

إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Development of a GIS-based Land Registry System for Gaza Strip

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***Development of a GIS-based Land Registry System for
Gaza Strip***

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Development of a GIS based land Registry System for Gaza Strip

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واللجنة إذ تمنحه هذه الدرجة فإنها توصيه بتقوى الله ولزوم طاعته وأن يسخر علمه في خدمة دينه ووطنه.

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﴿يرفع الله الذين آمنوا منكم والذين أوتوا العلم درجات﴾

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Dedication

This research is dedicated to:

My mother soul...

My father for his encouragement...

My brothers and sisters...

All of my friends and colleagues...

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All admirations and glory are due to **ALLAH** for all the support granted to me. This effort would not be reached without God's limitless guidance and support.

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Abstract

Land is the most crucial item and the core of the Palestinian-Israeli conflict. Palestinian people need their land to set up their independent state. Israeli Occupation Forces (IOF) are depriving the Palestinians from their right to access their own lands, in addition to the continuous land confiscating policy in the whole occupied territories and the Access Isolated Area in the Gaza Strip.

Gaza Strip suffers from the lack of advanced techniques that help and support land registration using GIS technology. The currently-used-system for land registration in the Gaza Strip is extremely traditional and not able to meet the increasing demand. Conflicts between data on maps and on ground are frequently faced and decisions relating to these problems cannot easily be made. Such an out of date system leads to difficulties in tracking and updating land owners and identifying the actual current owners.

This research aims at proposing a new automatic land registration system in the Gaza Strip. Through a multi users unified database with identified access per each user; this new methodology will ease land registration on both Gaza citizens and the Palestinian Land Authority's (PLA) employees.

So, direct and indirect data were collected through reviewing relevant literatures and conducting several interviews with key informants from PLA, free lancers, specialists, and clients. Due to the contextual analysis; the gap in land registration system was assessed and the required corrective strategies were participatory identified with PLA's relevant staff.

Using Geographic Information System (GIS); attribute and spatial data were connected. A user friendly web based GIS tool was developed to accelerate the land registration process, in addition to providing a decision support system through easily managing and interpreting attribute and spatial data in a precise logical way. The aforementioned new developed tools will create and maintain an accurate, secure and comprehensive land registration system in the Gaza Strip.

ملخص البحث

الأرض هي العنصر الأهم والأساسي في الصراع الفلسطيني-الإسرائيلي، حيث أن الشعب الفلسطيني في أمس الحاجة لأرضه لإقامة دولته المستقلة عليها، في حين تواصل قوات الاحتلال الإسرائيلي حرمان الشعب الفلسطيني من حقه الأساسي في الوصول إلى أرضه، بالإضافة إلى السياسات المستمرة في مصادرة الأراضي في كامل فلسطين المحتلة وفرض المنطقة العازلة في قطاع غزة.

يعاني قطاع غزة من النقص في التقنيات الحديثة التي تساعد وتدعم تسجيل الأراضي باستخدام نظم المعلومات الجغرافية، حيث يعد النظام المستخدم حالياً لتسجيل الأراضي في قطاع غزة نظاماً تقليدياً لا يلبي الاحتياجات المتفاقمة. وهناك الكثير من التباين المستمر في البيانات بين ما هو موضح على الخرائط وما هو موجود على الأرض مما يؤثر سلباً على اتخاذ القرارات الصحيحة بخصوص المشكلات المطروحة. هذا النظام الغير محدث يقود إلى الكثير من الصعوبات في تعقب وتحديث بيانات مالكي الأراضي و تحديد الوضع الحالي الحقيقي.

يهدف هذا البحث إلى اقتراح نظام الكتروني جديد لتسجيل الأراضي في قطاع غزة وذلك من خلال نظام معلوماتي موحد متعدد المستخدمين بصلاحيات محددة لكل مستخدم، هذا النظام المحدث سوف يسهل عملية تسجيل الأراضي لكل من المواطن الفلسطيني و موظفي سلطة الأراضي. لذلك تم جمع العديد من المعلومات المباشرة و الغير مباشرة من خلال مراجعة الدراسات السابقة المتعلقة بموضوع البحث بالإضافة إلى العديد من المقابلات مع المختصين من سلطة الأراضي واستشاريين و اختصاصيين ومواطنين.

من خلال تحليل الوضع الراهن تم تحديد الفجوة في نظام تسجيل الأراضي و الاستراتيجيات اللازمة لتصحيح الوضع الراهن وذلك بطريقة تشاركية تضم موظفي سلطة الأراضي ذوي الصلة.

تم ربط المعلومات المكانية و الغير مكانية باستخدام نظم المعلومات الجغرافية وتطوير أداة لتسريع عملية تسجيل الأراضي بالإضافة لتوفير نظام دعم لعملية اتخاذ القرارات من خلال إدارة و تحليل المعلومات المكانية و الغير مكانية بطريقة منطقية دقيقة.

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List of Abbreviations

Arc SDE	Arc Spatial Database Engine
CODI	Committee on Development Information
CSO's	Civil Society Organizations
DoE	Department of Environmental
DSS	Decision Support System
ECA	Economic Commission for Africa
ECIM	Egyptian Cadastral Information Management
ESA	Egyptian Survey Authority
FIG	International Federation of Surveyors
GIS	Geographical Information System
GUI	Graphical User Interface
ICT	Information and Communication Technology
ILS	International Land System
IT	Information Technology
LIS	Land Information System
LR	Land Registration
LRS	Land Registration System
MOP	Ministry Of Planning
NLIS	National Land Information System
OCHA	Office for the Coordination of Humanitarian Affairs
PLA	Palestinian Land Authority
PNA	Palestine National Authority
RDBMS	Rational Database Management System
SDSS	Spatial Decision Support System

SQL	Structured Query Language
SMS	Short Message Service
SWOT	Strength, Weakness, Opportunity, and Threat
UCD	Unified Cadastral Database
UN	United Nations
UNECE	United Nations Economic Commission for Europe

Chapter 1: Introduction

1.1 Introduction

Land is free gift from Allah, It's stands for all nature, living and insensible. It includes all natural resources that human being get free from air, water and land. The terms 'land' refers all that nature has created on the earth, above the earth and below the earth's surface.

Zevenbergen (2004) defines Land registration as the process of official recording of rights in the land through deeds or title (on properties). It means that there is an official record (the land register) of right on land or deed concerning changes in the legal situation or defined units of land. It gives an answer to the question "who" and "how". "In law, land registration is a system by which the ownership of estates in land, is recorded and registered, usually by government, in order to provide evidence of title and to facilitate dealing".

The increasing demand on land, especially in the Gaza Strip has been significantly increasing from time to time by the ever rapidly growing need of the human and livestock population. An extensive area of land has been brought to agriculture without considering proper land management practices, beside the deforestation that is increasing at an alarming rate, creating a big gap between demand and supply, all of these factors came as a direct result to the Israeli Occupation and the continuous restrictions on the Gazans' daily life, as the Gazans farmers are prevented from accessing 24% of the agricultural areas in the Gaza Strip (OCHA, 2007), which the Israeli Forces called it the buffer zone. "Conflict over land use is another big problem that needs urgent solution" (Hayilu and Birmegie, 2006).

"Palestine has a long history tied to land, since the Islamic period. The first Land law and land policy was established 153 years ago in 1858. During this period, Palestine was under Turkish control, from 1917 to 1948, through the British mandate, and new laws and policies were put in place. Following this Jordanian land laws and policy regulated the West Bank from 1948 to 1997 and Egyptian land laws and polices regulated land use and ownership in the Gaza Strip. During Israeli occupation military orders and land policy superseded previous land laws and policies in West Bank and the Gaza Strip. During initial periods of establishing the Palestinian Authority in 1993-1994 the

necessity of devising a land policy was recognized and it would be developed to encourage good management of Palestinian land and natural resources and harmonization of various laws, regulations and practices operating in West Bank and the Gaza Strip” (MOP, 2007).

The Palestinian Land Authority (PLA) in the Gaza Strip have started using geographical Information System (GIS) in 2007, and that’s limited by the dealings that are being accomplished in the PLA in the Gaza Strip, as it is all about just drawing the piece of land and recording its owner's name, in addition to the basic data regarding to the land itself and its owner. The proportion of registered lands using, GIS techniques, in the Gaza Strip doesn't exceed 2% of the total area of the Gaza Strip (PLA, 2011).

1.2 Problem Statement

It may be known that there are some troubles facing the decision makers regarding managing and utilizing the available data in some of the governmental organizations in the Gaza Strip, in addition to what the local residents in the Gaza Strip are facing in identifying their land properties' borders and what the municipalities are facing regarding maps and drawings.

The currently-used-system for land information, in general, and land registry, in particular, in the Gaza Strip is extremely traditional and does not reflect the changes occurred regarding land information management. The use of GIS for this purpose is limited as well as data for land property and history is unavailable. Conflicts between data on maps and on ground are frequently faced and decisions relating to these problems cannot easily be made. Therefore, a strong need to enhance this traditional system is strongly recommended.

High level administrators and decision makers, who are not technically professional in the field of land registration using the new GIS technology, are facing troubles in managing land registration, because it is not easy for them to deal with the available software and its tools during utilizing the applications of this software as: ARCMAP, ARCVIEW, etc.

