6%							5.1%
No opportunity to gain new skill due to poor transparency	Valid N	1									1
	% of Total	2.6%									2.6%
I do not expect advanced training, even in the future	Valid N		1								1
	% of Total		2.6%								2.6%
No opportunities in all types of training	Valid N	2									2
	% of Total	5.1%									5.1%
Short and long-term advanced training and skills are available	Valid N		2								2
	% of Total		5.1%								5.1%
Higher institutions are the appropriate places to get advanced training opportunities	Valid N		2								2
	% of Total		5.1%								5.1%
	Valid N		1								1

Opportunities for advanced training or new skills are available in our department	% of Total	2.6%						2.6%
	Valid N		1					1
Short term training sometimes available	% of Total		2.6%					2.6%
	Valid N		1			1		2
There is possibility of getting training at some time interval /periodically	% of Total		2.6%			2.6%		5.1%
	Valid N		1	1				2
Advanced training is available, there is no equal chance to all staff to acquire it	% of Total		2.6%	2.6%				5.1%
	Valid N		1					1
New skills and advanced training available but not on the issues of LA	% of Total		2.6%					2.6%
	Valid N		1					1
We get short-term courses and other training inside and outside Ethiopia	% of Total		2.6%					2.6%
	Valid N			3				3
There is a big demand on advanced training in LA	% of Total			7.7%				7.7%
	Valid N			1				1
New skills in LA are required if the financial constraints are solved	% of Total			2.6%				2.6%
	Valid N			1				1
Advanced training on LA is urgent if rapid implementation is realized	% of Total			2.6%				2.6%
	Valid N		1	3				4
I have some opportunities to new skills and advanced training	% of Total		2.6%	7.7%				10.3%
	Valid N			1				1
I do not have opportunity in our region, which is associated with poor information flow	% of Total			2.6%				2.6%

D04f.2 Comments for satisfaction on "Opportunities to gain new skills and advanced training"_ Continued

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
I have just acquired advanced training in GIS and AutoCAD	Valid N				1						1
	% of Total				2.6%						2.6%
Although there is high demand on advanced training, financial constraint has become the main obstacle	Valid N				1						1
	% of Total				2.6%						2.6%
There are opportunities if I am given equal chance	Valid N					1					1
	% of Total					2.6%					2.6%
Long-term training in LA is vital if the financial problems are solved	Valid N					1					1
	% of Total					2.6%					2.6%
There is no training opportunity to gain new skill and knowledge in our department	Valid N					1					1
	% of Total					2.6%					2.6%
There is an ample opportunity to advanced training	Valid N						1				1
	% of Total						2.6%				2.6%
Some times short term training available but not the advanced one	Valid N						1				1
	% of Total						2.6%				2.6%
I get equal opportunity for the new skills	Valid N							1			1
	% of Total							2.6%			2.6%
Knowledge upgrading is available	Valid N								2		2

	% of Total								5.1%		5.1%
Our office provides some technical training	Valid N								1		1
	% of Total								2.6%		2.6%
Total	Valid N	4	6	7	12	3	2	1	4		39
	% of Total	10.3%	15.4%	17.9%	30.8%	7.7%	5.1%	2.6%	10.3%		100.0%

Note: The comments are given by the people who are VERY SATISFIED and SOMEWHAT SATISFIED on Opportunities to gain new skills and advanced training

SECTION E - Job Advancement Information

E01 Have their responsibility increased in a significant way?

		REGION									Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Yes	Valid N	8	16	15	9	4	5	3	14	1	75
	% of Total	6.5%	12.9%	12.1%	7.3%	3.2%	4.0%	2.4%	11.3%	0.8%	60.5%
No	Valid N	7	7	11	5	4	4	3	4	3	48
	% of Total	5.6%	5.6%	8.9%	4.0%	3.2%	3.2%	2.4%	3.2%	2.4%	38.7%
Don't Know	Valid N			1							1
	% of Total			0.8%							0.8%
Total	Valid N	15	23	27	14	8	9	6	18	4	124
	% of Total	12.1%	18.5%	21.8%	11.3%	6.5%	7.3%	4.8%	14.5%	3.2%	100.0%

E02a If yes, describe

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		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Responsibilities increased because of an increase in income	Valid N			1							1
	% of Total			3.4%							3.4%
Their responsibilities increased due to promotion	Valid N	1					1				2
	% of Total	3.4%					3.4%				6.9%
They participate in different consultancy and research activities	Valid N	1	3								4
	% of Total	3.4%	10.3%								13.8%
Salary increment and new position made them to be more responsible	Valid N		1	1							2
	% of Total		3.4%	3.4%							6.9%
Because their duties take high risk and require responsible staff	Valid N	1	2								3
	% of Total	3.4%	6.9%								10.3%
Their responsibilities is associated with new positions gained recently	Valid N		1	1	1						3
	% of Total		3.4%	3.4%	3.4%						10.3%
Their responsibilities increased significantly due to strong government policy	Valid N			1							1
	% of Total			3.4%							3.4%
Improvement of skill and awareness enhance their responsibility	Valid N	1	2		1						4
	% of Total	3.4%	6.9%		3.4%						13.8%
Their work and quality services led them to be more responsible	Valid N				1						1
	% of Total				3.4%						3.4%
Because the work demand increases	Valid N						1				1
	% of Total						3.4%				3.4%
Because land issue is sensitive	Valid N						1				1
	% of Total						3.4%				3.4%
Their involvement to different activities led them to be responsible	Valid N							1			1
	% of Total							3.4%			3.4%
They are committed to establish training centre and support trainers and trainees	Valid N								1		1
	% of Total								3.4%		3.4%
They develop academic ethic while they conduct their research work	Valid N								1		1
	% of Total								3.4%		3.4%
They work hard and fill responsibility to be honest and respected their jobs	Valid N								2		2
	% of Total								6.9%		6.9%
	Valid N								1		1

They hard worker and give respect to their jobs	% of Total									3.4%	3.4%
Total	Valid N	4	9	4	3	2	1	1	5	29	
	% of Total	13.8%	31.0%	13.8%	10.3%	6.9%	3.4%	3.4%	17.2%	100.0%	

E02 Are they been prompted to a new position in the last 2 years?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	6	10	6	5	1			5		33
	% of Total	5.2%	8.6%	5.2%	4.3%	0.9%			4.3%		28.4%
No	Valid N	8	13	19	9	6	8	3	12	4	82
	% of Total	6.9%	11.2%	16.4%	7.8%	5.2%	6.9%	2.6%	10.3%	3.4%	70.7%
Don't Know	Valid N			1							1
	% of Total			0.9%							0.9%
Total	Valid N	14	23	26	14	7	8	3	17	4	116
	% of Total	12.1%	19.8%	22.4%	12.1%	6.0%	6.9%	2.6%	14.7%	3.4%	100.0%

E02a If yes, describe

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
They are promoted due to high performance and their responsibilities	Valid N	1									1
	% of Total	8.3%									8.3%
	Valid N	1									1

Some of them have been promoted to policy-making position	% of Total	8.3%								8.3%
Advanced training and new skills led them to be promoted	Valid N		1					1		2
	% of Total	8.3%						8.3%		16.7%
Their promotion to higher position is associated with the completion of the new advanced training	Valid N		1							1
	% of Total	8.3%								8.3%
A few of them have been promoted to environment inspection position	Valid N		1							1
	% of Total	8.3%								8.3%
Promoted from city administration to college teacher	Valid N		1							1
	% of Total	8.3%								8.3%
Some of them have been promoted to a higher position	Valid N			1						1
	% of Total			8.3%						8.3%
A few of them have been promoted to private sector	Valid N			1		1				2
	% of Total			8.3%		8.3%				16.7%
Their hard working performance promoted them to higher position	Valid N				1					1
	% of Total				8.3%					8.3%
Promoted to a new position outside their organizations	Valid N				1					1
	% of Total				8.3%					8.3%
Total	Valid N	2	4	2	2	1		1		12
	% of Total	16.7%	33.3%	16.7%	16.7%	8.3%		8.3%		100.0%

E03 Have they received an increase in wages or hours?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	6	5	8	6	1	1	1	4	1	33
	% of Total	5.4%	4.5%	7.2%	5.4%	0.9%	0.9%	0.9%	3.6%	0.9%	29.7%
No	Valid N	9	14	16	9	5	7	2	12	3	77
	% of Total	8.1%	12.6%	14.4%	8.1%	4.5%	6.3%	1.8%	10.8%	2.7%	69.4%
Don't Know	Valid N			1							1
	% of Total			0.9%							0.9%
Total	Valid N	15	19	25	15	6	8	3	16	4	111
	% of Total	13.5%	17.1%	22.5%	13.5%	5.4%	7.2%	2.7%	14.4%	3.6%	100.0%

E03a If yes, describe

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Salary according is associated with job position change and the civil service regulation	Valid N	1								1	2
	% of Total	6.7%								6.7%	13.3%
Salary increment was made in the private sector/companies as they work hard and more hours	Valid N	1	1	1							3
	% of Total	6.7%	6.7%	6.7%							20.0%
The salary increment is associated with their education and advanced training	Valid N		1								1
	% of Total		6.7%								6.7%

Some of them got salary increment after their promotion to new position	Valid N		1							1
	% of Total		6.7%							6.7%
Few of them are said to work extra hours and increased their salary by about 10%	Valid N			1						1
	% of Total			6.7%						6.7%
Their salary increment has to do with high cost on basic goods and services	Valid N			1						1
	% of Total			6.7%						6.7%
Increased associated with government salary scale increment	Valid N			1						1
	% of Total			6.7%						6.7%
Promotion led to salary increment	Valid N				1					1
	% of Total				6.7%					6.7%
The new promotion led them to salary increment	Valid N				1					1
	% of Total				6.7%					6.7%
Some said their salary increased by about 30% due to private firm increase in the last few years	Valid N				1					1
	% of Total				6.7%					6.7%
Advanced training led them to salary increment	Valid N							1		1
	% of Total							6.7%		6.7%
The government investment policy accommodate part time workers	Valid N							1		1
	% of Total							6.7%		6.7%
Total	Valid N	2	3	4	3			2	1	15
	% of Total	13.3%	20.0%	26.7%	20.0%			13.3%	6.7%	100.0%

E04 Has your status changed so that you are now eligible for benefits?

	REGION
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		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	7	7	5	11	1	1	1	3	1	37
	% of Total	6.1%	6.1%	4.3%	9.6%	0.9%	0.9%	0.9%	2.6%	0.9%	32.2%
No	Valid N	8	15	17	6	5	7	5	11	3	77
	% of Total	7.0%	13.0%	14.8%	5.2%	4.3%	6.1%	4.3%	9.6%	2.6%	67.0%
Don't Know	Valid N			1							1
	% of Total			0.9%							0.9%
Total	Valid N	15	22	23	17	6	8	6	14	4	115
	% of Total	13.0%	19.1%	20.0%	14.8%	5.2%	7.0%	5.2%	12.2%	3.5%	100.0%

E04a If yes, describe

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Status change followed by transport, telephone and housing allowance	Valid N	3									3
	% of Total	21.4%									21.4%
Greater benefits were given to higher authority and company managers	Valid N	1									1
	% of Total	7.1%									7.1%
	Valid N	1	1								2

Those with advanced degree and long years experiences are more beneficial than others	% of Total	7.1%	7.1%							14.3%
Only in advance education	Valid N		1							1
Contact and experiences led some of them to status change, and the latter in turn make them beneficial	% of Total		7.1%							7.1%
Cars, free medical attention and housing are some of the benefits provided to persons with higher positions	Valid N		1							1
Industry manager and directors are more beneficial than the ministers	% of Total				7.1%					7.1%
At the time of interview, one of the respondents received 600 Birr increment and transport allowance due to his status	Valid N				1					1
Officials and senior lecturers live in government subsidized subsidize houses and use free transport services	% of Total				7.1%					7.1%
Project coordinators receive transport and housing allowance	Valid N				1					1
My status changed and receive better benefits	% of Total				7.1%					7.1%
Total	Valid N	6	3	2	3					14
	% of Total	42.9%	21.4%	14.3%	21.4%					100.0%

05 Have you begun or completed training to gain additional skills that will position you for a raise or promotion?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes	Valid N	7	8	9	10	1		2	6		43
	% of Total	5.7%	6.6%	7.4%	8.2%	0.8%		1.6%	4.9%		35.2%
No	Valid N	8	15	16	6	6	8	4	11	4	78
	% of Total	6.6%	12.3%	13.1%	4.9%	4.9%	6.6%	3.3%	9.0%	3.3%	63.9%
Don't Know	Valid N			1							1
	% of Total			0.8%							0.8%
Total	Valid N	15	23	26	16	7	8	6	17	4	122
	% of Total	12.3%	18.9%	21.3%	13.1%	5.7%	6.6%	4.9%	13.9%	3.3%	100.0%

E05a If yes, describe

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Began a new course in land management and land registration	Valid N	1							1		2
	% of Total	3.0%							3.0%		6.1%
I am joining a M. Sc Programme	Valid N	1		1							2
	% of Total	3.0%		3.0%							6.1%
I took different short term training	Valid N	1									1
	% of Total	3.0%									3.0%
I have just completed training and am expected a new position	Valid N	1									1
	% of Total	3.0%									3.0%
M. Sc in LA and management	Valid N		1								1
	% of Total		3.0%								3.0%
I am attending/attended GIS and Remote Sensing training	Valid N		1		1						2
	% of Total		3.0%		3.0%						6.1%
I am full time lecturer after completing my M. Sc .Programme	Valid N		1								1
	% of Total		3.0%								3.0%

I am an Ass. Professor and promoted to Director position	Valid N		1		1				2
	% of Total		3.0%		3.0%				6.1%
I have got Ph. D study	Valid N		1						1
	% of Total		3.0%						3.0%
Completed in land management	Valid N	1	1						2
	% of Total	3.0%	3.0%						6.1%
Complete surveying course and promoted to a new position	Valid N					1			1
	% of Total					3.0%			3.0%
Completed GIS/LIS course	Valid N	1	2						3
	% of Total	3.0%	6.1%						9.1%
I got more than three trainings that up grade my skill I	Valid N				1				1
	% of Total				3.0%				3.0%
Completed MA degree in urban environment and climate change	Valid N				1				1
	% of Total				3.0%				3.0%
I already have M. Sc and the certificate that can promote me to a new position	Valid N	1			1				2
	% of Total	3.0%			3.0%				6.1%
I have just competed special training on LA	Valid N					1			1
	% of Total					3.0%			3.0%
Up graded to master program	Valid N					1			1
	% of Total					3.0%			3.0%
I am promoted thanks to the LA training programme	Valid N					1			1
	% of Total					3.0%			3.0%
Completed GPS, GIS and biodiversity courses recently	Valid N					1			1
	% of Total					3.0%			3.0%
Training in cadastral survey prompted me to work as head of the department	Valid N					1			1
	% of Total					3.0%			3.0%
Completed training in Architecture, GIS and Auto cad	Valid N					1			1
	% of Total					3.0%			3.0%
Completed a course in research methods	Valid N							1	1
	% of Total							3.0%	3.0%
Completed training in Urban planning and land management	Valid N							1	1
	% of Total							3.0%	3.0%
I have received a diploma on cadastral survey	Valid N							1	1
	% of Total							3.0%	3.0%

attended training in sales and leadership	Valid N			1						1
	% of Total			3.0%						3.0%
Total	Valid N	7	8	5	8	1			4	33
	% of Total	21.2%	24.2%	15.2%	24.2%	3.0%			12.1%	100.0%

SECTION F - Further Education for Current Professionals

F01 Whether you are employed or not, are you currently a student?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Yes, Part-time	Valid N	2	5	4	4		2				17
	% of Total	2.2%	5.4%	4.3%	4.3%		2.2%				18.5%
Yes, Full-time	Valid N		1	2	1	1			2		7
	% of Total		1.1%	2.2%	1.1%	1.1%			2.2%		7.6%
Not currently a student	Valid N	13	17	13	2	5	6	1	7	4	68
	% of Total	14.1%	18.5%	14.1%	2.2%	5.4%	6.5%	1.1%	7.6%	4.3%	73.9%
Total	Valid N	15	23	19	7	6	8	1	9	4	92
	% of Total	16.3%	25.0%	20.7%	7.6%	6.5%	8.7%	1.1%	9.8%	4.3%	100.0%

F02 Which school are you attending?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Mekelle university	Valid N	1									1
	% of Total	5.9%									5.9%
Bahir dar university	Valid N		4	1							5
	% of Total		23.5%	5.9%							29.4%
KTH in Sweden	Valid N		1								1
	% of Total		5.9%								5.9%
Hilcoe school of CST	Valid N			1							1
	% of Total			5.9%							5.9%
Institute of Land Administration, Bahir Dar university	Valid N			2							2
	% of Total			11.8%							11.8%
Addis Ababa University	Valid N			1				1			2
	% of Total			5.9%				5.9%			11.8%
Jijiga University	Valid N				2						2
	% of Total				11.8%						11.8%
Haromaya University	Valid N				2		1				3
	% of Total				11.8%		5.9%				17.6%
Total	Valid N	1	5	5	4		1	1			17
	% of Total	5.9%	29.4%	29.4%	23.5%		5.9%	5.9%			100.0%

F03a What is the degree you are pursuing?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
1st degree (BA, B. Sc.....)	Valid N		2		1						3
	% of Total		11.8%		5.9%						17.6%
2nd degree (MA, M Sc.....)	Valid N	1	2	3	3		1		1		11
	% of Total	5.9%	11.8%	17.6%	17.6%		5.9%		5.9%		64.7%
Ph. D	Valid N		1	1		1					3
	% of Total		5.9%	5.9%		5.9%					17.6%
Total	Valid N	1	5	4	4	1	1		1		17
	% of Total	5.9%	29.4%	23.5%	23.5%	5.9%	5.9%		5.9%		100.0%

F03b What is your major?

		REGION									
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
Geography	Valid N	1	1								2
	% of Total	5.6%	5.6%								11.1%
Drafting	Valid N	1									1
	% of Total	5.6%									5.6%
Accounting	Valid N		1								1
	% of Total		5.6%								5.6%
Surveying	Valid N		1								1
	% of Total		5.6%								5.6%
Soil and water conservation	Valid N		1								1
	% of Total		5.6%								5.6%
Rural property evaluation	Valid N		1								1
	% of Total		5.6%								5.6%

Software engineering	Valid N			1						1
	% of Total			5.6%						5.6%
Range land management	Valid N				1					1
	% of Total				5.6%					5.6%
Civil engineering	Valid N				1					1
	% of Total				5.6%					5.6%
Agricultural economics	Valid N				1					1
	% of Total				5.6%					5.6%
Educational leadership	Valid N				1					1
	% of Total				5.6%					5.6%
Computer science	Valid N			1						1
	% of Total			5.6%						5.6%
LA and management	Valid N			1						1
	% of Total			5.6%						5.6%
Land registration and surveying	Valid N			1						1
	% of Total			5.6%						5.6%
Environmental management	Valid N					1	1			2
	% of Total					5.6%	5.6%			11.1%
Construction management	Valid N						1			1
	% of Total						5.6%			5.6%
Total	Valid N	2	5	4	4	1	2			18
	% of Total	11.1%	27.8%	22.2%	22.2%	5.6%	11.1%			100.0%

SECTION G - General Feedback on the Training Received

G01_Feedback on the training received (for current professionals (in the professions anticipated to be in high demand))

	REGION
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			Tigra y	Amhar a	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP	Harari	Total
1) The application and orientation process clearly communicated what you expect from the program	Disagree	Valid N	6	8	1	1	4	1	3	3	1	28
		% of Total	5.2%	6.9%	0.9%	0.9%	3.4%	0.9%	2.6%	2.6%	0.9%	24.1%
	Agree	Valid N	7	9	15	6	4	3		9	1	54
		% of Total	6.0%	7.8%	12.9%	5.2%	3.4%	2.6%		7.8%	0.9%	46.6%
	Strongly Agree	Valid N		4	7	2	1	2	2	5		23
		% of Total		3.4%	6.0%	1.7%	0.9%	1.7%	1.7%	4.3%		19.8%
	Very Strongly Agree	Valid N		3	2	1		1	1	2	1	11
		% of Total		2.6%	1.7%	0.9%		0.9%	0.9%	1.7%	0.9%	9.5%
	Total	Valid N	13	24	25	10	9	7	6	19	3	116
		% of Total	11.2%	20.7%	21.6%	8.6%	7.8%	6.0%	5.2%	16.4%	2.6%	100.0%
2) Training institution's staff helped you to clarify your goal and identify obstacles to achieving them	Disagree	Valid N	6	5	3	3	2	2		2	2	25
		% of Total	5.1%	4.2%	2.5%	2.5%	1.7%	1.7%		1.7%	1.7%	21.2%
	Agree	Valid N	8	11	12	2	6	3	5	9		56
		% of Total	6.8%	9.3%	10.2%	1.7%	5.1%	2.5%	4.2%	7.6%		47.5%
	Strongly Agree	Valid N		5	8	4	1	3		7		28
		% of Total		4.2%	6.8%	3.4%	0.8%	2.5%		5.9%		23.7%
	Valid N		2	2	1		1	1	1	1	1	9

	Very Strongly Agree	% of Total		1.7%	1.7%	0.8%		0.8%	0.8%	0.8%	0.8%	7.6%
		Valid N	14	23	25	10	9	9	6	19	3	118
	Total	% of Total	11.9%	19.5%	21.2%	8.5%	7.6%	7.6%	5.1%	16.1%	2.5%	100.0%
3) Training institution's staff worked in a supportive way with you to address specific obstacles	Disagree	Valid N	4	4	4	1	5	3		2	2	25
		% of Total	3.4%	3.4%	3.4%	0.9%	4.3%	2.6%		1.7%	1.7%	21.6%
	Agree	Valid N	6	7	13	9	2	5	5	8		55
		% of Total	5.2%	6.0%	11.2%	7.8%	1.7%	4.3%	4.3%	6.9%		47.4%
	Strongly Agree	Valid N	1	10	6		2	1		7	1	28
		% of Total	0.9%	8.6%	5.2%		1.7%	0.9%		6.0%	0.9%	24.1%
	Very Strongly Agree	Valid N	1	2	2	1			1	1		8
		% of Total	0.9%	1.7%	1.7%	0.9%			0.9%	0.9%		6.9%
	Total	Valid N	12	23	25	11	9	9	6	18	3	116
		% of Total	10.3%	19.8%	21.6%	9.5%	7.8%	7.8%	5.2%	15.5%	2.6%	100.0%
4) The training program connected you with useful community resources to help you address the needs	Disagree	Valid N	6	4	8	2	7	2	2	1	1	33
		% of Total	5.4%	3.6%	7.1%	1.8%	6.2%	1.8%	1.8%	0.9%	0.9%	29.5%
	Agree	Valid N	3	11	6	5	1	2	3	11	2	44
		% of Total	2.7%	9.8%	5.4%	4.5%	0.9%	1.8%	2.7%	9.8%	1.8%	39.3%
	Strongly Agree	Valid N	3	5	6	2	1	4	1	3		25
		% of Total	2.7%	4.5%	5.4%	1.8%	0.9%	3.6%	0.9%	2.7%		22.3%

Very Strongly Agree	Valid N		3	3	1		1		2		10
	% of Total		2.7%	2.7%	0.9%		0.9%		1.8%		8.9%
Total	Valid N	12	23	23	10	9	9	6	17	3	112
	% of Total	10.7%	20.5%	20.5%	8.9%	8.0%	8.0%	5.4%	15.2%	2.7%	100.0%

Note: % of Total refers to the total number of respondents in each category

G01_Feedback on the training received for current professionals (in the professions anticipated to be in high demand) _continued

		REGION										
		Tigray	Amhara	Addis Ababa	Somali	Oromiy a	Dire Dawa	Afar	SNNP	Harari	Total	
5) Training institution's instructors were helpful and supportive	Disagree	Valid N	7	3	3	2	5	3		1	1	25
		% of Total	6.1%	2.6%	2.6%	1.8%	4.4%	2.6%		0.9%	0.9%	21.9%
	Agree	Valid N	4	5	11	4	3	3	4	7	1	42
		% of Total	3.5%	4.4%	9.6%	3.5%	2.6%	2.6%	3.5%	6.1%	0.9%	36.8%
	Strongly Agree	Valid N	1	9	8	4	1	1	1	9	1	35
		% of Total	0.9%	7.9%	7.0%	3.5%	0.9%	0.9%	0.9%	7.9%	0.9%	30.7%
		Valid N		5	3	1		2	1			12

	Very Strongly Agree	% of Total		4.4%	2.6%	0.9%		1.8%	0.9%			10.5%
		Valid N	12	22	25	11	9	9	6	17	3	114
Total		% of Total	10.5%	19.3%	21.9%	9.6%	7.9%	7.9%	5.3%	14.9%	2.6%	100.0%
		Valid N	2	5	2	1	2	2		2	1	17
6) You were able to develop strong, positive relationship with other students from your/ other training institutions	Disagree	% of Total	1.7%	4.3%	1.7%	0.9%	1.7%	1.7%		1.7%	0.9%	14.7%
		Valid N	9	8	10	5	4	2	3	5	2	48
	Agree	% of Total	7.8%	6.9%	8.6%	4.3%	3.4%	1.7%	2.6%	4.3%	1.7%	41.4%
		Valid N	1	6	11	1	2	2	3	8		34
	Strongly Agree	% of Total	0.9%	5.2%	9.5%	0.9%	1.7%	1.7%	2.6%	6.9%		29.3%
		Valid N	1	3	2	3	1	3		4		17
	Very Strongly Agree	% of Total	0.9%	2.6%	1.7%	2.6%	0.9%	2.6%		3.4%		14.7%
		Valid N	13	22	25	10	9	9	6	19	3	116
Total		% of Total	11.2%	19.0%	21.6%	8.6%	7.8%	7.8%	5.2%	16.4%	2.6%	100.0%
		Valid N	5	7	4	2	4	2	2	1	1	28
7) Training Institution gave you the training and assistance you need to develop specific job skills	Disagree	% of Total	4.5%	6.2%	3.6%	1.8%	3.6%	1.8%	1.8%	0.9%	0.9%	25.0%
		Valid N	6	4	10	4	4	3	3	6	1	41
	Agree	% of Total	5.4%	3.6%	8.9%	3.6%	3.6%	2.7%	2.7%	5.4%	0.9%	36.6%
		Valid N	1	7	10	2	1	3	1	9		34
	Strongly Agree	% of Total	0.9%	6.2%	8.9%	1.8%	0.9%	2.7%	0.9%	8.0%		30.4%
		Valid N										