1.3 Justification of Research

Gaza Strip suffers from the lack of advanced techniques that help and support land registration using GIS technology, which leads to difficulties in tracking and updating land owners and identifying the actual current owners. There is a critical need in the Gaza Strip for an ideal appropriate systems and models that guarantee an easy technique for data accessibility, sharing, tracking and manipulating public inquires in a transparent way.

Applying of GIS technology to the LRS in the Gaza Strip would be a suitable solution, provided that its advantages and shortcomings are well understood. This is possible during developing a tool for the purpose of land registration, to help decision makers to deal with the available data, quickly, accurately and efficiently.

1.4 Aim and Objectives

This research aims to develop a new land registry system using GIS Technique by which an objective and clear methodology is to be presented to facilitate land management of the Gaza Strip area. To achieve this aim, the following objectives are to be considered:

- Stand on and evaluating the traditional method of land registry in the Gaza Strip, and performing a SWOT analysis for it.
- Develop an objective methodology with clear stages that can enhance the land registry system and enable to facilitate land management and consequently save time and efforts.
- Creating a new GIS user friendly tool that is easy to be used, where people who are not specialist can use it for the purpose of land registration. This new GIS tool will enhance the opportunities of managing the data in better quality and sufficiently accurate, and finally to create and maintain an accurate, secure and comprehensive registry system.

1.5 Methodology

To achieve the objectives of this research, there are three stages starting from data collecting, data analysis, conclusion and recommendations related to the topic of the study.

The study can be broadly divided into three stages:

- ✓ **The first stage** includes literature reviews; which based on the primary data collection by reviewing books, similar studies, scientific papers, magazines, articles, web sites and others.
- ✓ **The second stage** includes many practical steps relevant to the current situations in the Gaza Strip, as the following:
 - Interviews with relevant professionals in PLA.
 - Manipulating and editing the collected data.
 - Assessing the current used system for land registry.
 - Developing a new system.
 - Using GIS technology to create a tool for Land registry.
 - Performing a case study on Gaza Strip.
 - Sharing outcomes regarding land registry with the relevant decision makers as a decision support system.
 - Giving recommendation in the field of land registry during survey, collecting data, and enter data that can be utilize in the Gaza Strip.
- ✓ **The Third stage** is to define the conclusion and recommendations with reference to the objectives of this research. Figure (1.1) shows the different stages of methodology.

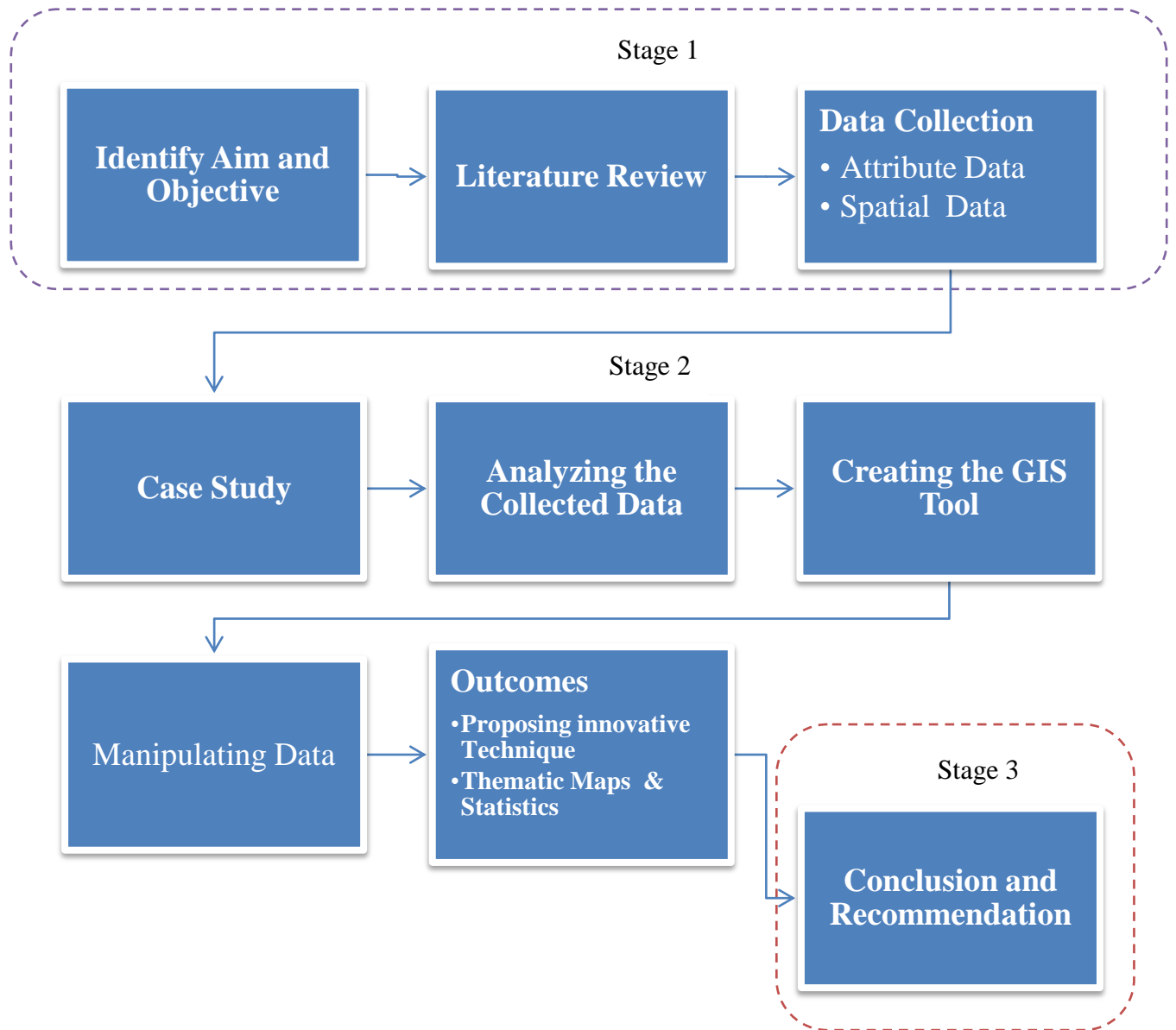


Figure (1.1): Flow Chart of Methodology

1.6 Thesis Structure

This thesis consists of Six chapters. Chapter One presents the background to the study, statement of the problem, justification for the study, the aim and objectives as well as the structure of the research methodology.

Chapter Two introduces the definition of land registration, types of land registrations and various approaches adopted to apply it in developing countries. Chapter Three briefly outlines the evolution of the land tenure and registration system in Palestine throughout various ages.

Chapter Four assesses the current used LRS and introduces the findings of a participatory SWOT analysis. Chapter Five introduces a modified automated LRS based on GIS and web technologies. Finally, Chapter Six concludes the study and recommendations.

Chapter 2: Land Registration

2.1 Introduction

This Chapter aims at providing a comprehensive review about land registration generally and its development in developing countries. This chapter also introduces the definition of land registration, types of land registrations and various approaches adopted to apply it in developing countries.

2.2 The development of Land Registry System

The need to record and manage lands forced us to create a system to order, control, and manage land parcels and its information, that system was Land Registration System. Very similar topic is cadastres, which defined best by McLaughlin and Nichols (1989) as, "an official record of information about land parcels, including details of their bounds, tenure, usage, and value".

According to McLaughlin and Nichols (1989), land registration described as "the process of recording legally recognized interests (ownership and / or usage) in land". 'Registration' is an expression means the active process, whereby the result should be called 'register', any institution does that is a registry.

Land registration always refers to a legal and official registration, so you can know who owns a certain property. The term is very familiar in the Anglo-Saxon world, and matches the term Gumbuch in the Middle European. Sometimes land registration is exclusively used for 'registration of title' (Zevenbergen, 2004).

2.2.1 The Definition of Land Registry System

As much as the term of Land Administration has definitions, Williamson's (2000) defined Land Administration is more superior, the process whereby land and every single detail about it may be effectively managed. Land administration saves information about lands to provide when needed, to people with interest in real estate and information about those interests like nature, weather, period of land registration. It also includes a certain details such as ownership, location, size, improvements and value.

Hanstad (1998) stated that although the early efforts to establish comprehensive land records systems in Europe were mainly for the purposes of public taxation, there were also private needs for land records to facilitate effective land transfers. It was the need for land records that eventually provided the impetus for LRS's (MOP, 2004).

'Land management' is the way of managing the usage and development of land resources in a possible way. Related to land administration, even though a cadastre could be a tool in land management and one parcel-based Land Information System (LIS) has records of interest in land (like rights, restrictions and responsibilities associated with the land). It's impossible to have an effective and sustainable land management without a cadastre (the United Nation Commission). Figure (2.1) shows basic elements of land registration.

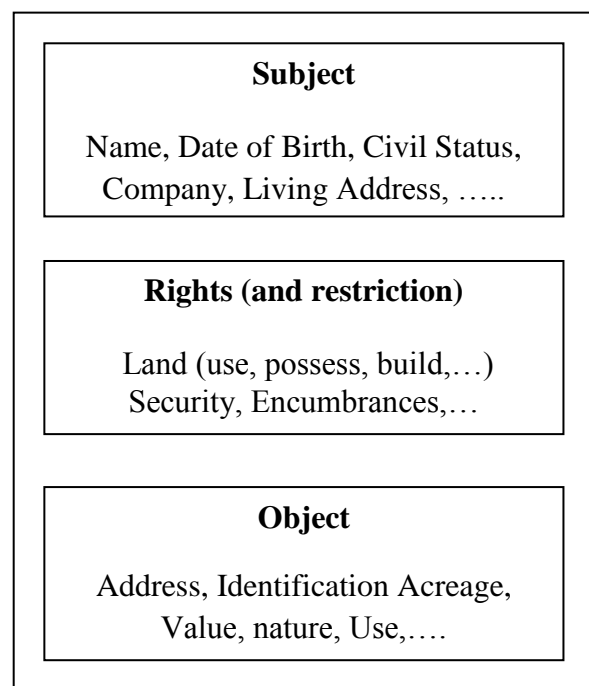


Figure (2.1): The basic elements of land registration (Henssen, 1995)

Larsson (1991) sees that, a suitable LRS helps local authorities to create a fair land taxation system and to be able to carry out land policies through proper land management.

So many various studies targeted Land Information System (LIS); as Dale (1993) stated it's as valid to ask whether a country can afford to be without a good LIS as it is to ask whether it can afford to install one.

Land registry system has improved significantly and took a huge step forward to a better management system in the last few decades. The significant contributions include, data recording, data management and analysis. Most important, it will facilitate conveyancing, a one will have no obstacles to transfer his right in land to another, and it will make the transfer of rights in land easier by supplying a mechanism for these transfers. That ensures one's investments in or purchase rights in land. It will reduce the time and minimize the cost of transferring such rights, and lead to stimulation of the land market and to more cost effective use of land (Dale, 1993). Some might argue about the development of countries, they said a country can't be developed without efficiently operating land markets. The likes of these land markets needs a mechanism for the transfer of rights in land that is based on an efficient system of land registration.

2.2.2 Types of land registry system

According to Hanstad (1998), there two existed types of Land Registration System; registration of titles and registration of deeds.

- **Registration of titles.**

This system appeared for the first time in Australia, in 1858, by Sir Robert Torrens. Torrens believed that "a land register should show the actual state of ownership, rather than just provide evidence of ownership." This system helped the government to protect all rights shown in land register. After Torrens introduced the concept registration in Australia, a very similar system developed in England.

- **Registration of deeds**

This method was developed first. In the United States, this system called "land recordation" it is about registering or recording documents affecting interests in land developed centuries ago in European countries to prevent double selling of land, to put

an end to land scam. With registration or recordation of the deeds at a government office, the priority of claims could be established in the event of double selling.

A main term closely linked at times with land registration, is "cadastre". A cadastre is described as " an official record of information about land parcels, including details of their bounds, tenure, use, and value" (McLaughlin/Nichols, 1989). It usually refers to a predominantly technical registration, which involves details like the location of property, what's bounded it, and its size the usage of the term cadastre has been found basically in European continental, where meaning has been shifted.

A Cadastre is normally a parcel based, and up-to-date LIS containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually described geometrically, the geometric description of land parcels linked to other records describing the nature of the interests, the one in control of those interests, and often its price and improvements. It may be established for fiscal purposes (e.g. valuation and equitable taxation), or legal purposes (conveyancing), to help land management and land usage (e.g. for planning and other administrative purposes), and enables sustainable development, and protect the environment (FIG, 1995).

Cadastre various applications are given in the last sentence, also referred to as the fiscal, juridical (or legal) and multi-purpose cadastre (e.g. Dale/McLaughlin, 1988, McLaughlin/Nichols, 1989). The term 'multi-purpose cadastre' often means the same meaning of the term Land Information System. A juridical cadastre, which serves as a legally and officially recognized record of land tenure, is similar to the term LR (land registration). A cadastre divided in two parts; a descriptive part (register or indexes) and a geographic part (map or plan). The relation between the two is very strong with high importance, and being arranged through a so-called 'parcel identifier'.

Land registration is a process by which rights in land are officially recorded through deeds or title (on properties). It means that there is an official record (the land register) of rights on land or of deeds concerning changes in the legal situation of defined units of land. And its answering the questions of "who" and "how" (Zevenbergen, 2004).

Cadastre is a scientifically method of arranging public inventory of data about properties in a country or district, based on a scan of their boundaries. Those properties are orderly identified by means of some separate designation. The parcel identifier and boundaries of property are normally shown on large scale maps, which side by side with registers, may tell information about property like separation from other, nature, size, value and legal rights associated with the parcel. It answers the question of "where" and "how much". As Mr. Henssen and Williamson confirmed the previous in 1990 "land recording is usually used to indicate land registration and cadastre together as a whole. Land registration and cadastre usually complement each other; they operate as interactive systems."

It is mentioned again that, primal the introduction of the (fiscal) cadastre did not affect the existing (juridical) land registration systems much, but that increasingly became desirable to use the cadastral maps, which were compiled through systematic land survey, for the real properties identification in the land registration process (e.g. Simpson, 1976; Larsson, 1991). This later development in which the cadastre fulfills both a fiscal and juridical role had been always Napoleon's intention, judging by the quotes given in the box (Kurandt, 1957).

The taxation side got all the attention in most countries during implementation, and the supporting role to the civil code was lost or remained underdeveloped. Nowadays all countries especially the countries which have both a cadastre and a land registry indentify the property in the latter by its description in the cadastre, except if the cadastre was not complete (as was the case in Spain, Portugal and Latin America, where the land registry often missed a unique identification and is practically independent from the cadastre). This use of cadastral identification in land registration has been both used to enhance deeds registration and to facilitate the change from a deeds to a title registration system (Larsson, 1991). On the other hand, the cadastre should be updated repeatedly when the information on land transactions through land registration is made readily available. For that reasons, it is important to consider land registration and cadastre together. At least they should cooperate and work together side by side, it is unfortunately not the case in many countries. Experts expressed that "there is a strong

need to integrate and rationalize land title registry and cadastral systems” (UNECE, 1996).

There is no countries or jurisdictions that have effective land registration (most of the developed countries, although some exceptions exist, and several other countries) , they don't have the same system or even a similar one, everyone has its own system of land registration, which satisfy its needs, partly determined by the incidences of its (historic) development. This forms the question if it is possible to say anything about land registration in general at all of models and the complexity of the systems which leads to even researchers needing years to dig out the Similarities. Its possible, because the number of basic differences between systems of land registration at a functional level is smaller than is normally thought. The differences of the task level have much attention when describing system of land registration (Stubkjar, 1994).

As the case in a number of countries worldwide, an efficient and complete used formal real property system containing information of all properties is main cornerstone for the society to manage the perfect usage of wealth and values, which are hidden in real properties. One of the most famous well-known promoters of formal, registered real property ownership is the economist Hernando De Soto from Peru, who argues that the poor in developing countries own more assets than is generally believed. But this capital is “dead” because its ownership cannot be readily traced, validated, and exchanged legally.

Therefore, the poor people cannot us their assets in efficient and legally secured market transactions, like securing a bank loan or guaranteeing the payment of water, electricity, or other infrastructure services. He (De Soto) declare that a formalization process would benefit both the poor and society at large (De Soto, 1997). Also Rabley and Falk state: “Securitization of commercial interests in land mobilizes funding and further develops and strengthens capital market formation. Therefore, the wealth multiplier effect of good governance and sound land administration is potentially enormous.” (Rabley, Falk, 2004).

2.3 The Role of GIS at Land Registration

2.3.1 GIS

GIS is a computer-based tool for mapping and analyzing things that exist and events that happen on earth' whilst the Department of Environmental (DoE) (1987) defines GIS as a tool 'for capturing, storing, checking, manipulating, analyzing and displaying data which are spatially referenced to the Earth'. Definitions like these were build on the theories of a fairly predictable environment within which GIS are to be used, using the GIS as a toolbox, and therefore ignore the behavioral or institutional aspects that decide the success or failure of GIS implementations.

And another definition for the GIS by Carter in 1989 , he defined it as, 'institutional entity reflecting an organizational structure that integrates technology with a database, expertise and continuing financial support over time' would look to be more suitable in a developing-world context. The definition of GIS is not only generic, but also includes an organizational dimension that influence GIS adoption and a financial dimension that is crucial in developing countries. That's why the definition is holistic, a point of view shared by Chan and Williamson in 1999, who suggest that the elements of this perspective should include people with GIS expertise, information technology, organizational setting, data and standers.

As GIS and involved technologies mature and more data become in hand in computerized form, the usage of GIS for uniting land and all related data becomes more suitable. Improvements to the existing land administration systems are being made through developments in the technology. Improvements to the existing land administration systems are being made through developments in the technology. For providing the administrators and data users with accurate and updated information about the land, more systems have been developed rapidly and efficiently for data capture, storage, updating and distribution. The key feature of GIS technology is the full-support for spatial Data Based Management System (DBMS), the availability of digital maps, and proliferation of higher network bandwidth, have all promoted the provision of map-based National Land Information System (NLIS) solutions.

Through considering the internet and the internet solutions, the latest generation of NLIS are supplying wider access to geographical information. The advantage of this technology is that the users can login to the information using standard internet browsers (Coleman,1999). Successful NLIS needs spatial referencing standards and appropriate GIS technology to support spatial data servers, federated DBMS, temporal management, efficient WAN (Wide Area Network) technology, and efficient client customization tools. Therefore, the application of GIS technology to the land registration activity in Gaza would be a suitable solution provided that its advantages and shortcomings are well understood. Proliferation and development of GIS or any other technology should rather be seen as a social process involving an organizational/financial/ responsive agreement between stakeholders involved (Geertman and Stillwell, 2002), Challenges facing developing countries in GIS diffusion, many governmental as well as private organizations have introduced GIS concepts and technology in their daily work, mostly through development projects. Many of these efforts are project-specific, carried out in isolation and therefore have not been very effective. Some of the progress, challenges, barriers and lessons learned has been documented in a report by the National Research Council of National Academies (2002).