Very Strongly Agree	Valid N		4	1	1		1		2		9
	% of Total		3.6%	0.9%	0.9%		0.9%		1.8%		8.0%
Total	Valid N	12	22	25	9	9	9	6	18	2	112
	% of Total	10.7%	19.6%	22.3%	8.0%	8.0%	8.0%	5.4%	16.1%	1.8%	100.0%
Disagree	Valid N	6	7	10	3	4	4	4	3	2	43
	% of Total	5.2%	6.1%	8.7%	2.6%	3.5%	3.5%	3.5%	2.6%	1.7%	37.4%
Agree	Valid N	5	5	9	6	3	3		7		38
	% of Total	4.3%	4.3%	7.8%	5.2%	2.6%	2.6%		6.1%		33.0%
Strongly Agree	Valid N	1	5	3	2	2	1	2	8	1	25
	% of Total	0.9%	4.3%	2.6%	1.7%	1.7%	0.9%	1.7%	7.0%	0.9%	21.7%
Very Strongly Agree	Valid N		5	1	1		1		1		9
	% of Total		4.3%	0.9%	0.9%		0.9%		0.9%		7.8%
Total	Valid N	12	22	23	12	9	9	6	19	3	115
	% of Total	10.4%	19.1%	20.0%	10.4%	7.8%	7.8%	5.2%	16.5%	2.6%	100.0%

Note: % of Total refers to the total number of respondents in each category

G01_Feedback on the training received for current professionals (in the professions anticipated to be in high demand) _continued

	REGION
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			Tigray	Amhara	Addis Ababa	Somali	Oromiy a	Dire Dawa	Afar	SNNP	Harari	Total
9) Training Institution helped you develop the problem solving and teamwork skills you need to be successful on the j	Disagree	Valid N	4	8	6	2	3	3	4	1	1	32
		% of Total	3.5%	7.1%	5.3%	1.8%	2.7%	2.7%	3.5%	0.9%	0.9%	28.3%
	Agree	Valid N	5	4	8	6	6	2	1	8	1	41
		% of Total	4.4%	3.5%	7.1%	5.3%	5.3%	1.8%	0.9%	7.1%	0.9%	36.3%
	Strongly Agree	Valid N	1	5	8			3		5		22
		% of Total	0.9%	4.4%	7.1%			2.7%		4.4%		19.5%
	Very Strongly Agree	Valid N	2	5	3	2		1	1	3	1	18
		% of Total	1.8%	4.4%	2.7%	1.8%		0.9%	0.9%	2.7%	0.9%	15.9%
	Total	Valid N	12	22	25	10	9	9	6	17	3	113
		% of Total	10.6%	19.5%	22.1%	8.8%	8.0%	8.0%	5.3%	15.0%	2.7%	100.0%
10) Overall, the program met your goals	Disagree	Valid N	2	6	4	3	2	3	4	2	1	27
		% of Total	1.8%	5.3%	3.5%	2.6%	1.8%	2.6%	3.5%	1.8%	0.9%	23.7%
	Agree	Valid N	7	7	10	5	5	2	1	7	1	45
		% of Total	6.1%	6.1%	8.8%	4.4%	4.4%	1.8%	0.9%	6.1%	0.9%	39.5%
	Strongly Agree	Valid N	2	7	7	2	2	3	1	8	1	33
		% of Total	1.8%	6.1%	6.1%	1.8%	1.8%	2.6%	0.9%	7.0%	0.9%	28.9%
	Very Strongly Agree	Valid N	1	1	3	1		1		2		9
		% of Total	0.9%	0.9%	2.6%	0.9%		0.9%		1.8%		7.9%
	Total	Valid N	12	21	24	11	9	9	6	19	3	114
		% of Total	10.5%	18.4%	21.1%	9.6%	7.9%	7.9%	5.3%	16.7%	2.6%	100.0%
11) You would recommend your training institution to others	Disagree	Valid N	5	4	8	2	4	4	4	1	1	33
		% of Total	4.5%	3.6%	7.2%	1.8%	3.6%	3.6%	3.6%	0.9%	0.9%	29.7%
	Agree	Valid N	4	9	8	6	3	1		7	1	39

	% of Total	3.6%	8.1%	7.2%	5.4%	2.7%	0.9%		6.3%	0.9%	35.1%
Strongly Agree	Valid N	2	5	5	1	2	2	2	9	1	29
	% of Total	1.8%	4.5%	4.5%	0.9%	1.8%	1.8%	1.8%	8.1%	0.9%	26.1%
Very Strongly Agree	Valid N	1	4	3			1		1		10
	% of Total	0.9%	3.6%	2.7%			0.9%		0.9%		9.0%
Total	Valid N	12	22	24	9	9	8	6	18	3	111
	% of Total	10.8%	19.8%	21.6%	8.1%	8.1%	7.2%	5.4%	16.2%	2.7%	100.0%

Note: % of Total refers to the total number of respondents in each category

G02 Which specific aspects of the training of the demanded professions are MOST likely to be helpful in meeting needs?

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Lard surveying	Valid N	2	1					2	1	1	7
	% of Total	1.7%	0.8%					1.7%	0.8%	0.8%	5.8%
cadastral surveying	Valid N	1	1								2
	% of Total	0.8%	0.8%								1.7%
Land use planning	Valid N	3	1	2		1	2	3	1		13
	% of Total	2.5%	0.8%	1.7%		0.8%	1.7%	2.5%	0.8%		10.7%
Surveying	Valid N	1	2	1		2					6
	% of Total	0.8%	1.7%	0.8%		1.7%					5.0%
GIS and remote sensing	Valid N	2	4	5	3	3	4			1	22
	% of Total	1.7%	3.3%	4.1%	2.5%	2.5%	3.3%			0.8%	18.2%
Urban planning	Valid N		2	3	1						6
	% of Total		1.7%	2.5%	0.8%						5.0%
	Valid N	2									2

Instructor for universities and colleges	% of Total	1.7%								1.7%
	Valid N				2			3	3	8
General skill training	% of Total				1.7%			2.5%	2.5%	6.6%
	Valid N	3	4	1	2				2	12
Land administration specialty	% of Total	2.5%	3.3%	0.8%	1.7%				1.7%	9.9%
	Valid N	1	3							4
Training related to practice	% of Total	0.8%	2.5%							3.3%
	Valid N	1	3							4
Land management	% of Total	0.8%	2.5%							3.3%
	Valid N	1	1							2
Land registration	% of Total	0.8%	0.8%							1.7%
	Valid N		2		1	1			1	5
LIS	% of Total		1.7%		0.8%	0.8%			0.8%	4.1%
	Valid N	1	1							2
Land law	% of Total	0.8%	0.8%							1.7%
	Valid N		2							2
Real estate property valuation	% of Total		1.7%							1.7%
	Valid N			2						2
Entrepreneurship	% of Total			1.7%						1.7%
	Valid N			1						1
Land economics	% of Total			0.8%						0.8%
	Valid N			1				1		2
Land policy specialty	% of Total			0.8%				0.8%		1.7%
	Valid N			1						1
Geographic information management	% of Total			0.8%						0.8%

G02 Which specific aspects of the training of the demanded professions are MOST likely to be helpful in meeting needs?_Continued

		REGION								Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Dire Dawa	Afar	SNNP		Harari
Cadastral lease system	Valid N					1	1				2
	% of Total					0.8%	0.8%				1.7%
Real estate evaluation	Valid N					1					1
	% of Total					0.8%					0.8%
How to develop institutional development plan	Valid N								1		1
	% of Total								0.8%		0.8%
Training in LA and cadastral survey	Valid N								2		2
	% of Total								1.7%		1.7%
Cadastral survey	Valid N								1		2
	% of Total								0.8%		1.7%
Surveying methodology	Valid N								1		1
	% of Total								0.8%		0.8%
LA and data base	Valid N								1		1
	% of Total								0.8%		0.8%
Urban management related courses	Valid N								1		1
	% of Total								0.8%		0.8%
Practical training on LA	Valid N								2		2
	% of Total								1.7%		1.7%
Land use planning and administration	Valid N								1		1
	% of Total								0.8%		0.8%
Data base management system	Valid N								1		1
	% of Total								0.8%		0.8%

Field work related courses	Valid N								1		1
	% of Total								0.8%		0.8%
Practical training on project sites	Valid N								1		1
	% of Total								0.8%		0.8%
Mapping	Valid N										1
	% of Total										0.8%
Total	Valid N	18	27	18	8	9	8	9	21	3	121
	% of Total	14.9%	22.3%	14.9%	6.6%	7.4%	6.6%	7.4%	17.4%	2.5%	100.0%

Percentages and totals are based on responses.

G03 Which specific aspects of the training of the demanded professions are LEAST likely to be helpful in meeting needs?

		REGION							Total	
		Tigray	Amhara	Addis Ababa	Somali	Dire Dawa	Afar	SNNP		Harari
Land use planning	Valid N	3								3
	% of Total	7.9%								7.9%
Land administration technicians	Valid N	1		2	2		1	2	1	9
	% of Total	2.6%		5.3%	5.3%		2.6%	5.3%	2.6%	23.7%
GIS	Valid N		1		1		1	2	0	5
	% of Total		2.6%		2.6%		2.6%	5.3%	0.0%	13.2%
Land taxation	Valid N		1							1
	% of Total		2.6%							2.6%
Land administration law	Valid N		1	1						2
	% of Total		2.6%	2.6%						5.3%

Instructors for universities and colleges	Valid N	2	1					3
	% of Total	5.3%	2.6%					7.9%
LIS	Valid N	1	1					2
	% of Total	2.6%	2.6%					5.3%
Urban/city planning	Valid N	1	0					1
	% of Total	2.6%	0.0%					2.6%
Civil engineering	Valid N	1	0					1
	% of Total	2.6%	0.0%					2.6%
Property registration	Valid N		2					2
	% of Total		5.3%					5.3%
Geographic data base	Valid N		1					1
	% of Total		2.6%					2.6%
Mapping	Valid N			1				1
	% of Total			2.6%				2.6%
Land policy specialty	Valid N				1			1
	% of Total				2.6%			2.6%
Law	Valid N				1		1	2
	% of Total				2.6%		2.6%	5.3%
Land surveying	Valid N					3	0	3
	% of Total					7.9%	0.0%	7.9%
Land property law and land valuation	Valid N					1	0	1
	% of Total					2.6%	0.0%	2.6%
Total	Valid N	4	8	6	6	2	2	8
								2
								38

% of Total	10.5%	21.1%	15.8%	15.8%	5.3%	5.3%	21.1%	5.3%	100.0%
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Percentages and totals are based on responses.

G04 Provide suggestions for improving the service and support provided to the students in these highly demanded professions

		REGION							Total	
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	Afar	SNNP		Harari
Training should be one that leads to practical experience	Valid N	1	4				1		1	7
	% of Total	2.0%	7.8%				2.0%		2.0%	13.7%
Continuous training in the same discipline	Valid N	1	1							2
	% of Total	2.0%	2.0%							3.9%
Financial support and availability of equipments	Valid N		2							2
	% of Total		3.9%							3.9%
These is a need to include land surveying and GIS in the training	Valid N		2							2
	% of Total		3.9%							3.9%
The right training for salary increment and attitude change	Valid N		1							1
	% of Total		2.0%							2.0%
Availability of Jobs and equipments	Valid N		1							1
	% of Total		2.0%							2.0%
Relentless effort of stakeholder is needed to improve the quality of education	Valid N		2							2
	% of Total		3.9%							3.9%

Availability of highly skilled instructors	Valid N	3						3
	% of Total	5.9%						5.9%
Practical experience, sufficient orientation about the subject matter and provision of materials	Valid N	2						2
	% of Total	3.9%						3.9%
Availability of financial and material support for training and field work	Valid N				1	7		8
	% of Total				2.0%	13.7%		15.7%
Availability of accommodation and transport facilities	Valid N	1	1	1				3
	% of Total	2.0%	2.0%	2.0%				5.9%
Integrated training with adequate laboratory, field and research facilities	Valid N	1						1
	% of Total	2.0%						2.0%
Professional linkage between universities and other sectors through parent ship and training mechanism	Valid N	1						1
	% of Total	2.0%						2.0%
Students should be furnished with well equipped library and laboratory facilities as well as research materials	Valid N		1	2				3
	% of Total		2.0%	3.9%				5.9%
Land administration needs special policy and regulation for proper management	Valid N		1	0				1
	% of Total		2.0%	0.0%				2.0%
Availability of computer, GPS and other facilities	Valid N				1			1
	% of Total				2.0%			2.0%
Financial and logistic support to students	Valid N				1			1
	% of Total				2.0%			2.0%
Required highly skilled trainers and advisors	Valid N				1	1		2
	% of Total				2.0%	2.0%		3.9%
Training should be given with sufficient time	Valid N				1			1
	% of Total				2.0%			2.0%

G04 Provide suggestions for improving the service and support provided to the students in these highly demanded professions_ Continued

		REGION								Total
		Tigray	Amhara	Addis Ababa	Oromiya	Dire Dawa	Afar	SNNP	Harari	
Provide training equipments and research facilities for the students	Valid N							2		2
	% of Total							3.9%		3.9%
Highly skilled professionals for GIS and land surveying	Valid N							1		1
	% of Total							2.0%		2.0%
Conductive environment and atmosphere	Valid N							1		1
	% of Total							2.0%		2.0%
Less theory and more practical work	Valid N							1		1
	% of Total							2.0%		2.0%
Student centered teaching approach is useful	Valid N							1		1
	% of Total							2.0%		2.0%
Practical courses, workshops and seminars	Valid N							1		1
	% of Total							2.0%		2.0%
Total	Valid N	2	13	8	3	3	6	15	1	51
	% of Total	3.9%	25.5%	15.7%	5.9%	5.9%	11.8%	29.4%	2.0%	100.0%

Percentages and totals are based on responses.