The challenge was achieving a coherence in the result of individual projects and ensure that these enable the building of a cohesive and comprehensive information infrastructure as a prerequisite for ensuring their sustainable development and use (EIS-Africa, 2001). Muller (1993) indicates that the challenge of GIS is not so much technical but lies in organizations' aptitude to make the most of the potential of GIS throughout management and planning, and to integrate multiple sources of information which in turn requires co-operation and communication between multiple partners from government and private industry There is a strong argument that it may be necessary for indigenous scientists and decision makers to have a greater degree of knowledge and control of GIS. Africa still depending on donations, support, and development assistance from the west countries, that present grate challenges. However, if we (the indigenous people) want to introduce GIS successfully in these countries, we must develop, modify and control by us the indigenous people with a fully understand of the

social, economic and political context of the situation as well as the technical capabilities of GIS (Taylor, 1991).

Karikari et al. (2003) stated that acknowledge the serious lack of indigenous expertise but suggest that effective GIS project design and implementation will only occur when indigenous people are fully involved. The method applied in technology transfer needs to be human centered and led much less by the technical prescriptions than donors have rapidly pursued and governments of developments of developing countries have allowed (Toulmin and Quan, 2000). There has been over-confidence in technology and an underestimation of the associated human and institutional problems (Dale, 1999). So, it is imperative that the diffusion and application of GIS which designed for especial institutions in the developing world and that usage is made of indigenous expertise where possible. That means the new objectives must be set for GIS development in relation to land administration and other sectors in developing countries.

There are four suggested strategies by Yapa in 1991 to improve the appropriateness of GIS in developing countries. These are the establishment of information systems involving strong and local public participation, the development of the public domain, the relaxation of copyrights over existing GIS software and the development of software that takes advantage of existing software infrastructure in the third world. Yapa argues that the term 'appropriate technology' is relevant only in terms of the technology being low-cost, professionally independent, and patent-free for such Third World countries.

As for the developing countries, data capture and the creation of a cost effective way of keeping data up to date is the crucial issue. this problem happens when converting a certain land records in to digital form, as existing systems are producer-driven, rather than demand driven, and the agencies appear not to have sufficient resources to cope with the consequent increase in the number of dealings.

2.3.2 GIS in Land Registration

The improvements of land registration system and the developed of LIS or Geographic information system are very important requires for the efficient management of land in a developing-world context. This was recognized by the Global Strategy for Shelter for the Year 2000 (HABITAT, 1990) and by the Sub-Committee on Geo-information of the

Economic Commission for Africa (ECA) Committee on Development Information (CODI) at its meeting in Addis Ababa in 1999 (ECA-CODI, 1999), this implies in identifying the problems of the land, determining strategies for land reform, monitoring land usage change on public land, developing alternative plans and finding solutions to a myriad of land problems, including encroachments on public land. There is no specific GIS project currently functioning in the lands sector.

Therefore, the need to develop and introduce geographic information system is more in response to pressing internal need than to competitive pressure. The reform of existing organizations will involve an examination of traditional data recording, data quality procedures and data maintenance, and recognition of the changes in work practices and communication behavior that would have to occur within a new GIS institutional framework (Karikari et al., 2003). These pose a great challenges to agencies in the lands sector, yet to fully embrace geo-technology.

Saad (2010) stated that Transformation of Land Registry Services is an integral part of the Libyan Government's modernization program. This transformation is to support the country's modernizing growth via matching the appropriate GIS technology to Libyan Registry Authority (LRA) business processes and providing an open architecture that can flexibly be integrated with any legacy or future systems. In addition to, describes the system applications, and how LRA benefits from such transformation of the services using GIS technology.

Wood (2009) explores the range of technologies (appropriate and otherwise) that have been or might be applied to such efforts. It will also present a few select examples of such implementations in Ethiopia and throughout Africa and discuss the issues involved. It addresses how spatial data created from the cadastral mapping effort can both contribute to and benefit from the development of land management systems and Spatial Data Infrastructure.

Spinney et. al (2007) stated that spatial decision support system (SDSS) framework using GIS technology have been utilized in the developed countries to combine geospatial information, perform spatial analysis, and provide interactive visualization capabilities in order to cleanse Land Registry data. The purpose of the SDSS framework

in the developed countries is all about: (i) to apply land use and neighborhood information to Land Registry data, (ii) to extract vacant land sales from the population of real estate transactions, and (iii) to provide a mechanism to identify and remove erroneous price.

In the duration of the past two decades, applications of geographic information system have made a wonderful step forward in progress. The usage of GIS in land administration is one area where the technology is being used widely at the present time. Since the 1990s, many countries developed or developing , have been applying GIS for land administration purposes. These clarifications are important because they raise some key differences between GIS and LIS , which have been a subject of previous discussion . while some experts regard LIS as the concept for spatially referenced land-related data (a position adopted by Federation International des Geometers (FIG)). An argument runned by Meltz (1988) about the principal that focus on a LIS is on the land parcel, Whilst the architecture of a GIS is concerned with features of enabling the map, noting that in functionality, a LIS could work as a GIS.

There is another major problem lies in data processing and analysis. Nearly all cadastral and LRS have focused on record management, instead of information exploitation. While there has been much promotion of geographic information system /land information system, GIS technology has not been used for real to any great extent in land administration, except for drawing maps. By overcoming the problems successfully, many countries computerizing their cadastral records and creating a large national databases. The databases about land-related are now being integrated, analyzed and distributed in ways which until now were not possible. The computerized system will guide users and thus minimize the possibility of any malpractice. Searching information will be easily, very fast and efficient from the database. Lately updated GIS will give the possibility to produce print-outs, maps, forms, reports and statistics easily, accurately and fast.

Any government has its own politics with respect to individuals, manpower, employment and how far the system must be capital rather than labor-intensive. Since land information systems have been related to high technology, there is a need to work out clear strategies to overcome the impact of such development. An extensive

influence computerization has on the structure and staff categories within organizations. For example, within the routine operations of a land information system there are many specific tasks that are conducted by different category of staff such as systems engineer, system manager and programmer etc ... the perfect use of a new technology, like GIS, in an organization often entails that work routines and chains of command be changed.

2.3.3 Requirements for Applying GIS for Land Registration

Tuladhar (2002) summed up the application requirement of GIS technology, to be used in the establishment of a LRS in four major phases to ensure the success and sustainability of the system and make it applicable at all times:

I. Planning phase (What about Planning instead of initiation)

The importance of planning phase comes in planning for creating an environment, to get ready to go to strategic planning processes, in this phase will be the planning committees formation, consisting of employees with expertise and competence in the fields of land, survey, GIS Developer and Information Technology, to facilitate planning processes and get consensus on key issues to create a system of a computerized land registration, to reach an agreement on harnessing the time and effort in the support of this system, as it represents the system of great importance in maintaining the rights and property of citizens and the state, and support the set of the plan, which will determine the phases of implementation , application and ensure its success and neutralize the influences that may adversely affect their success.

II. Modeling phase

The system model representation of the system is an integral part of the design process, using analysis tools such as graphics, data flow, audited, storage and supply data to maps or exported as a recording certifications, the basic procedure for the development of the system model is to determine what is already exist, remove anything that is not necessary, add any new functionality the competent authorities please to facilitate the process of land registration, and finally the formation of how to implement the new design exactly and this process occurs as a gradual transformation from a model to another.

III. Development phase

During this phase, the requirements is determined to implement two previous phases, first phase's needs is determined by the needed data, and how to document it , and the shape of the outlet to be followed later by phase modeling, to identify the ways in which they can access the best way for the system, at this phase, the hardware and software needed is determined for implementation process, where the programmers programming code modules, and writing scripts for the entire system, then testing the system, and later they endorse the process, finally the system is installed to be used by users.

In this phase, the output is a fully functioning program without any errors, matches the required specifications and full documentation of land records, certificates, and cadastral maps. After the inauguration of the final version of the system, the coder transfer data for the new system and then train users on the new system.

IV. Deployment and maintenance phase

In this phase, software and tools that have been implemented is to use for a fully functioning without any errors according to the required specifications, which include data processing, archiving and a complete documentation of lad records, certificates, cadastral maps and information about the plots of parcels and blocks, after implementing the final version of the system, the coders transfer data to the new system and then train users on the new system.

2.3.4 Constraints and Opportunities

It is not an easy mission to institutionalize a full automated land registration system in the Gaza Strip as well as the whole developing countries. From the experiences of users; securing the potential benefits of computer-based technologies, including GIS, can be problematic (McRae, 1993; Moore, 1993).

Prior to reforming organizational arrangements, attention needs to be on understanding the current government structure and policies, and the current requirements for land information management and the constraints that deter its progress (Dale and McLaughlin, 1988).

Due to consulting several experts via in depth interviews and brain storming sessions in the PLA and free lancers about the current LRS in the Gaza strip the following constraints and opportunities were recognized to match the context of the Gaza strip.

2.3.4.1 Constraints

There are various factors constrained to establishment of LRS/GIS. The major constrains are:

- The current LRS in PLA suffers from overlapping responsibilities leading to the duplication of data recording for land administration. This makes the maintenance and updating of the records more complex.
- PLA suffer from lack of trained operators and use technicians. Therefore, personnel management for the transition to a new technology should be given top priority.
- Due to lack of resources; PLA choose to retrain their own staff in conversion courses instead of employing outside experts. The needs for expertise are often underestimated. Without the essential expertise, advancement can be frustratingly slow.
- The absence of national information body that could provide an umbrella policy on information management and exchange within the Gaza Strip. This includes: common national standards in data collection formats, procedures, storage medias etc., which could allow easy information sharing and the public access to them within the Gaza Strip.
- Lack of adequate skills in the area of managing computerized land management information systems, specifically in GIS/RS, Database Management Systems, Systems Administration and Networking.
- Shortage of external development funds to support the establishment and maintenance of the LIS/GIS at all levels.

- Lack of awareness of the benefits of LIS/GIS at higher decision-making levels.

2.3.4.2 Opportunities

Although different factors seem to constrain the LIS/GIS initiatives, opportunities for future establishment and efficient implementation of the systems exist in the Gaza Strip.

These include:

- The advancement of information and communication technologies (ICT) for processing and managing land data, like: GIS software, surveying advanced hardware, global position system applications, and web based tools...etc.
- The technological advancement in ICT for providing effective access and ability to inquire and edit land registration data.
- The huge development in data gathering technologies such as: Remote Sensing and aerial photography and mapping.
- Increasing of the international development agencies interest in environment information management in MENA countries such as the UN, World Bank, African Development Bank, USAID...etc.
- Palestinian Authority's commitment to improve the ICT infrastructural capacity.

2.4 GIS and Land Registration: Egypt case study

Egyptian Cadastral Information Management Project (ECIM) is considered as an example of a computerized LRS project from which experiences can be gained. ECIM implemented by the Egyptian Survey Authority (ESA). The project's purpose was improvement of land information system for cadastral services and its links to land registration. This aims at better land tenure and transaction security beside a more sustainable management of the Egyptian land resources.

The Egyptian Cadastral Information Management Project (ECIM), working since March 2002, is funded by the Ministry for Foreign Affairs of Finland, to support the computerization of the cadastral system in Egypt.

Elrouby et. al, (2005) summarized the approach and main findings of the aforementioned pilot project as follows:

Damanhour district in Beheira Governorate was the targeted area by this pilot project. It is a rural area approximately 160 km north of Cairo and 60 km south of Alexandria. The old land registration system was only focused on rural lands, which are involved in the Title Registration System. The approved tactic was to develop a consolidated cadastral database and to convert there all existing analogue and digital data, both map data and the corresponding attributes. The GIS chosen (Oracle, ArcSDE, ArcCadastre, and MapObjects) was customized to include fully automated procedures to continuously update these data. Computerizing the day-to-day cadastral work of ESA was seen the most secure way of keeping the database up to date.

Concurrently; the selected approach will rationalize the formerly varying work procedures, as the system will guide ESA staff thorough the workflows. This has been seen significant, as good governance is an important sub-goal of the project.

Considerable time was spent in analyzing the current manual updating system, which was made more difficult because of the lack of an agreed practice manual. Egypt also still runs two land registration systems in parallel, namely the old Deeds Registration System in urban areas, and still about 20% of rural areas, and the new Title Registration System, that has been built by systematic adjudication since 1976, and currently covers approximately 80% of rural areas. The fact that two fundamentally different systems are run in parallel in same offices and by same staff has made it confusing for the involved persons to distinguish between the procedures.

ECIM has made significant progress in developing a computerized cadastral information management system in the ESA. One of the key results of ECIM Project is the Unified Cadastral Database (UCD), which combines the map data with the attributes, and which is designed to satisfy end user needs: continuous and automatic

updating through day-to-day cadastral work, senior management monitoring, and printing out of different map outputs, reports and statistics. The unified cadastral database will be updated by automated workflows of all land registration activities.

2.5 Summary

This chapter discusses the development of Land LRS. Types of LRS included: 1) registration of deeds; 2) registration of titles. GIS was a highly appreciated tool in developing land registry systems in developed and developing countries during the last two decades. To apply GIS for land registration; decision makers will pass through 4 phases including: 1) planning for using GIS; 2) modeling the current situation; 3) development phase; 4) deployment phase. This chapter ended with describing a case study for applying GIS in LRS in Egypt.

The next chapter assesses the development of LRS in Palestine since the Ottoman duration.

Chapter 3: Land Registration in Palestine

3.1 Introduction

This chapter aims to briefly outline the evolution of the land tenure and registration system in Palestine throughout various ages and facilitate for proposing a future methodology that may improve the current system. Because of the scarcity of the reference material on the land laws and customs during the Byzantine rule in Palestine, the Islamic period will be taken as the starting point. It tracks the development process of land registration system and how it inherited various key elements from other sources. It also covers the land administration system adopted in the West Bank and Gaza Strip.

3.2 History of Land Registration in Palestine

3.2.1 Ottoman Period

Ottoman state enacted the famous land registry known as Tabu for recording ownership of a land, Palestine was under the Ottoman rule, for that the Palestinian territories witness tax laws and administration area of its territory. However, Palestine had its own laws , such as the related ones to the registration of land and land ownership for foreigners.

Lands were going by Islamic terms and laws before the Ottoman occupation, although the especial Primitive laws of land for maps shortage and undocumented location, but it was fair price at the time (Attallah et al., 2006).

In Islam, the term (Tenure) is defined as a relationship between man and things he get from his legal and legitimate outputs. Man's relation with stuff lead to a relationship of man to society, which in turn dominated and organized by the Islamic laws and legislation.

There are a lot of verses refers to the respect of property rights in holy Koran, Koran obliged respect for property rights to people regardless of religion, the non-Muslims have the same property rights of Muslims, Koran also spur the respect of orphans and women's rights and others (UN-HABITAT, 2005).

The concept of land registration in the Islamic era was not the same as in the modern era, although there was some sort of registration, which is limited to public lands and state lands. Lands classified into two types: the first is the land that lies within the boundaries of cities and villages, "urban" and this land is to be owned by especial people, and include homes and small roads. The second type is the land that lies outside the boundaries of urban areas are state lands, but can be rented to people in order to be used under certain conditions (Jamal Al-Din, 1966).

So, the purpose of recording the second type was for controlling the stat's income and expenses. As it didn't include any precise description of areas and borders, and limited to a list of names of granted people who are supposed to pay tithes of the crop, were the separated recorded offices called divans (Tamim, 1995).

Like any other part of the Ottoman Empire, much of lands in state ownership were transferred firstly to the British in 1917, and then to Israel in 1948. Is still referred to as the recording properties Israeli territory to the Land Registry, registration offices and record certificates Tabu. Tabu is ottoman term in origin, and its official certificates in the courts and judiciary, it can't be revoked or denied or dispose registered Tabu lands but by a permission from supreme court.

By going back in Palestinian land history, we find it under the byzantine rule before Islam, where there is a dearth of references that talk about this period, after that, the Islamic conquest came, it was like any other state has been liberated by the Muslims, native population were not stripped of their land, but divided into two types, "tithe paying " and " tribute paying (Goadby and Doukhan, 1935).

Tamim (1995) has explained that the tithe lands are lands that have been delivered to the Muslims conquerors, or who converted to Islam, and they were paying tithe of the income of the crop, the land abscess are left with the non-Muslims , where they pay a fixed amount agreed upon or the proportion of the crop no less than tithe.

Land tenure and land registration continued loose in the absence of a specific regulatory laws in the early days of Islam, and did not make any attempts to organize the land tenure until the Ottoman rule of Palestine (Zubaida, 1993).

In 1958, Ottoman authority set the law of Tabu to register ownership of the land, as asked the citizens to record Ground in their possession in the "deed register" as it only records the case number and the year, but no determine of locations (Attallah et al., 2006). Palestinian felt danger to register their land for two main reasons: 1) spare themselves paying exorbitant taxes to the Ottoman state; 2) to escape military service, where they were used names in the registered their land in the lottery for the service in the Ottoman army (Tamim, 1995).

Turkish deed registers were unable to document the ownership of the land in Palestine, so continue to people collective ownership of the land, and continued the tradition, except for some families and individuals who took advantage of this law, and registered so many land in their favor, some of them were not even theirs, especially those in positions in the government (Hezmawi, 1998).

3.2.2 British Mandate Period

During the British mandate time, a law of Land Settlement Ordinance was set in 1928, which stipulates that land ownership is recognized only through surveying and registration in the name of the owner only, not the name of village, family or clan, this law faced objection of many citizens, because it conflicts the principle to participate in the ownership of the land, and an attempt to break the solidarity of families and villages, and to strengthen the capitalist system (MOP, 2007).

Under this law, every village has been divided into a convergent suitable block, each block has been given a site name and a serial number, as well as define land location in each block according to claim the owners, each land has been given a unique serial number distinguishes it from other, and began a land survey and prepare the schemes of its space, and the issuance of property documents known as (Tabu Certification), which include the name of the owner, the site, block or parcel number and land area (Hezmawi, 1998).