G05 Any other comments

		REGION							Total
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Afar	SNNP	
	Valid N	2							2

The training should be designed to bring practical knowledge, skill and attitude change	% of Total	3.4%							3.4%
LA programme should focus on land regulation, compensation, definition of family members, valuation and good governance.	Valid N	2	1						3
	% of Total	3.4%	1.7%						5.2%
The training should focus on operation and maintaining surveying equipments	Valid N	1							1
	% of Total	1.7%							1.7%
International experiences should be included in the training and the for the coming report	Valid N	1							1
	% of Total	1.7%							1.7%
A big number of map and image interpreters as well as property taxation level valutors are needed.	Valid N	1							1
	% of Total	1.7%							1.7%
This questioner was good if it was administered and completed in Amharic	Valid N	1	1						2
	% of Total	1.7%	1.7%						3.4%
Land information system requires experts in LA to come up with accurate data, data analyses, etc.	Valid N	2							2
	% of Total	3.4%							3.4%
LA programme conduct urban and rural land engineering surveying project	Valid N		1						1
	% of Total		1.7%						1.7%
The trainee are expected to undertake property and land survey and set out procedures	Valid N		1						1
	% of Total		1.7%						1.7%
Training on rural and urban LA has to be given and managed in one institution or training centre	Valid N		1						1
	% of Total		1.7%						1.7%
The questioners would have been easier if it is prepared in Amharic rather than in English	Valid N		1						1
	% of Total		1.7%						1.7%
There should a positive thinking from trainers' side not to undermine the students and degrade theis morals	Valid N		1						1
	% of Total		1.7%						1.7%

If further information is required, the proposal and questionnaires have to be designed by local experts	Valid N % of Total	1 1.7%						1 1.7%
Questionnaires should be relevant to the local conditions and culture	Valid N % of Total		1 1.7%					1 1.7%
Highly skilled instructors are desirable if successful outcome is expected	Valid N % of Total		2 3.4%					2 3.4%
Capacity building and the necessary technologies are vital	Valid N % of Total		1 1.7%	1 1.7%				2 3.4%
Farmers have to be part of the respondents and discussion groups	Valid N % of Total				1 1.7%			1 1.7%
Awareness in LA, tenure, food, nutrition and environmental security is desired	Valid N % of Total				1 1.7%			1 1.7%

G06 Any other comments_ Continued

		REGION						Total	
		Tigray	Amhara	Addis Ababa	Somali	Oromiya	Afar	SNNP	
Local knowledge and commitment are needed if LA programme is implemented in all regions	Valid N % of Total				1 1.7%				1 1.7%
Since LA is a huge task requires the support from all walk of life and nationalities	Valid N % of Total				1 1.7%				1 1.7%
LA is a backbone for our economy and existence, the programme itself should be promoted through media	Valid N % of Total				1 1.7%				1 1.7%

Without LA, the vast land in lowland areas can not be controlled, managed and productive	Valid N % of Total			1 1.7%			1 1.7%
Adaptation to climate change is impossible without LA particularly in the lowland areas of the country	Valid N % of Total			3 5.2%			3 5.2%
The LA programme is expected to train valuator s in order to determine the issues of collateral, legal dispute, quantity s	Valid N % of Total			3 5.2%			3 5.2%
LA at M.Sc level should include GIS, PS, cadastral survey, land use methodology and environment	Valid N % of Total			2 3.4%			2 3.4%
Nationwide information is needed if the value of certification is understood well	Valid N % of Total			7 12.1%	2 3.4%		9 15.5%
Training should be strongly given on entrepreneurship and business oriented	Valid N % of Total				2 3.4%		2 3.4%
Unless the nature of LA is not understood well , the positive outcome of the programme can not be expected	Valid N % of Total					1 1.7%	1 1.7%
LA can create a lot of jobs if the subject matter is understood, which is not the case until today	Valid N % of Total				2 3.4%		2 3.4%
	Valid N					1	1

LA should be seen in association with land/agrarian reform and environmental rehabilitation issues	% of Total						1.7%	1.7%
Officials could get a clear picture about LA if they are provided with short-term training	Valid N						1	1
	% of Total						1.7%	1.7%
If sustainable resource use desirable, LA programme has to be supported and understood by all nationalities	Valid N						2	2
	% of Total						3.4%	3.4%
The questioner should be straight forward and understood easily.	Valid N						1	1
	% of Total						1.7%	1.7%
Without the implementation of the LA programme, all the ongoing projects in the country can not be sustainable	Valid N						1	1
	% of Total						1.7%	1.7%
Such questionnaires should be completed by carefully selected individuals and organizations	Valid N						1	1
	% of Total						1.7%	1.7%
	Valid N	11	7	4	22	4	5	58
Total	% of Total	19.0%	12.1%	6.9%	37.9%	6.9%	8.6%	100.0%

Percentages and totals are based on responses.



Appendix H: International Programs in LA and LA Related Fields

International Academic Programs Related to Land Administration

Red Courses = LA Courses; Green Courses = Professional Courses Related to LA; Gold Courses: General Courses Not Directly Related to LA

Year	Technical University of Kenya Bachelors of Science in Built Environment in Urban and Regional Planning	Cambodia Royal University of Agriculture Bachelor of Land Management and Land Administration	Universiti Teknologi Malaysia Bachelor of Science in Land Administration and Development	University of Botswana Bachelors in Land Management	University of Wageningen Masters of Science in Sustainable Land Management	University of Kathmandu Masters in Land Administration	University of Twente Masters of Science in Land Administration
1	<p>Communication Skills; Planning Principles and Techniques; Mathematics A; Introduction to Urban and Regional Planning; Information Communication; Technology A; Introductions to Economics; Studio-Presentation; Techniques for Planners; Heath education; Society and Culture; Land Use Planning (Rural/Urban/Regional); Critical and Creative Thinking; Information Communication; Technology B; Development Economics; Mathematics B; Introduction to Site Planning; Site planning studio</p>	<p>Foundation Courses (appears to be a common core for all students although it is not described; total of 38 credits)</p>	<p>UTM does not lay out its curriculum in the traditional manner of years one through four. Instead, they list sub-discipline:</p> <ul style="list-style-type: none"> Property Development Property Valuation Property Marketing Property Investments Property Economics <p>In addition, they list specific areas covered by course work:</p> <ul style="list-style-type: none"> Land Law Land Policy Land Planning Land Economics Surveying Land Valuation Land Development 	<p>GEOMATICS I; COMMUNICATION AND ACADEMIC LITERACY; BASIC MICROECONOMIC S; COMPUTER SKILLS FUNDAMENTALS I; INTRODUCTION TO LAW; MATHEMATICS FOR SOCIAL SCIENCES I; PRINCIPLES OF VALUATION; LAND ECONOMICS; COMMUNICATION AND ACADEMIC LITERACY II; BASIC MACRO ECONOMICS; COMPUTER SKILLS FUNDAMENTALS 2; INFORMATION SKILLS 11</p>	<p>The common part of the study comprises the following compulsory courses:</p> <p>Issues and Concepts in International Land and Water Management Research; Approaches to Land and Water Management; Sustainable Land and Water Management (Spain); Modular Skills Training; Issues and Concepts in International Land and Water Management; Land Degradation and Development; Quantitative Analysis of Land Use Systems Sustainable e-Land Management Policies; Erosion Processes and Modeling; Fundamentals of Land Management; Research;</p>	<p>Geo Information Technology and Land Administration; Principle of GIS; Principle of Remote Sensing; Database and Geoinformation; Modeling for LA; Land Information System; Data Handling Technologies; Principle of Land Administration; Land Policy and Land Management; Business Administration and Organizational Development; Land Information Infrastructure; Project Management; Individual Project Assignment</p>	<p>Theory of GIS and Remote Sensing; Tools for GIS and Remote Sensing; Techniques for GIS and Remote Sensing; GIS and Remote Sensing in Land Administration; Land Policy, Management and Administration Design; Simulation and Management of Workflow Adjudication; Cadastral and Social Tenure Mapping; Value Assessment and Land Use Classification; Business Administration; Planning and Control; Financial Management; Data Modelling; Processes Analysis; Stakeholder Analysis; Community Participation; Information System Design; Development, (Re-)engineering Information Management (legal aspects,</p>

			<ul style="list-style-type: none"> Land Information Systems (LIS) Geographic Information System (GIS) Malaysian Land Administration Systems 	MATHEMATICS FOR BUSINESS & SOCIAL SCIENCES II;	Elective I; Elective II		authentication, pricing, costing); Spatial Data Infrastructure Theory and Application (authentic registers).
2	<p>Industrial Based Learning</p> <p>Geospatial Information Science Environmental Studies Land Survey and Cartography Population and Demography Introduction to Statistics Rural and Urban Geography History of Planning Rural Planning Studio I Construction Technology and Services Spatial Statistics GIS and Remote Sensing Application Environmental Management Systems Building Design and Development Infrastructure Planning Rural Planning Studio II</p>	<p>(Must complete 45 credits) Land Administration I Photogrammetry/Remote Sensing Geodesy Geographic Information System I Cartography English Data Application Soil Science Management and Leadership Presentation Technique Geodesy II Land Administration II Geographic Information Systems II Photogrammetry/Remote Sensing II Interpretation of Aerial Photographs Land Use Planning English Land Economics Urban Sociology/Geography and Development Rural Sociology/Geography and Development Soil Management and Conservation</p>		<p>METHODS OF VALUATIONS; LAND LAW FOR GEOMATICS; PRINCIPLES OF MANAGEMENT; ELEMENTARY STATISTICS; INTRODUCTION TO TOWN PLANNING; INTRODUCTION TO LAND ADMINISTRATION ; PRINCIPLES OF GIS; SATELLITE POSITIONING SYSTEMS; INDUSTRIAL TRAINING I; ORGANIZATIONAL DESIGN AND DEVELOPMENT; PUBLIC ADMINISTRATION IN BOTSWANA;</p>	Thesis: Soil Physics and Land Management; Second Thesis	<p>Land Economics Land Laws Research Method and Skills Proposal Writing Elective I Elective II Electives: • Land Governance • Spatial Decision Support System • SDI • Participatory Mapping and GIS • Advance Urban Land Use Change and Modeling • Land Use Planning and Management • Integrated Assessment: Applying Principle of Cost Benefit Analysis and Economics in Spatial Planning</p>	<p>Research Methods; Electives; Masters Thesis</p>
3	<p>Internal Attachment Housing Regulations</p>	(Must complete 38 credits)		STATUTORY VALUATIONS;			

	<p>Social and Community Planning Infrastructure Design Planning Theory Property and Land Economics Urban Planning Studio I Human Settlement Planning Community Services and Amenities Community Engagement / Involvement in Planning Research Methods Transport Planning Public Health in Urban and Regional Planning Urban Planning Studio II</p>	<p>Legal Frameworks for LMLA Land Administration II Real Estate Market I Real Estate Valuation I Land Use Planning Geography Information Systems III Geodesy III Land Law English Project Planning and Management Real Estate Market II Real Estate Valuation II Reconciliation Land Information Systems Cadastral Mapping English Information and Communication Techniques Regional Planning General Administration Environment</p>		<p>REMOTE SENSING FOR LAND MANAGEMENT; PRINCIPLES OF REAL ESTATE FINANCE; e-GOVERNANCE; HOUSING STUDIES; TRIBAL LAND MANAGEMENT; ESTATE MANAGEMENT & AGENCY; PROJECT PLANNING & IMPLEMENTATION; COMPUTER APPLICATIONS IN LAND ADMINISTRATION; INDUSTRIAL TRAINING</p>		
4	<p>Industrial Based Learning Environmental Conflict and Public Consultation Planning Law Planning Policy Administration and Management Urban Design Regional Planning Studio Planning Professional Ethics Management Principles Entrepreneurship Education Planning Research Project</p>	<p>(Must complete 23 Credits) Land Taxation Land Readjustment English Land Evaluation Watershed Management Social Research Methodology Scientific and Thesis Writing Cadastral Mapping Thesis</p>		<p>ALTERNATIVE DISPUTE RESOLUTION IN LAND ADMIN; RESEARCH PROJECT I; ADVANCED LAND ADMINISTRATION; Optional Courses REAL ESTATE DEVELOPMENT; PROPERTY MANAGEMENT;</p>		

	Civic Education			GIS DESIGN AND IMPLEMENTATION; PRINCIPLES AND PRACTICE OF SDI DEVELOPMENT; REAL PROPERTY INVESTMENT; APPRAISAL CONTRACT ADMINISTRATION ; PROFESSIONAL ETHICS; RESEARCH PROJECT II; Optional Courses FACILITIES MANAGEMENT; CADASTRAL SURVEYING PRACTICE; SPECIAL STUDIES IN LAND ADMINISTRATION			
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International Academic Programs Related to Technical Aspects of Land Administration

Year	University of New South Wales Bachelor of Engineering in Surveying	Technical University of Munich Bachelor of Science in Geodesy and Geoinformatics	Technical University of Munich Masters of Science in Geodesy and Geoinformatics Track I: Remote Sensing and Satellite Geodesy	Technical University of Munich Masters of Science in Geodesy and Geoinformatics Track II: Photogrammetry, Remote Sensing, and Cartography	Technical University of Munich Masters of Science in Geodesy and Geoinformatics Track III: Geodesy, Geoinformation Systems, and Land Management		
1	Mathematics Physics Engineering Computing Engineering Design Surveying and GIS Electives	Surveying I Introduction to Informatics I Foundations of Spatial Planning	Image Analysis Remote Sensing and Signal Processing Visualization from Geodata Global Geodatic Observation Systems	Image Analysis I Remote Sensing and Signal Processing Geodata Visualization Global Geodatic Observation Systems	Image Analysis I Remote Sensing and Signal Processing Visualization of Geodata Global Geodatic Observation Systems		



		<p>Legal Foundations for Geodesy and Geoinformatics</p> <p>Physics for Geodata I</p> <p>Advanced Math I</p> <p>Practicum</p> <p>Surveying II (with field exercises)</p> <p>Introduction to Informatics II</p> <p>Real Estate Reference Systems</p> <p>Physics for Geodata II</p> <p>Advanced Math II</p> <p>Geometry for Geodata</p>	<p>Scientific Use of Satellite Navigation Systems I</p> <p>Object Oriented Programming I</p> <p>Surveying Engineering I</p> <p>Project Management</p> <p>Environmental Planning and Land Rights</p> <p>Geodatic Seminar</p> <p>Gravity, Elevation, and Geoid (Project)</p> <p>Wavelet Analysis</p> <p>Observation Techniques and Geodatic Spatial Processes</p> <p>Scientific Use of Satellite Navigation Systems II</p> <p>Satellite Orbits</p> <p>Satellite Geodesy</p> <p>Software Engineering</p> <p>Object Oriented Programming II</p> <p>Valuation Theory</p> <p>Elective</p> <p>Interdisciplinary</p> <p>Elective (Project)</p>	<p>Scientific Use of Satellite Navigation Systems</p> <p>Object Oriented Programming I</p> <p>Surveying Engineering I</p> <p>Project Management</p> <p>Environmental Planning and Land Rights</p> <p>Geodatic Seminar</p> <p>Image Analysis II</p> <p>Photogrammetry</p> <p>Engineering</p> <p>Valuation Theory</p> <p>Remote Sensing and GIS Applications</p> <p>Geodata Mining</p> <p>Generalizing Geodata</p> <p>Web-based</p> <p>Cartography</p> <p>Elective</p> <p>Interdisciplinary</p> <p>Elective (Project)</p>	<p>Scientific Use of Satellite Navigation Systems</p> <p>Object Oriented Programming I</p> <p>Surveying Engineering I</p> <p>Project Management</p> <p>Environmental Planning and Land Rights</p> <p>Geodatic Seminar</p> <p>Surveying Engineering with Field Exercises</p> <p>Sensor-based and Mobile Information Systems</p> <p>Laser Scan Modelling</p> <p>Applied</p> <p>Geoinformatics I</p> <p>CAFM/GIS and Facility Management</p> <p>GIS Application in Land and Community Development</p> <p>Land and Community Development I</p> <p>Land and Community Development II</p> <p>Elective</p> <p>Interdisciplinary</p> <p>Elective (Project)</p>		
2	<p>Surveying and Geospatial Technology</p> <p>Surveying Computations</p> <p>Engineering</p> <p>Mathematics</p> <p>Principles of Water Engineering</p> <p>Geodesy & Geospatial reference frames</p> <p>Engineering</p> <p>Computations</p> <p>General Education</p>	<p>Property Valuation</p> <p>Photogrammetry and Remote Sensing I</p> <p>Digital image Processing</p> <p>Introduction to Cartography</p> <p>Computer Graphics and Visualization</p> <p>Foundations of Geodesy</p> <p>Sensing Methods I</p> <p>Geoinformatics Project</p>	<p>Global Gravity Modeling Applications, Current Satellite Missions</p> <p>Earth Science Geodesy</p> <p>Geophysics</p> <p>INS and GPS</p> <p>Navigation, Gravimetry</p> <p>Geodatic Astronomy (Project)</p> <p>Earth Rotation</p> <p>Elective</p> <p>Interdisciplinary</p> <p>Elective (project)</p>	<p>Photogrammetry: Selected Topics</p> <p>Photogrammetry and Remote Sensing I</p> <p>Photogrammetry and Remote Sensing II</p> <p>Systems Theory and Signal Processing</p> <p>Cartography (Project)</p> <p>Elective</p> <p>Interdisciplinary</p> <p>Elective (Project)</p> <p>Masters Thesis</p>	<p>Selected GIS Project</p> <p>Surveying Engineering</p> <p>Field Exercises</p> <p>Geolocalization and Vehicle Navigation</p> <p>Real Estate Management</p> <p>Community Infrastructure</p> <p>Land Politics and Land Tenure</p> <p>Model Project (Eichenau Municipality)</p>		

		Mathematical and Physical Foundations of Geodesy Photogrammetry and Remote Sensing II Topographical Cartography I Foundations of Geodesy II Satellite Geodesy I Sensing Methods II Geoinformatics Practicum	Masters Thesis		Elective Interdisciplinary Elective (Project) Masters Thesis		
3	Sustainable Transport or Soil Mechanics Water resource Engineering Geospatial Information Systems Cadastral Surveying and Land Law Surveying applications and Design Surveying field projects Remote sensing Geodetic Positioning and applications	Photogrammetry and Remote Sensing III Thematic Cartography Topographical Cartography II Geodesy and Surveying Satellite Geodesy II Satellite-based Positioning and Geoinformatics Land Use and Development Geodesy and Physical Geodesy Kinematic Geodesy and Hybrid Methods Land Use and Urban Development Transportation Infrastructure Planning Construction Engineering for Geodesy and Geoinformatics Geology for Survey Science					
4	Thesis Design Practice Engineering operations and control Professional electives General Education	Bachelors Project					

Appendix I: LAND Validation Workshop, June 23-24

I.1 Workshop Participant List

Market Assessment for Demand of Land Administration Professionals Workshop Bishoftu, Ethiopia | Baboya Resort June 23-24,2015			
No	Name	Organization	Position
1	Adugnaw Abebe	Poly Technical College	Department Head
2	Abdikader ILYas	Somali TVET	Expert
3	Abduljewad Mohammed	Land Mgt. Project Office	Land Mgt. Office Head
4	Abera Hadera	TEPLUA	Land Administration Expert
5	Addisalem Simegn	Agriculture & Envital Office	Land Administration Officer
6	Biel Keat	Gambella /LUAEPA	Expert
7	Daniel Assefa	SNNP	Land A/U/Auto.
8	Getahun Alemeneh	BOEPLAU	Expert
9	Getenet Tadesse	Agriculture Office	Land Admin. Expert
10	Habtamu Fantu	Enyi Real Estate	Business Development Manager
11	Habtamu Hoyeso	SNNP	Land A/U/Auto.
12	Kassahun Girma	MOA Land	land administration Expert
13	Kidanu Tadesse	Afar	Land Admin. Expert
14	Melkamu Belachew	Bahir Dar University	Lecturer ILA
15	Mensur Kedir	F/AC/L/D/OG	Land Lease Officer
16	Muhyadin Mohamed	LCRDB	LCRDB Coordinator
17	Omer Abdulahi	Harar/ Land Mgt.	land administration Expert
18	Rahel Hailu	Geo Informatics	FULLRI Agency
19	Seid Hussen	Woldia University	Academic V/President
20	Sentayehu Tadesse	BOEPLAU	Land Administration expert
21	Sufian Shafi	HAB	Coordinator
22	Tariku Megersa	OTVET Commission	Agriculture Expert
23	Tassew Negussie	Geomark System	GIS/RS Expert
24	Tebikew Ayele	Urban agriculture & land administration	Dept. Head
25	Yadessa Dinsa	OBLAEP	land administration Expert
26	Yared Berhe	Mekelle University	Strategic Leadership Coordinator
27	Dr. Zemen Haddise	USAID/Ethiopia	LAND CORE
28	Dr. Mengistu Woub	LAND	National Consultant
29	Dr. Aregy Waktola	LAND	DCOP

30	Alehegne Dagne	LAND	Land Admin & use Specailist
31	Meseret Agegnehu	LAND	Finance and Admin Assistance
32	Teramed	LAND	Driver
33	Dr. Zerfun Hailu	REILA	Deputy Team Leader
34	Simon Lapper	LIFT	Project Manager
35	Dr. John Medendorp	MSU	Consultant
36	Dr. John Bonnell	MSU	Consultant

I.2. Workshop Program

Time	Program	Presenter	Chair person
June 23			
8:30-9:00	Registration		
9:00-9:10	Program introduction	Alehegne Dagne	
9:10-9:20	Welcoming speech	Dr. Aregay Waktola	
9:20-9:30	Opening remark	Ato Tigistu	
9:30-9:40	Presentation on Survey Methodology	AlehegneDagne	Dr. Aregay Waktola
9:40-10:30	Presentation of Demand survey results	Dr. John Medendorp	Dr. Aregay Waktola
10:30-10:50	Coffee break	Organizer	
10:50-11:50	Presentation of Curricula review and recommendations	Dr. John Bonnell	Dr. Zemen Haddis
11:50-12:30	Questions and comments		Dr. Zemen Haddis
12:30-1:30	Lunch	Organizer	
1:30-2:00	Presentation on implementation plan	Dr. Mengistu Woube	Ato Tigistu G/Meskel
2:00-3:00	Round 1; Group discussion by sector		
3:00-3:20	Coffee break	Organizer	
3:20-4:30	Presentation of sector Groups	participants	
4:30-5:30	Round 2: group discussion across sectors		
June 24			
9:00-10:30	Presentation of cross-sector groups	Participants	Ato Tigistu G/Meskel
10:30-10:50	Coffee break	Organizer	
10:50-12:30	General discussion		Ato Tigistu G/Meskel

12:30-12:45	Closing remark	Ato Tigistu G/Meskel	
12:45-1:30	Lunch		

I.3. Semi-structured group discussion protocol

Round 1 – Groups by sectors (Tuesday, 23 June 2:00-3:00 pm)

1. Discussion of survey results and methodology (data collection)
 - a. **Results and Methodology**
 - i. Do these findings accurately reflect your sector? If not, how?
 - ii. What data, if any exists, about LA in your sector that is not in the survey?
(Especially need input from city administration, private, other ministries (e.g. infrastructure agency for road and railroad, etc.)
 - iii. Are there more effective ways of collecting data from or within your sector?
 - iv. What data could be collected in your sector that is not currently being collected?
 - v. Who holds that data? What can be done to access it? Who can access it?
 - b. **Standardization of LA specializations**
 - i. Based upon your particular sector, do position descriptions on the survey adequately and discretely define the work of LA?
 - ii. Is there overlap or redundancy?
 - iii. Are there positions, specializations, or skills not addressed in your sector that was not included in the survey?
 - iv. How do you envision the positions being distributed throughout the LA structure once the LA system is fully implemented? How many at regional office? At Woreda level? At the Kabele level? How are they currently distributed?

Round 2 – Groups by cross-sector (4 mixed groups; Wednesday, 24 June, 4:30-5:30 pm)

1. **Discussion of Curricular Review & Recommendation**
 - a. Do you feel the current curricula are addressing the needs of various sectors? If not, where are the gaps?
 - b. Are there other forms of education and training that we not included? If so, what? (e.g. private training, GIS training in other fields, etc.)
 - c. Is the necessary training available and accessible where it is needed?
 - d. Are the recommendations about integration /coordination of program possible to implement?
 - i. Pathway from para -surveyor to TVET or other program?
 - ii. Pathway from TVET to university

- e. What pedagogical reforms are necessary to make training effective and more closely aligned with the needs?
- 2. Discussion of Implementation plan**
- a. Content of the plan
 - i. Are the number and kind of instructors accurate?
 - ii. From where and how quickly can we find instructors for this system?
 - iii. What dimensions are lacking from the plan? (standardization of job descriptions)
 - b. Strategy to enact the plan
 - i. What factors might impede the success?
 - ii. What change strategies are needed in order to guarantee success?
 - iii. What sort of M&E plan needs to be in place?
 - iv. Who should enact the M&E plan?
 - v. What authority does that person/agency have?

I.4 Workshop Report

Validation workshop on market demand assessment of LA professionals and review of university and TVET training curricula 23-24 June, 2015 Babo Gaya Resort, Bishoftu, Ethiopia

The Land Administration to Nurture Development (LAND) Project in partnership with Michigan State University had conducted a market assessment on demands of land administration (LA) professionals and a review of university and TVET training curricula with the following key objectives:

- To determine the need for LA and land use planning graduates in the public and private sectors and identify their skills and knowledge gaps
- To assess the university and TVET curricula and capacity to satisfy the demand identified, and identify gaps in curricula and training levels.
- To develop undergraduate, graduate and TVET training strategies and implementation plans.