3.2.3 The (Israel) occupation of Palestine

Between 1948-1967, the time of Jordanian control of the West Bank and the control of Egypt to the Gaza Strip, land settlement continued, the process of registration, land

settlement and surveying to prepare the settlement schemes "block" continued as well, which included settlement processes nearly one-third of the land area of the West Bank, but the processes settlement stopped at the fall of the West Bank and Gaza Strip in 1967. In that period, about 70 laws of the land registration and transactions have been set, which were issued Law No. 40 of 1952, a law of "Land and Water Dispute Settlement Law", and this law in force in the Palestinian territories to this day, most of the laws are not suitable for the current situation , however The Palestinian Authority is currently working to pass new laws governing land ownership, registration and administration (MOP, 2007, Tamim, 1995).

In 1980, Israel declared that the lands which were not registered or cultivated as state land, and put hands in all lands to be considered without the owner (MOP, 2007).

3.2.4 The Establishment of Palestinian Authority

During periods when the first of the establishment of the Palestinian Authority in the period between 1993 and 1994 , it was necessary to create policies for the land, and developing them to encourage the new administration of the Palestinian land and natural resources and harmonize the various laws and regulations that in operation in the West Bank and Gaza strip. In June 2002 , a presidential decree number10 ordered to establish the authority of the Palestinian land, has its own entity and budget, and reports directly to the Council of Ministers, giving it the full responsibility in managing space circles , registering and managing the state lands.

After the issuance of Decree No. 10, the Land Authority became the only body authorized to deal with land management, what distinguishes this system that it is ruled by one independent and efficient administration, this system were accepted at the request of the world bank, noting that this system is applied in the countries in transition Europe. In many countries, land registration offices and cadastres operate separately in different ministries and this was the case before 2002 (MOP, 2007).

The PLA mission statement at present is: "Preserving the right of land ownership and other consequent rights of people, governmental and non-governmental institutions by surveying and registering lands in land registers. In addition, working to solve conflicts

and disputes regarding land boundaries and preserving governmental lands and estates as well as good use of lands” (PLA, 2013).

An alternative mission statement suggested is: “Establish, register and preserve land rights, administer land transactions, help to resolve land boundary conflicts and disputes, and maintain the integrity of cadastral information” (PLA, 2013).

The existing land classifications are as follows and described generally as:

- Mulk – privately owned;
- Miri – ultimate power lies with the Sultan (state) and can be converted;
- Mattrouk – public use land for the greater good;
- Mawat – uncultivated and unclassified land, can be converted to Miri; and
- Waqf – land held in religious trusts, some land in trusts are granted to villages and held privately. Waqf land is managed by the Ministry of Waqf.

3.3 Land Administration and Registration in Palestine

Area of historic Palestine is 27027 square kilometers, where water bodies constitute the size of 704 square kilometers. As a result of the political conditions and the Israeli occupation in 1948, the land of Palestine was divided into 3 sections (Attallah et al. , 2006 / MOP, 2007):

- Israel 20 922 km² (77.4%)
- The West Bank 5,755 km² (21.3%)
- The Gaza Strip 351 km² (1.3%)

After the Oslo agreement, land in the West Bank was divided in 3 security categories, Figure (3.1) shows Palestine Map according to Oslo Agreement.

- Area A, 18% land coverage came under Palestinian control of civil administration and security.
- Area B, 24% land coverage came under Palestinian control of civil administration only.
- Area C, 58% land remains under full Israeli control.

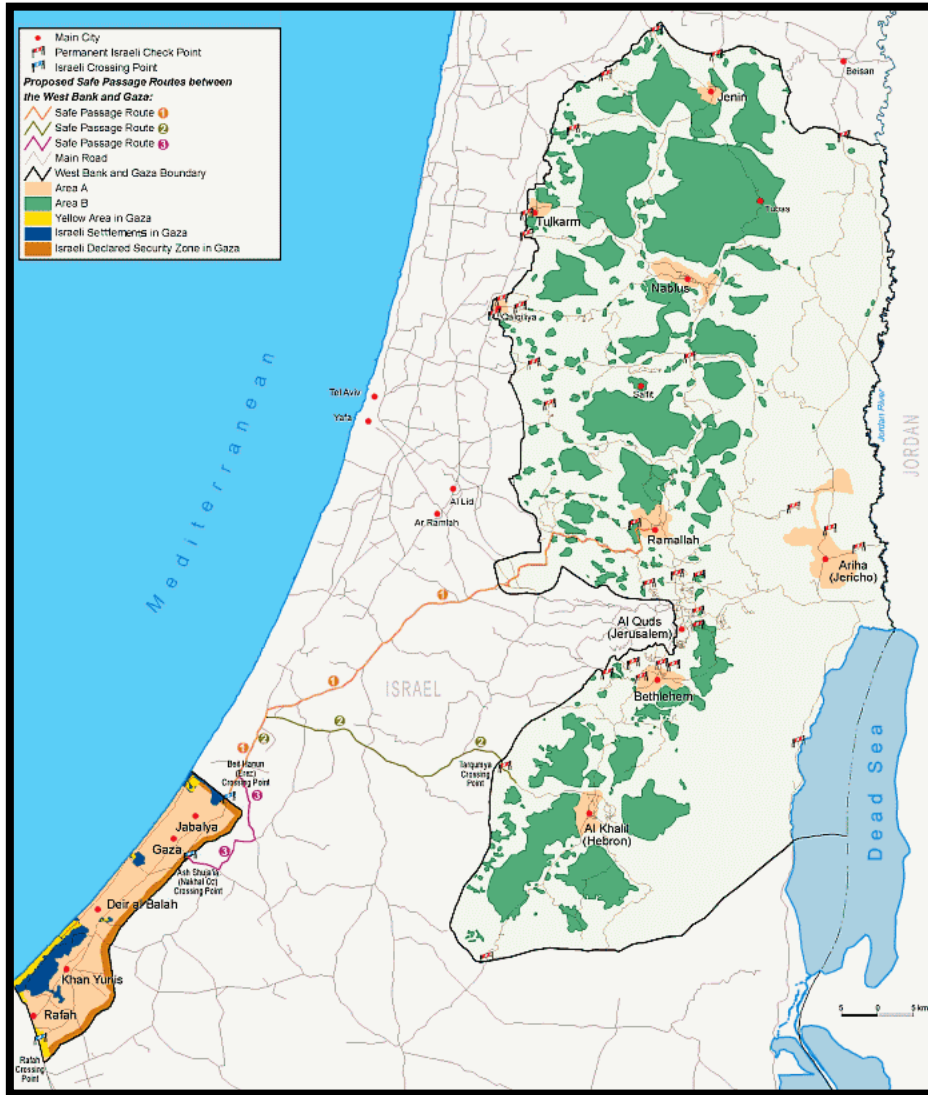


Figure (3.1): Palestine Map according to Oslo Agreement (mideastweb)

Before the Israeli occupation, the systematic land registration system in light of the Jordanian regime and include the address and cadastral maps. the attempts to register land were not interrupted in the West Bank and Gaza during the Jordanian-Egyptian administration respectively. During this period was recorded 98% of the vouchers Lands Gaza, and 30% of the West Bank lands were scanned and registered (PNA, 2008). The reason for the lack of proportion of land registered in the West Bank, because 58% of the territory is controlled by the Israeli occupation "area C" .

The system used in the registration of land transactions in both the West Bank and Gaza is based on a complex manual processes, which may takes long period of time, this is a

very tiresome processes on employees and citizens, in addition to, the registration process is too expensive for some landowners. That encouraged the use of informal unsafe ways like contracts for the sale at the lawyers, which in turn adversely affected the registration records in not matching with the current owner of the land (Attallah et al., 2006).

Through the field survey, found that only 48% of current owners match the registration records, in addition to that there are many disincentives for recording land transactions, such as a complex process and is transparent and takes a long time and conditions before registration and payment of delayed taxes dating back for generations (PNA, 2008).

The current registered areas of land are shown statistically and are based on a total of 5,598 km² of Palestinian occupation (MOP, 2007), Incomplete and unregistered land therefore totals 3759.57 km² (67.1%), which includes 3108.62 km² (55.5%) of land that does not have any registration record as illustrate in table (3.1).

Table (3.1): The registration land in Palestine. (PNA, 2007)

	Registered land		Incomplete registration		registration has not begun	
	km ²	%	km ²	%	km ²	%
A	499.68	8.9	112.71	2.0	387.56	6.9
B	285.78	5.2	132.17	2.4	782.68	14.0
C	1053.06	18.8	406.07	7.2	1938.38	34.6
Total	1838.52	32.9%	650.95	11.6%	3108.62	55.5%

3.3.1 Land Administration in West Bank

Settlement operations have been done in the West Bank for 7000 blocks, also known as cadastral maps that have been previously surveyed, and each block consists of 150 parcel a total of approximately 1,050,000 are registered parcels in addition to regular surveys. Registration operations were sporadic, in the period between 1967-1997, the average of 55 registration transactions recorded annually, and rose to 100 transaction registered under the Palestinian Authority. The total of 1052650 ownership was recorded in the West Bank. With this huge number of parcels it is clear that huge tracts of the extensive land has not been recorded and a high percentage of land populated registered (MOP, 2007).

Since 1991, the surveying department has not make any procedures to update cadastral maps referred to in the records of the Land Registry, and many often divisions parcels and equivalence do not reflect the current situation. LRS works in the West Bank in a decentralized manner, there are Ten registration offices are independently responsible for the registration of land in their home state, and there is a paper registration system in use, where it is manually registered in books and contracts. Fortunately, there are some common data exist: parcel number, block number, the name of the village, which help determine the parcels with a minimum of confusion. Citizens are dealt with in the West Bank registration offices by placing the citizen's name on a waiting list until the arrival of his turn, he will be called, or he goes to the lawyers to help get the service information or to register land.

3.3.2 Land Administration in Gaza

The Gaza Strip is under Zone A, with full security and administration sovereignty of the Palestinian Authority, records shows that 98% of the area registered on the cadastral maps. Nearly 30400 of ownership titles, 239 were registered address. The transactions are classified and procedures in the Gaza office differs in the West Bank offices, Gaza does not follow the same procedure where citizens go directly to the Gaza Strip to the registration office reception department and do not have to wait, they fill in model of two, either to apply for information or registration services. So he might fill himself, or go out the office for writers to write (MOP 2007).

3.4 Palestinian Land Authority

3.4.1. The Goals of PLA

The goals of PLA are (PLA, 2013):

- Computerizing the Palestinian Territories using aerial photographs
- The removal of illegal acquisition of lands by forcing laws
- Conduct an inventory survey for lands owned by the government
- Register lands and houses according to the 1996/1 law
- Update and digitize old records
- The use of GIS to save and improve the quality of maps
- Set up a geographical information system using GIS

3.4.2 PLA Responsibilities

PLA is the only authority responsible for dealing with land, such as land surveying, registration and administration of Lands State. It is the responsibility PLA harmonization of existing data and procedures between the registry offices and office survey. It is also responsible for addressing related rights cases, illegal settlement, and sporadic systematic registration of land, and inventory of state lands and remove the transcendences and update cadastral geographical maps. In addition to that, registration offices administration in the West Bank and Gaza in terms of delivering services to citizens is the easiest and fastest way possible, and the development of laws and regulations to regulate the transactions surveying and registering the land and other transactions in accordance with the changing temporal and spatial, and receive complaints from citizens, accept suggestions, study and address the outstanding issues regarding the transactions.

One of the most important responsibilities of the PLA is to setup a strategic plan that address the technical-financial resources, institutional-human resources and work to achieve their own goals.

3.5 Summary

During this chapter; history of land registration was discussed covering the period from Ottoman (Islamic Empire) to the Palestinian Authority. Then, land administration and registration in Palestine (West Bank & Gaza Strip) was discussed in details. Goals and responsibilities of the established PLA were handled briefly.

During the next chapter; the current LRS in the Gaza Strip will be assessed by lots of measures and data collection tools.

Chapter 4: Evaluation of the Current Situation

4.1 Introduction

This chapter identifies the land registration situations and the needed modifications to ensure efficiency and effectiveness. Several key informants interviews were conducted with technicians and decision makers in PLA (see annex 3). The findings of these interviews and meetings will reveal the structure of the PLA and the specific duties per each department, and that to ensure the fully understanding for the current used methodology of land registration.

After collected data process, a SWOT analysis will be conducted in a participatory approach involving PLA technicians and decision makers.

4.2 General Administration for Land Registration

The General Administration for registration of land and real estate is considered as one of the most crucial departments of the Land Authority, which is responsible for the following tasks:

1. Keeping land records and files related to land registry.
2. Hold records of transactions and restrictions on the land, parcel and flat.
3. Produce registration and ownership certificates in accordance with the restrictions listed in records.
4. Conduct the mortgage transactions and the acquisitions of lands
5. Record Registration applications for transactions, standardization and assembling properties.
6. Collect legal fees due on transactions.

As money in transactions are confined to the General Administration of land registration and real estate, it is not transfer of ownership, but to register in the records of the Land Registry, which help the new owner to confirm his acquisition under the law of the Land Registry, unlike contracts customary, which is a temporary contracts. The law granted “Tabu Contracts” strong immunity and official ethnicity by the courts so no one has the power to cancel it without a court decision.

The General Administration consists of land and property registration from three departments, namely:

A. The Reception Department

The reception department in the land registration consists of three employees. Those employees are responsible for the following duties:

- Receive applications from citizens
- Registration certificates of registration and enrollment.
- Receipt of transaction and check all the papers of the transaction.
- Record and reference received transactions and integrated into the program of the Land Registry
- Record transactions electronically on the computer.
- Respond to inquiries auditors

B. Audit Department

The Audit department in the land registration consists of four employees. Those employees are responsible for the following duties:

- Checking transactions and applications once submitted
- Calculating quotas transferred to heirs upon the legacy of deed.
- Prepare a summary sheet for each application
- Reference each application
- collect the fees for the service provided

C. Registration Department

The registration department in the land registration consists of four employees. Those employees are responsible for the following duties:

- Registration on book contracts
- Date in the book of records
- Print extracts enrollment
- Print registration certificates
- The final audit of the transaction

Gaining a Tabu registration from the General Administration passes through three steps:

- 1- Registration certificate request
- 2- Free-responsibility request
- 3- Under-extractor request

4.3 Procedures for Registration Certificate

The following steps are illustrating the ownership transformation process:

4.3.1 Stage of the scribes and lawyers

- Involved parties will go to the writer "must be licensed and has its own stamp" for the mobilization of the application for registration.
- Prepare all papers needed to open an application, for example land registration contacts should include: Refillable sales contract "Cartoon Contract" which shows the names and numbers identities of the involved parties, the share sold, widget, quotas, and agreed price.
- The writer collects fixed fees set by the ministry of interior affairs.
- The writer to commit to the fixed fee.

4.3.2 Submission Stage

The ownership transaction process starts with applying an application to the reception department, and then it passes through two separate stages, as follows:

A. Handiwork

- Submit a request to open a new transaction.
- Requesting an ownership request to prove legal ownership of the land.
- Paper checking in order to open a transaction.
- Be sure that the land parcel has no objections are by querying the land parcel through the computer.
- Verify the application and the purpose of this agreement, the application should be thoroughly edited. In addition to that all involved parties in the

contract should be verified; (the seller by fingerprint and write his name, ID number, and other parties by signature only) Any error in the application for registration must be invalidated and cancel the transaction.

- Make sure all the necessary paperwork for the transaction from contracts of tax-free party and others.
- Give each transaction annually serial number.
- Pay a fixed fee
- Record the contract in the transaction book which contains; transaction number, the date of opening of the transaction, name of seller and the transferee, the type of transaction, parcel, and the city in which the land is located.
- Mark process and record the process of marking transactions are open by entering the transaction number \ year in the notes box in front of the owner's name, that is done in Registration Department.
- Send the transaction to the Audit Department .

B. Computer work:

- Check the status of the land and parcel and make sure that there was no reservations or objections about this land in the system.
- Entering the transaction to the system
- Mark transactions that are opened through the system .
- Check the status of the transaction through the system.

4.3.3 Audit Stage

The work is divided into two stages:

- First, auditing pre the guessing committee.
- Second, auditing and calculating the audit fees and payment receipts.

Each of the aforementioned stages passes through two processes: starting with the manual preparation; and then finalizing registration by the computerized system. The following ordered steps will illustrate the whole audit procedure:

1. The transaction is transferred to the audit department to disclose the transactions that have been opened and make sure that the transaction is kept in its own file.
2. Check the ownership certificate and make sure there is no variation from the data on the computer.
3. Make sure that the land or parcel has no registered rights or objections or reservations.
4. For selling transaction, a check will be made to assure that the owner has the land he is willing to sell.
5. For sales transaction which include documents of procuration, specific procedures should be followed to make sure that the procuration is certified and if the procuration specified by the spaces that will be sold must make sure that the selected area equal to or greater than the area of the owner of any that space sufficient for the transaction must also make sure that he is not selling the selected area before in previous transactions are sure of that reference to contracts or transactions that are opened to the same owner.
6. Procuration agreement should be published in the Official newspaper as agreements that are over the 15 years and more dependent implemented directly in the Land Registry either public procuration are published for two weeks and is valid for 6 months from the date of announcement, and after the announcement must be renewed, either procuration periodic on the rights of others are published for a whole month, and a year from the date of publication.
7. Make sure to publicly declare the agreement by official newspaper in terms of the name of the clients as well as the land and parcel number. In the case of private agencies, the transaction opened, after that it is publishing in the Official newspaper and writes the transaction number.
8. In the case of the discovery of an error in the newspaper announcement, it is requested to correct it or republish the advertisement again.
9. Check the availability of all required documents.

10. Make sure that all involved parties have free-tax records.
11. Fill out a special form each transaction showing all documents included in the transaction.
12. In transferring transaction, all documents should be legally certified.
13. Must ensure that the legacy of deed relationship to the inherited person.
14. Check who transferred lands previously by tracking the quotas that have been moved through the system, and this is done by check notes and keep track of the quota transferred contracts.
15. Calculating quotas transferred to the heirs on the deed legacy (in the case of the earth kind of meri and date of death before 1965 and planted after 1331 Hijri or Muftilhh or Hakura are supported distribution transitional or formal to the legacy of any of the male like the share of female and whether planted year before 1331 Hijri and the date of death by the year 1965 distribution is illegal and it is illegal.
16. In the case of inheriting transitions happened before 1955 , the English reference should be adopted.
17. Write the land quotas, area, and price on the cover of the transaction application.
18. Transfer of application from the audit team to the committee.
19. First stamp by the auditor and a signature.
20. Print a list with all applications sent from the Committee and to make sure that all transactions sent from the Commission audited and sealed.
21. Transfer the application to the secretarial to fill out a form and write on application covers the estimated price per meter.
22. Computer Work Phase including: 1) Inquiry about the land parcel that he there is no rights of or objections of Reservations; 2) Transfer the application from the estimating team to the committee by the system.