To validate the assessment results and training strategy LAND organized a one and a half day workshop involving stakeholders from federal and regional LA and land use agencies of urban and rural sectors, universities, TVETs, private sectors and development partners currently engaged in supporting the implementation of LA system.

Dr. Aregay Waketola Deputy chief of LAND Project made a welcoming speech. Dr. Aregay expressed his pleasure to welcome the participants and thanked them for coming to attend the workshop. He said that LAND is a USAID-funded, 5 year project implemented under the auspices of the Ministry of Agriculture in collaboration with six regional states, Ethiopian mapping agency, universities and think tanks. Additionally, he

said USAID had contracted a US-based international development consulting firm, Tetra Tech/ARD, for its implementation. Dr. Aregay further explained that the LAND project is designed to build upon the outcomes of two previous land tenure and LA projects that were successively implemented in 2005-2013 with financial support provided by USAID. He also highlighted the four core objectives of the project related to improving legal frameworks, capacity building of LA professionals, building training and research capacities of universities and TVETs in areas of LA, and enhancing communal land use rights. He underlined that in meeting the core objectives of the project, well-trained LA professionals are critical. Thus long this line, LAND is supporting universities and TVETs to train undergraduates, graduates and technicians in building the capacity of LA sector. As part of the capacity building program LAND had sub-contracted Michigan State University (MSU) to conduct a market assessment study on demand of LA professionals and curricular review to guide Ethiopian universities and TVETs to design and offer LA courses that would satisfy the demands identified in public and private sectors. Finally, he thanked the MSU staff and the local consultant for conducting the empirical study in addition to the LAND staff for their coordination and technical contribution they made for the study.



Dr. Aregay Deputy of chief of LAND delivering a welcome speech

Dr. Zemen Haddis, Team leader of land, water and climate in the office of USAID/Ethiopia and LAND COR made an opening remark. He mentioned USAID support in the LA sector since 2005 to date is with the prime objective to improve land tenure security for both farm communities and pastoralists and thereby to encourage them to boost their production sustainably. He explained that the current capacity building focus of the LAND Project to support the LA sector is aimed to sustain the efforts of two previous USAID financed projects ELTAP, 2005-2008 and ELAP, 2009-2013 implemented by Tetra Tech/ARD. He also briefly explained the importance of major components of LAND designed to support land laws reform, capacity building and mapping and certification of communal land holdings. The capacity building program of LAND project is under implementation following the strategy designed to ensure sustainability of interventions beyond the life of the project. This is becoming practical through linking the training and research capacity building program of universities with that of TVETs and LA and land use institutions. The foundation laid by LAND support would enable the capacity building program to perpetuate itself beyond the project period. For example, an intervention intended to help clients in need of identification and development of appropriate curriculum could serve as

the hub for the sustainable capacity building support. As part of the capacity building program the market demand assessment conducted by MSU is expected to assist the LA and land use agencies and the universities to make decisions on needs and training provisions respectively. Dr. Zemen appreciated MSU staffs for conducting and finalizing the need assessment study and the LAND Project team for handling it and organizing this workshop. Finally, he wished for the participants fruitful deliberations.



Dr. Zemen Haddis giving opening speech

Following the opening speeches from the aforementioned invited guests, Alehegne Dagneu, LAND staff, started the presentation of the labor assessment with a brief explanation of the study's methodology. Alehegne briefly introduced the objectives of the study and explained the methodology followed in the demand assessment. The demand assessment was carried out in two rounds using both qualitative and quantitative methods. As to why two rounds survey were employed he justified that the second round survey was mandatory in order to bridge the gaps observed in the first round survey. The results of the first round were not accurate enough to provide a solid foundation for accurate demand estimate on LA professionals. Further he explained that in the first round survey an individual questionnaire and in depth stakeholder discussions were made with LA and land use officials and experts, University and TVET officials, instructors and students and private sector officials and employees. Additionally, the study reviewed University and TVET curricula and previous need assessment studies.

He reported that 31 federal and regional institutions participated in the first round survey which included 2 federal ministries, 8 regional bureaus, 6 universities, 6 TVET colleges, 6 City administration and 3 private sectors. With regard to the typology of the survey respondents 50 employers, 28 employees, and 61 University and TVET staffs had been interviewed. In total 139 respondents were interviewed, of which only 11 were women.

Analysis of the first round survey showed a flawed estimate on demands of LA professionals. In response MSU and LAND opted for a second round survey to be carried out. It was focused on data collection that would improve the limitations identified in the

first round survey. Accordingly, the data collection was concentrated on the following key issues

- On current staff availability and forecasted demands of LA professionals in 5, 10 and 20 years time.
- Rationale for demand estimate
- Estimate of daily office transaction at woreda level
- Survey team productivity estimate
- Unsurveyed land estimate
- Major skills and knowledge gaps

In the second round survey questionnaires were distributed to 20 federal and regional institutions which includes 2 federal LA offices, 2 federal TVET agencies, 10 regional LA and use bureaus, 3 universities, 1 real estate and 3 development initiatives working on LA sector. As a result of corrective measure, the second survey findings were more realistic and comprehensive, and contributed much to the improvement of the training strategy.

Dr. John Medendorp, MSU staff, gave a detailed presentation on both urban and rural demands and aggregate national demands. Furthermore, Dr. Medendorppointed out the survey subjects (regions and ministries) and major observations on aggregate of rural LA sector demand. In the rural demand the largest single demand identified was for skilled LA technicians, estimated at 12,194 over the next 20 years time. Moreover,LA technicians and surveyors together make up 50 percent of the national rural demand, while five positions (including land managers, LA experts and land lawyers) make up 87 percent of the rural demand. Dr. Medendorpsuggested that the demand for LA technicians and surveyors can be met with TVET programming.



Dr. John Medendorp briefing participants on survey results

Dr. John Medendorp further explained about the demand of LA professionals by region. The Amhara region has more than twice the demand of any other region and accounted for more than 50 percent of the demand of the regional aggregate. On the other hand, Harari region has the least estimated demand.

Similarly Dr. John Medendorp explained about the urban LA sector demand. In this demand assessment the survey subjects are Dire Dawa and Addis Ababa city governments and Ministry of Urban Development, Housing and Construction (MoUDHC). In fact the national demand for urban LA sector was estimated through MoUDHC. Urban LA sector demand is more than three times larger than the rural demand. Likewise in the rural sector, surveyors and LA technicians have the highest demand estimate in urban LA sector. Together they represent 36 percent of the demand opposed to over 50 percent in rural LA sector. The demand in urban sector is much more diverse than the rural sector.

Continuing his explanation Dr. John Medendorp said that aggregate demand of rural and urban LA sectors shows consistent but rising demand from present to 20 year bench mark. Surveyors and LA technicians make up 40 percent of the national demand for LA professionals. Urban LA sector demand makes up 76 percent of the total (national) demand. He suggested that approximately 70 percent of the surveyors and LA technicians demand could be met by TVET program.

Dr. John Bonnell and Dr. John Medendorp gave presentations on the University and TVET curricular review, institutional capacity assessment and recommendations. Dr. John Bonnell had taken the lead in this presentation. The two presenters gave detail presentations on curricular capacity, institutional capacity and gap assessment results and recommendations. Dr. John Bonnell explained the background on the survey purpose and methods used in the curricula and institutional capacity assessment. He said that the purpose of the demand assessment is to know the current institutional program and human resources and to understand future plans for education and training in the LA sector. Analysis of curricula documents and interview with government officials, professionals, post-secondary institutional leaders, private sectors and project team leaders were methods used in curricular capacity assessment.



Dr. John Bonnell presenting the curricular review

The source documents used in the curricular capacity assessment were undergraduate and graduate curricula, from the Institute of Land Administration of Bahir Dar university, undergraduate curricula of the College of Agro-industry and Land Resources of Haramya University, undergraduate curricula of the Mapping and Surveying Department of Ethiopian Civil Service University, Mekelle and Hawassa Universities curricula, and curricula of various levels TVET programs. Moreover, interviews were made with officials of the universities and agencies leading the TVET training system at federal and regional levels.

In curricular capacity assessment MSU consultants reviewed international LA programs at TVET, undergraduate and graduate levels from various countries to document some lessons from international experiences. Thus, the TVET training program and qualification frameworks of various countries have been reviewed. For undergraduate training program, experiences of Technical University of Kenya, Cambodia Royal University of Agriculture, University Technology of Malaysia and University of Botswana were assessed. For graduate training programs, curricula of Wageningen, Kathmandu and Twente universities were reviewed.

The findings on the review of international TVET programs showed that the international TVET training programs are skill-oriented and context specific. Thus, they have limited utility to the Ethiopian context, but can be used as benchmark for improving the technical skill in surveying, mapping, GIS, LIS, registry and archiving. In urban land sector Ethiopia has a logically ordered and well-defined TVET program with excellence comparable to the international TVET programs.

The review of the international undergraduate program showed that they had great variety in their programs as they have specific emphasis on their own context. One communality across programs is that all have strong emphasis on GIS, LIS and LA related technology. Prior Ethiopian undergraduate LA training programs lacked such technical emphasis; but the newly designed harmonized curriculum rectifies this deficiency with a concentration on technical fields.

In tandem with international curricula experiences, the Ethiopian LA training program capacities at TVET, undergraduate and graduate levels were reviewed. In this survey eight Ethiopian TVET model curricular based on their occupational standards were reviewed. In terms of their level, five of the eight TVET model curricula are level III programs, while three are level IV programs and the remaining one is a level V program. Regarding the TVET capacity, the institutions have increased from 17 in 1996/97 to 437 in 2012/13 and correspondingly the enrollment has increased from 2,924 to 238,884 in 2012/13. In line with this the Ethiopian Government has been reforming the TVET system using international standards and best practices. Their context-specific design intends to meet the specific needs of their respective industries. As a result, most of the TVET programs are well designed and structured as competency based. They are primarily standardized on competency requirements for multitude of program offerings and for integration into university programs.

The study reviewed undergraduate and graduate LA programs of Institute of LA of Bair Dar University, Mapping and Surveying Department of Ethiopian Civil Service University and College of Agro-industry and Land Resources of Haramaya University. The study found that the B.Sc LA program of ILA is more comprehensive and an exemplar model for future programs. The courses are offered in four tracks namely geomatic, economic, law, and land management tracks. The College of Agro-industry and Land Resources of Haramaya has a similar structure to that of ILA but had included the 5th additional ICT track and geomatic track with strong emphasis on remote sensing. On the other hand, the surveying and mapping departments of Civil Service University offer BSc training with heavy emphasis on mapping, surveying and GIS and remote sensing. This program strongly matches the urban TVET training program and enables integration of the TVET program into the University. (Note: Stakeholders at the validation workshop informed the MSU team about a newly designed harmonized B.Sc. curriculum in LA. After the workshop the curriculum was shared with and reviewed by the team. The curriculum review was updated accordingly).

With regard to graduate programs, ILA offers the only masters program in Ethiopia, which was designed jointly with the Royal institute of technology (Sweden). The program is comprehensive and up-to-date. The program focuses on land information management system, real property law and real property valuation. However, the program lacks strong GIS capability. Moreover land use planning course is urban focused which needs to be balanced with rural land use planning. None of these institutions have started a doctoral program. The study has recommended two options to start the program. The first option is sending students abroad for study. In this option the disadvantage outweighs its advantage with respect to de-contextualizing the training and increases the risk of students not returning. The second option is to co-develop the program with foreign and domestic institutions. Stakeholders affirmed the second option as more feasible in solving the problems associated with contextualizing and retaining the trained staffs.

The capacity of the three aforementioned institutions has also been assessed. The ILA has a well-established program developed with support of Swedish International Development Agency (SIDA). So far ILA has trained 250 LA professionals in a B.Sc. degree. The Institute is staffed with qualified personnel who are capable to train and carry out national research on land issues and provide consultancy services. It is also equipped with modern surveying equipment and GIS labs. Furthermore, the institute is working to expand its intervention in the areas of research, student internship and externship, fields of trainings, a certification program in land surveyors and appraisers, and to develop PhD and an outreach programs. The Ethiopian Civil Service University is organized constituting urban planning, urban engineering, urban land management and land information system and surveying and mapping. However, the training program in the university is highly challenged by budgetary and staffing constraints, and insufficient teaching and laboratory facilities. Thus, in these programs the University struggles to produce qualified trainees that could meet the public and private sector demands.

In their summary Dr. John Bonnell and Dr. John Medendorp highlighted that there is a swelling national interest and support for LA education and training. The Urban TVET program is well-structured and best of all internationally available programs. Thus, they recommended that the existing TVET system should replicate experiences and lessons gained from the urban LA sector. The ILA MSc program except with minor limitation could be considered as the most advanced program that could be replicated by other universities. The existing training curriculum is comprehensive and responsive to the current training needs. Moreover, Dr. John Medendorp and Dr. John Bonnell further identified the following priority areas for growth of LA labor demand in the country.

- Urgent need to address technical and professional needs for workers in employment fields identified as near-term and high-priority. They have indicated the following lists of positions.
 - land surveyors, GIS/LIS specialists, real estate appraisers and tax specialists, land use managers, land use and city planners, university and college instructors, LA specialists, land property lawyers and LA technicians
 - Long-term, high-priority e.g. land policy specialists
- Expand practice-oriented training (not overly theoretical), such as internships, field practice, experiential learning
- Ensure financial and material support for practical needs training and field work, such as accommodation and transportation
- Need for qualified, skilled instructors through a strategic program of human and institutional capacity building
- Integrate land surveying and GIS knowledge and skills across curricula
- For specialization, introduce post-graduate training to enhance knowledge and skills.
- Design articulation and transfer agreements to enhance access to and movement in educational pathways and collaborate across system.

Furthermore Dr. John Bonnell and Dr. John Medendorp clearly outlined priority areas for professional training and specialization and research. Training in undergraduate and graduate programs and research and consultations on land issues were suggested. In undergraduate programming, cadastral survey, land registration, land information/cadastral information system development, land and property law and land valuation and taxation were identified as priority areas. In graduate and post graduate programs, applied spatial analysis, advanced remote sensing, GPS application, land policy analysis and formulation, land law and legislative drafting, data base management, land dispute resolution and rural and urban land use planning need to be priority areas. The study's findings also emphasized that research and consultations should focus on impact assessment associated with land certification, assessment of the importance, role and mechanisms of land certification in pastoral and agro-pastoral areas, preparation of land for investment, land valuation for compensation, land dispute resolution, effectiveness of the application of LA tools, and implementation gaps in land certification. in order for training institutions to be responsive to the growing needs of the public and private sectors.

The study's gap analysis identified missing skills and practical experiences that could be gained from university and TVET educations as major problems hampering LA graduates from well performing in both public and private sectors. Furthermore the gap between labor supply and demand among key LA professional positions was assessed from two perspectives. The first perspective was the gap between the permitted posts and current available staffs. In this regard it was found that the rural LA sector had filled only 60 percent of its permitted posts. The finding on urban sector was the reverse of the rural sector; only 30 percent of the permitted posts are filled. The urban and rural gap aggregate shows that only 40 percent of the permitted posts are filled. The second perspective was analyzed from the forecasted demands in the coming five, ten and twenty years. It is estimated that the LA sector needs 35,000 technicians and professionals in the next five years, an additional 50,000 in the ten years, and another additional 55,000 technicians and professional in the twenty years.

With regard to the future demands, the gap analysis framed needs in three terms: (1) immediate and urgent needs, (2) near term but not urgent, and (3) long term needs. Regarding the immediate and urgent need, surveyors, LA technicians, GIS/LIS technicians, land lawyers, land/ real estate appraisers, tax specialists and para- surveyor instructors were identified as the most important positions need to be filled. Regarding the near term but not urgent need, land use and city planners, land use managers and university and TVET instructors were identified. In the long term needs LA specialists were identified as the most important positions. The analysis was further carried out on education and training on LA sector to meet the identified demands. In this regard para-surveyors' trainers and TVET and college instructors were identified as immediate and urgent needs while developing specialization program for land lawyers is identified in the near term but not urgent needs. Regarding the long term, it was suggested that sending qualified candidates for doctoral training in recognized international program is essential.

Dr. John Medendorp and Dr. John Bonnell concluded with comprehensive recommendations to improve institutional and curricular capacities. The following recommendations were suggested.

1. Incorporate parasurveyor training as the basis of the certification process.
2. Develop a means to recognize acquired competencies of parasurveyors within the TVET qualification (QF) system.
3. Develop stronger articulation and transfer agreements between project training systems, TVETs, and universities.
4. Increase the number of TVET institutions and QFs to meet the demand of 105,000 TVET trained personnel over the next twenty years.
5. Increase the number of institutions offering LA degree programs.
6. Strengthen existing LA degree granting institutions through cooperative agreements with international universities to fill in gaps in expertise until local experts can be credentialed.
7. Raise the annual number of Masters graduates to 30.
8. Immediately identify five potential doctoral students for doctoral study in different needed areas of specialization in LA.

9. Allocate a percentage of land tax revenues to the development of LA programs.

Similarly, the following program specific recommendations were given to improve the curricular capacities.

1. Develop clear competencies for parasurveyors, and fit the competencies within the Qualifications Framework of the TVET system.
2. Develop a TVET program for mapping and surveying, GIS/LIS technicians and LA Technicians.
3. Develop a specialization in Land Law.
4. Develop a doctoral program in LA.

Finally, a four-tiered training strategy was recommended in order to address the country's needs for many LA professionals. The strategy consists of a pathway that starts with parasurveyor training and extends to graduate programming.

Dr. Mengistu, the local consultant who assisted MSU throughout the demand assessment period, delivered the fourth presentation which focused on the implementation plan. His presentation was framed in a concise logical framework for modeling implementation of the training programs. The implementation plan for training is designed in a three-phase approach. Phase 1 includes training of parasurveyors and TVET instructor for mapping and surveying, TVET and college instructors for GIS and LIS technicians, for real property appraisers, and tax assessors. Phase 2 is limited to TVET and college instructors for land use managers and specialization for land lawyers as well as strengthening and increasing the existing LA program. Phase 3 consists of launching on doctoral programs



Dr. Mengistu briefing participants on implementation plan

Questions, comments and suggestions

An interactive discussion, chaired by Dr. Aregay, among the stakeholders and presenters followed the four presentations. During the discussion participants raised a wide range of questions and gave comments and suggestions. Some of the questions, comments and suggestion raised by the participants include the following:

Questions

- In the demand estimate why was only GTP 1 was taken into account? It was suggested that although GTP 2 has not yet approved the demand assessment could have taken it into account.
- The MoA GTP 1 targets 50 million parcels to survey and this would provide enough jobs for parasurveyors. If this is the reality, why was the demand estimate for parasurveyors is underestimated in this assessment?
- It was suggested that whether the study had covered TVETs in agriculture or urban sector or both is not clearly stated in the document. In this connection the participants asked how many of the existing TVETs are assessed in this study?
- What is the existing capacity of the TVETs?
- How many TVETs are currently operating?
- What gaps the study identified in agricultural TVETs?
- Para-surveyors are critical for the surveying job but regions look with caution in recruiting them. How can the assessment be harmonized this difference in demand estimate?
- Why did curricular review not include Woldia University?
- What is the methodology used to select universities?

Comments and suggestions

- Participants suggested that the previous studies made by World Bank and Orgut on human resources development in four regions was not included. Similarly TVET curricula on land surveying and registration services developed with financial and technical assistance of REILA was not well assessed. Thus, it was suggested that such previous studies could add value to this assessment.
- The methodology is not clear and lacks depth in its sampling.
- The demand estimate for Oromiya regional state seems underestimated being the largest region and the demand estimate for the coming 20 years should include the pastoral areas as well
- The assessment should include the private sector demand
- The demand estimate for urban LA sector should be disaggregated by region.
- The sandwich program for doctoral program is a feasible option.
- The assessment didn't take into account fast economic growth of the country and changes as a result of the fast growth

- In institutional recommendations, encouraging professional associations should be added.
- The demand estimate in regions like Somali should be linked with organizational structure.
- On harmonization of the curricula it was suggested that Bahir Dar University and Woldia University have harmonized curricula and further it will be revised upon the national demand. The statement made about harmonization of curricula and gaps on LA program offered at ILA on this document seems unrealistic
- It was suggested that in meeting the current public and private demand generalization of the LA program is more important than specialization.
- There is mismatch between what is required and the actual employment rate of the public and private organizations for LA professionals. The current employment rate is much lower than what is required. As a result the new graduates are still unemployed. Thus, it is suggested that the demand estimate and actual need have to be balanced and further it is suggested that the reason for this mismatch has to be investigated whether it is related with financial capacity or commitment of institutions.
- The number of trainees proposed at PhD Level is underestimated
- It is suggested that TVETs have huge limitations in terms of resources needed to offer the training as per the designed curricula. Although the training curriculum is designed to be implemented as 70 percent practical and 30 percent theoretical, in reality it is in the reverse due to resources limitations. It is perceived that TVETs managed by the federal government have resources far better than those managed by regions. In this regard the participants suggested the assessment to include something about the possible solutions to improve the limited resources.
- The participants suggested that the assessment document should recommend appropriate institutions that could train TVET instructors. In this connection they suggested that Bahir Dar and Woldia Universities could be potential institutions to train TVET instructors.
- The discrepancy in demand estimates across the regions needs justification.
- Familiarization of the assessment document for key stakeholders and officials through a workshop would help in implementing it. It was also suggested that communication with universities and government organizations is essential
- The resources needed to implement the plan should be worked out

The following responses were given by the presenters

- The study does include a literature review of previous studies, including those by World Bank, Orgut, and REILA. The presenters noted for stakeholders where those could be found in the report.
- The demand estimate was mainly based on the current policy documents and government plans that are officially in use by public at large; but it was difficult for

- the researchers to take into account GTP2 plan as the document is not yet official and accessible to the public.
- The MSU researchers have exhausted their efforts in collecting information about TVETs operating in the country and have made a series of discussions with both Agricultural TVET office and the TVET agency in the Ministry of Education. Unfortunately, there is a lack of organized statistics about TVETs. There is scanty information about their capacity, current status and other information relevant to the study. Moreover, most of the agricultural TVETs are managed by regions. Only 25 TVETs are managed by Federal government. This makes it difficult to know their status. Despite all the difficulties, the researchers have reviewed relevant qualification frameworks of TVETs in both urban and rural sectors. Their gaps in meeting the demands identified have been reviewed and clearly shown in the assessment document.
 - With regard to the criteria used to select universities, except Woldia University, those universities currently offering LA program and related courses were addressed in the study. The MSU team reviewed the curricula that was supplied. (Stakeholders at the validation workshop informed the MSU team about a newly designed harmonized B.Sc. curriculum in LA from ILA, Woldia, and Haramaya. After the workshop the curriculum was shared with and reviewed by the team. The curriculum review was updated accordingly).
 - The case of parasurveyor is a contentious issue in that there is no qualification framework set for para surveyors. This would require further study.
 - As to the methodology of the survey, it is clearly spelt out in the document. The methodology purposefully employed both qualitative and quantitative methods. It is purposive because the scope is limited and aimed to know the demands of LA professionals in public and private sectors, and to identify their key problems associated with skills and knowledge. In this regard relevant public and private sectors have been contacted and interviewed and relevant information were collected.
 - The low number of trainees proposed at PhD level in the document is the reflection of the reality of the public demand. Currently the public at large requires technicians and BSc graduates in LA program. The work at hand does not require much specialization on LA program, but to support the LA system in research and to properly staff universities with qualified personnel the recommended number of trainees is more than adequate. The number will gradually increase when the demand arises.
 - Including the private sector on demand estimate was an issue raised by participants. Although the assessment has addressed some of the private sectors working on surveying works to identify their skills and knowledge gaps, putting the demand estimate for the public sector at a national level is a difficult task because there are no private sectors directly working on LA program and there is no legislative framework supporting the engagement of the private sectors in LA program.

- The predicted demand estimate in five, ten and twenty years time is the reflection of the emerging changes and fast economic growth observed in the country as long as the estimate is based on the government guiding policies and plans(GTP).
- The mismatch between the demand and actual need could arise due to various reasons. Some of the suggested reasons by the participants were, the qualification requirement set in the past are not yet changed and thus not inviting the LA graduates, the challenges working in LA system is not attractive for graduates and issues related with awareness about the program etc.
- Disaggregating the urban sector demand by region is a difficult issue because the study tried to collect information on urban sector through the ministry. It was impossible to collect data at regional level for reasons related to cost, time, and man power availability. But the study properly addressed the demand of urban sector working intensively with knowledgeable staffs in the ministry.

Group discussions

The four series of presentations were followed by two rounds of group discussions. In the first round, participants were organized by sector. Thus rural LA, urban LA and education groups were formed. The three groups were assigned to give their reflections on survey results, methodology and standardization of LA specializations. In the second round, participants were organized in three groups but having cross-sector composition. The three groups discussed the presented curricula review, recommendations, and implementation plan.

Round-one discussion results

Participants were grouped in three groups by sectors to validate and give additional information on survey results reliability, survey methodology, and standardization of LA specializations.

Rural LA sector group discussion results

With regard to the survey results and methodology the rural LA group had suggested the following points.

- The survey results on demands of LA professionals should consider the first and second level certification activities
- The assessment could have estimated the demand for IT personnel
- The group perceived that the sampling method is not clear in terms of its representativeness. Moreover the group indicated as the limitation not to include Gambella and Benishangule regions in the first round survey.
- The group also questioned whether higher officials have been fully involved on demand estimate.
- The group expressed the concern that the demand estimate did not consider the staff turnover, retirement rate, institutional set up and the existing staffs' field of training. Thus the group has taken these points as the limitations of the survey.

- The group has no comment on overlap of LA positions and didn't find out missed positions except IT.
- As to the distribution of land positions at various levels in the region, the group responded in general terms that the distribution is not uniform; rather it varies at all levels in relation to demand and volume of work.

Urban LA sector group discussion results

On the survey results and methodology the group presented the following comments:

a) Results and methodology

- The findings reflect the sector partially. The study is dominated by rural LA sector data,
- The urban LA professional demand estimate data is collected only from one federal institution, the regional and city administration. LA organization demand is not shown. Federal urban land development and management bureau need to be consulted.
- Dire Dawa city administration professional demand presented in the report reflects only the rural sector. Hence, consult Dire Dawa Land Development and Management Bureau.
- The private sectors involved in the cadastral base map production demand shall be incorporated.
- Since the regularization of property titles is done based on the regional & city administration rules and regulations, it is not possible to generalize with a statement written on page 42 "... regularization of property titles for people residing in place for more than 5 years."
- IT profession should be considered,
- On table 16: National demand estimate for LA expert (No.9), educational level required: 71% for diploma, if it is an expert the level is not diploma shall be corrected the level to be BSc & MSc.
- The group recommended the survey include additional data for making it more accurate and reliable. The suggested information are: existing LA organization structures, draft GTP II, size of the cities/towns, current transactions/day in a sample cities, urban land development and management policy and strategy.
- As to how the data can be accessed, the group response is it can be accessed from the MOUDHC, regional urban development bureaus, city administrations, Central Statistics Agency, etc.

b) Standardization of LA specialization

- The group has some reservation on description of land use manager position and suggested it should be redefined as land management expert
- On the redundancy of the positions, the group didn't find anything.

- The group members perceived that IT and land policy positions were not addressed in the survey and need to be included.
- The group's opinion on the distribution of the various positions is federal level shall constitute 10-15%, regional level 15-20% and the city/local level shall constitute 65-75%.

The education group discussion results

The group on education widened its discussion and commented on the survey results without being limited to the discussion points. The discussion results are summarized as follows:

a) On the results and methodology

- The group didn't reflect on the accuracy of the demand estimate rather the group gave general comments on the survey results.
- Land Law subject as presently offered by Law Schools in Ethiopia is not mandatory and is not delivered in the current context of LA and policy of the country. So this needs to be taken into account in the survey document.
- Land dispute resolution matters are not seen in the document which could have impacted on the proposed curriculum.
- The statements on the existing curriculum especially at the ILA such as inadequacy of technical subjects should consider the underlying rationale for its preparation. Also the procedures on the development of the curriculum should be seen such as the active involvement of interested parties. The fact of the MSc program running under ILA being a response to the shortage of professionals in the urban areas needed to be considered.
- Some higher institutions such as the LA Program in Woldia University is not included in the survey. The group also suggested the survey could consider the higher institutions such as justice offices, municipalities, civil service and courts.
- Private sector's potential for capacity development not seen.
- The scope of the study is not clear.
- Methodology, the individual's approached for data not clearly known.
- Existing trainings and studies not considered such as the REILA TVET study and program in Asosa, Benishangul Gumuz.
- The training demand is not presented with respect to the various TVET levels.
- Existing occupational standard for TVET not seen and neither whether all institutions give LA training according to the occupational standards. Statistics of the trainees on LA missing.
- The employment problems on existing LA graduates not seen.
- Pastoralist and communal lands administration not considered.

- Land market component is missing.
- Document needs to show required conditions for the achievement of the plan.

b) Position descriptions

- Positions relating to land market should be included: conveyance lawyer, real estate broker, mortgage specialists, investment specialist, etc.
- The group sees that the position demand in the LA system should be revised regularly taking into account the fast changing circumstances including economic changes.

Round two-group discussion results

In round two of group discussion the participants were organized into three groups with cross-sectorial composition. The participants were asked to give comments on the curricula review, recommendations, and the proposed implementation plan.

Group one discussion results

On curricula: The group strongly agrees that the curricular review has addressed the needs of various sectors. The group suggested consideration of the harmonization of the LA program and the program improvement from current generalist orientation to specialization program. Regarding the availability of the training, the group agreed but argues the curricula for education and training in various universities is not tailored to the need. According to the group opinion accessibility is a problem.

The group believes that the integration and coordination of the programs is possible and the path ways suggested to link para-surveyor to TVET and TVET to university are also possible options that could be implemented provided that the curricula are revised to meet these requirements. The group suggested that the revision of the curricula in way it to be practical oriented and be implemented on learning by doing methodology as reform to make the training more effective and aligned with the needs.

On the implementation plan: - the group commented on the number and kind of instructors proposed. According to the group, the PhD level proposal is underestimated. Furthermore, the group suggested that collaboration with foreign universities as the best and feasible option to quickly find instructors needed to implement the proposed training program. The group also mentioned lack of a detailed schedule and lack of specific duties and responsibilities of the stakeholders in the implementation plan as limitations and suggested these be further worked out.

With regard to the strategy to enact the plan, the group suggests budget and staff turnover could be the potential problems that would affect the implementation of the plan. The group has suggested implementing staff retention mechanism and incentive packages, reviewing the existing training policy if there are discrepancies and ensuring good governance could

guarantee successful implementation of the plan. The group further suggested the integrated M&E plan between LA agencies and training institution is necessary for monitoring of its implementation over time. It is suggested that LA agency should enact the M&E plan

Group two discussion results

The group made an in-depth discussion and diversified its review to other issues of the study. The following are summaries of the group discussion results.

On curricula: As to whether the curricular review addresses the needs of the various sectors, the group suggested the curricular review could have seen more specialized departments within the existing LA program and given emphasis to land use planning, communal LA, water, regional planning and urban-rural linkage issues. The group has agreed that the existing LA training is not very accessible and sufficiently available.

The group agrees on the need for coordination, cooperation, harmonization and sharing experiences among the training institutions offering the LA programs. But the group looks with caution on the training pathways and suggests it should be focused rather than be promoted in all ways. The group believes the training to be more effective and aligned if adequate resources for practical training would be in place.

On the implementation plan: the group didn't judge on the accuracy of the estimate given the number and kind of instructors; rather they suggested the estimate be more focused. On the quick means of finding instructors the group didn't agree on sending candidates abroad for training rather suggests the need for national framework for coordination and pooling trained manpower across the institutions and upgrading the capacity of the existing LA institution as a feasible strategy. The group has suggested lack of awareness, stakeholders coordination, political commitment and financial issue could matter its implementation. Thus, according to the group in order to avoid this risk institutional coordination and preparation of national guideline how to implement the document are very crucial actions need to be effected.

As to monitoring and evaluation methods, the group suggests the existing M&E system used by TVET agency of the ministration education be used and recommended. The steering committee represented from ministry of agriculture, ministry of agriculture and higher education be responsible for developing M&E system. The group warns that this should be exercised in a way that it doesn't defeat the purpose of the training.

Group three discussion results

On curricula: Group three didn't feel that the curriculum review has addressed the needs of the various sectors for the reason that the review didn't include the objective of the TVET and failed to properly review the limitations observed in the Land information system and land use planning courses offered in LA training program. With regard to missed education and training program the group commented in general term that the review didn't address the private sector experiences.

The group suggestion on integration / coordination of programs, the group shared the existing experience of eligibility in promoting level IV and V TVET graduates to University education as long as they qualify the COC exams. With regard to path way from para-surveyor to TVET program the group suggests the possibility as long as the industries are willing to promote and want to have the expertise of the experienced Para-surveyors. The group believes that pedagogical reform is necessary to make training more effective and aligned to the needs but the group has not suggested specific reform measures to be taken.

On implementation plan: The group has reserved on commenting the accuracy of the instructors proposed for the reason that it is an estimate. The group also believes the current market can provide sufficient number of instructors quickly needed to implement the proposed plan (TVET & Universities are mentioned as sources of instructors). The group commented that the implementation plan lacks to show detail resources/ finance required for its implementation. Financial constraints, lack of commitment and dedication and inadequate legislative frame-work suggested as potential problems challenging the implementation plan. As remedial action the group suggests re-organization of LA agencies to standardize their institutional set up, collaborative effort among concerned ministries and road map to integrate urban and rural LA sectors. As to the M&E plan the group didn't say anything but federal rural LA and use directorate in collaboration with federal TVET agency and ministry of education are suggested as appropriate institutions to develop M&E system.

General discussion

Right after the group results presentations, the general discussion was brief. In this discussion stakeholders suggested the need to familiarize the assessment results for higher officials, further communication with universities and relevant government organizations in implementing the plan and the need to work out the resources required to implement the plan.

Closing

On behalf of the MSU team, Dr. John Medendorp thanked the participants for their contribution, he promised to incorporate most of the comments given and finally the workshop was officially closed.

Note: following the workshop, the MSU consultants reviewed each specific recommendation and comment emerging from the validation workshop (as detailed above), and revised the report accordingly, as time allowed in the current funding cycle. The current form of the full report incorporates those revisions based on stakeholder comments.

References

- Adams, M., Backstrom, L., Ali, S. (2010). Study on institutional structure and human resource development needs in the sector of land administration in Ethiopia. Stockholm: ORGUT Consulting AB.
- Bruce, J. W., Ngaido, T., Nielsen, R., Jones-Casey, K.. (2015). *Protection of pastoralist' land right: Lessons from the international experience*. Burlington, VT: TetraTech.
- Byamugisha, F.F.K (2013), *Securing Africa's Land for Shared Prosperity: A Program to Scale Up Reforms and Investments*, Africa Development Forum Series, Washington DC: World Bank.
- Caprano & IFAD (2011), *Strengthening Women's Access to Land: Experiences from the Field*. Rome: IFAD.
- Central Statistic Authority (2012). 2007 Population and Housing Census of Ethiopia Administrative Report. Retrieved from <http://unstats.un.org/unsd/censuskb20/Attachment489.aspx>
- Deninger, Ali & Alemu (2009), *Impacts of Land Certification on Tenure Security, Investment, and Land Markets: Evidence from Ethiopia*. Gothenberg: Environment for Development.
- Ethiopian Human Rights Commission (2012). The status of human rights in Ethiopian villagization programs. Addis Ababa: Ethiopian Human Rights Commission, pp. iii, iv.
- Federal Democratic Republic of Ethiopia Central Statistical Agency (2014), *Population Projection of Ethiopia for All Regions at Wereda Level from 2014 – 2017*. Retrieved at http://www.csa.gov.et/images/general/news/pop_pro_wer_2014-2017.
- Federal Democratic Republic of Ethiopia Ministry of Finance and Economic Development(2010). *Growth and Transformation Plan*. Retrieved at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/08/17/000333037_20110817022200/Rendered/PDF/635920PRSP0P120e0only0900BOX361530B.pdf.
- Gebre-Egziabher, T., Zenebe, S., Liew, E., Hailu, D. (2013) Training and research needs assessment on land administration. Addis Ababa, Ethiopia: Addis Ababa University and Ministry of Urban Development and Construction.

- Groenendijk, Hagenimana, Lengoiboni, Hussen, Musinguzi, Ndjovu & Wayumba (2013), Land Administration Academic Education in East Africa. Paper presented at the FIG Working Week: Environment for Sustainability, Abuja, Nigeria, 6 – 10 May, 2013.
- Hailu & Backstrom (2006), Land Administration in Ethiopia. *GIM Mapping the World*, vol. 20:2.
- ILA (2013). *Advancing Land Rights for Growth and Transformation*. Addis Ababa: ILA.
- Keeley, J., Seide, W. M., Eid, A., and Kidewa, A. L. (2014). *Large-scale land deals in Ethiopia: Scale, trends, features and outcomes to date*. London: IDRC and IIED.
- ORGUT (2014), *Study On Institutional Structure and Human Resource Development Needs in the Sector of Land Administration in Ethiopia: Final Report*, Stockholm: ORGUT Consulting AB
- Reda, K. T. (2014). Formal and informal land tenure systems in Afar region, Ethiopia: perceptions, attitudes and implications for land use disputes. *African Journal on Conflict Resolution*, 14(2), 41-62.
- Schmidt & Kedir (2009), *Urbanization and Spatial Connectivity in Ethiopia: Urban Growth Analysis Using GIS*, Ethiopia Strategy Support Program 2 Discussion Papers, Washington DC: International Food Policy Research Institute.
- Shinn, D. H.; Ofcansky T. P.: Kebele. In: Shinn, D. H.; Ofcansky T. P. (eds.): *Historical Dictionary of Ethiopia*. Lanham, Maryland et al. 2004: 237-238
- Sonneveld, B. G. J. S., Pande, S., Georgis, K., Keyzer, M. A., Ali, A. S., & Takele, A. (2010). Land degradation and overgrazing in the Afar region, Ethiopia: a spatial analysis. In *Land Degradation and Desertification: Assessment, Mitigation and Remediation* (pp. 97-109). Springer Netherlands.
- Tengnäs, Myles, Alffram & Lundberg (2010), *Mapping and Review of SIDA's Assistance to Land Policy Reform, Land Administration and Land Governance*, Stockholm: Swedish International Development Agency
- USAID & ARD (2004), *Ethiopia Land Policy and Administration Assessment*, Washington DC: USAID and ARD.
- Van Dijk & Fransen (2008). *Managing Ethiopian Cities in an Era of Rapid Urbanisation*. Delft: Eburon Academic Publishers

Zein, T., Hartfiel, P., Berisso, Z. A. (2013). Addis Ababa: The road map to progress through securing property rights with real property registration system. Muenster, Germany: Hansa Luftbild. Retrieved from:
http://www.fig.net/pub/fig2013/papers/ts01a/TS01A_zein_berisso_et_al_6648.pdf