4.3.4 Guessing Committee

It is the committee that estimate the price of square meter based on the maps provided. The committee is chaired by the Chief of PLA and members of the Ministry of Local Government and the Ministry of Agriculture and two employee from the Land Authority; the LA register and a representative from the survey department.

1. The estimated price will be written in the transaction cover and in guessing form.
2. The form should be signed.
3. All forms should be signed by the Chairman of the Committee , Chief of Land Authority.
4. Submit the agreed price by the secretariat of the Minister's Office.

4.3.5 Gaza Registration Land

It includes waiver of land by the owner. This stage to confirm that the land owner waives his full ownership to the buyer in front of Registered Lands Gaza that capture the full price being recorded date of signature, the date is important and so recorded in the book of contracts .

4.3.6 Registration Department

Activities are divided into two stages:

A. Contracts registrations in a book

After the completion of the final signature for all parties involved, the application will be passed to the Registration Department in order to create a record in the book of contracts. Registration on the contracts book is the direct following step. This process starts by issuing a unique serial number for the application; and then calculating the quotas.

Data required for the contracts book includes: Contract number, contract date, the transaction number on the year, part number, parcel number, city name, buyers' names, the transferees' names, transaction type, and any other notes.

Numbers of contracts included in the transaction and the date of registration of this contract in the book of contracts are being written on the transaction files.

This is being followed by a computerized stage, where the book will be forwarded to another employee to record the contract on the system.

B. Contracts registrations in files

The Land Registry Tabu has 123 records to document properties which are classified according to land parcel number.

- Cancellation of the contract

The old contract will be crossed by red line in case of the transfer of all quotas to a new owner. A note will be written down to refer to the new contract.

In some cases, part of contracts will be cancelled, such as reallocating any contracts remaining quota of the inheritors without cancellation until transfer all the inheritors and writes in the notes box "quota value" quoted contract (New Contract No.'s | Year).

- Records entry

Data is recorded according to pre-defined procedures, including: Contract number, which was recorded from book contracts, the date of the contract, and quotas calculated and notes.

After registration records, contracts will be linked through a computerized system as follow:

- Land's number is entered, parcel and query data from display button.
- Once the new contract get a reference number, the old contract will be marked as "cancelled" and moves to the notes of the new contract.
- If the old contract is not fully cancelled, it will be written in the note section.

4.3.7 Final Reporting and Printing

To confirm the success of the data entry process for all contracts, a report can be printed to check all data. The report should include; New contract number, the names of current and previous owners and their quotas and the current owner space in addition to the total quota in the contract.

4.3.8 Printing Registry Certificate (Al-Koshan)

From the window of Printing, Any contract can be printed by selecting the contract by pressing the printing button. Then it can be stamped and sent to be collected by the owner.

4.4 Methodology of Recording New Unregistered Lands

4.4.1 Submission Stage

- Request to open new registration transaction made by the owner or his agent.
- Identification documents to the owner of the transaction
- Financial certificates from the Income Tax Department
- Sequence property contracts
- Inventory and approval of the heir son the rightness of selling or acceptance the registration.
- Approve the location of land's neighbors on all sides that ensures the rightness of ownership of the applicant.
- A confirmation by the mayor of the area
- Official confirmation by the applicant to confirm the ownership of the land and that all information provided to the Land Authority is correct.
- Pay a fixed fee voucher detection, which is non-refundable.

4.4.2 Technical Stage

- Advertising is placed in the mosque, municipal and Gazette for 30 days as an opportunity to submit objections.
- Land survey
- Draft map shows the land intended to be recorded, and the signing of the neighbors and mayor.
- The Committee will examine the objections made during the period of objection either to be presented after objections that are not taugth and gives the applicant period only a week to prove before the judicial authorities.

- In case of the absence of any objections, the final map will be issued by the Department of Survey after payment.

4.4.3 Audit Stage

- The file is displayed on the renewed Registration Committee to take a final approval.
- After approval of the Registration Committee restored file is displayed on the Commission to provide guessing price per square meter.

4.4.4 Registration Stage

- Give a transaction number in the Land Registry of the land intended to be registered.
- Payment of fees worth 0.5 % of the estimated land price by the guessing committee.
- Registration of land in the official records and gives owner the "certificate of registration" after giving it a land and parcel number.

4.5 Practical methodology of recording a new unregistered land.

4.5.1 Submission Stage

- Application is submitted with all required papers after the payment of fees
- All papers will be forwarded to the legal department for auditing.
- In case of Saba land and any other lands that are not within the old town, a financial certificate is necessary either in the land of the old town and the bodies of the country and the village is very essential.
- In case of failure to provide a certificate of Finance and the sequence of title deeds and any other proof of ownership of the right of the Registration Committee renewed request of the citizen of any papers or documents stating the disposition quiet and stable on the ground intended to be recorded along with papers that require treatment in normal circumstances.

- If a neighbor refused to sign on the draft map, initial draw him a book by the Land Authority to give reasons prevented him from signing within 15 days of receipt of the book. In the event of non-attendance during the period mentioned above brought him notice by the Land Authority that during a week if did not sign the map will be walking in the initial transaction without regard to his signature on the map, taking into account the proper ways to report securities. In case one of the neighbors does not exist and is unknown, an ads should be firstly announced in the newspaper that a neighbor ground mentioned descriptions of the location of land, or on behalf of the attendees to the PLA to signing on the initial map within 15 days from the date of publication, or the transaction will continuous without his signature. Second, assign the applicant to bring pledged that the border is correct and will bear no liability appear in the future.
- In case the applicant was able to provide the required papers and audit it legally the file can be referred to the Survey Department to study it technically.

4.5.2 Technical Stage

- If a site visit conducted in order to measure the land and the presence of any objections from neighbors or any other area team. The survey team should leave the site peacefully.
- The Committee should examine all objections made during the period of objection either to be presented after objections that are not taught and gives the applicant period a week only provable in front of the judicial authorities.
- After the completion of the technical, the transaction moves to the auditing stage.

4.5.3 Audit Stage

- The file will be checked by the Registration Committee. In the absence of any comments on it, the file is finally signed by the members of the Committee and will be then referred to the Commission to estimate the price per square meter and then will be signed the document by PLA Chief .

4.5.4 Registration Stage

- The transaction will be given a reference number in the Land Registry after the payment of the fees which is 0.5% of the land price.
- The file will be referred again to the survey department to give it a final details.
- Registration of land will be recorded and the owner will be given a the "Certificate of Registration".

4.6 SWOT Analysis

SWOT analysis is a common tool in evaluation studies. SWOT is an acronym used to describe four strategic factors - strength, weaknesses, opportunities and threats – of an organization or system as shown in Table (4,1). SWOT analysis is often used in the preliminary stages of strategic planning. It involves the following basic steps: analysis of the internal environment of the organization/system to identify the existing strengths and weaknesses; analysis of the external environment of the organization /system to identify opportunities and threats; the generation of alternative strategies; and the formulation of a strategic choice (MindTools, 2006).

Table (4.1): SWOT matrix (adapted from Winer, 2006)

	Helpful to achieving the objective	Harmful to achieving the objective
Internal (attributes of the organization)	Strengths	Weaknesses
External (attributes of the environment)	Opportunities	Threats

In order to provide a better understanding of the current state of land registration in PA, a SWOT Analysis can be undertaken.

A SWOT analysis is used here for a preliminary evaluation of the existing land method of land registration systems in the Gaza Strip as shown in table (4.2) . The strengths and weaknesses represent internal features of the systems while the opportunities and threats represent external factors that influence the systems. The list of strengths and weaknesses, based on a holistic examination of the system, gives valuable hints for improvements. The same can be said for the threats and opportunities, which hint in what way the system can develop in the future.

Table (4.2): SWOT analysis to the current registration method.

<p>Strengths</p> <p>System is acceptable/legitimate to community.</p> <p>Actors' roles and tenure rules/types are clear.</p> <p>Improved perception of tenure security.</p> <p>Good security of land tenure information.</p> <p>Local expertise in land measurement.</p>	<p>Weaknesses</p> <p>Difficulties in re-establishing surveyed boundaries to be connected with GIS.</p> <p>Bureaucracy.</p> <p>Time consuming measures in dealing with land transactions.</p> <p>Limited capacity of writers (private freelancing scribes), which may cause unwelcomed delays.</p> <p>Not friendly registration templates.</p> <p>Not efficient data entry and achieving techniques.</p> <p>Limited utilization for the GIS applications.</p> <p>Limited access to information for the public users.</p> <p>Limited integration between Tabu information's and GIS map.</p> <p>Stakeholder participation and awareness not supported</p> <p>System improvement is not a priority</p>
<p>Opportunities</p> <p>Improved LRS.</p> <p>Improved perception of land security.</p> <p>Integrate spatial data with other sources of data.</p> <p>Involvement of public organizations/Civil Society Organization (CSO's).</p>	<p>Threats</p> <p>Disruption of program.</p>

4.7 Summary

This chapter introduces the methodology of assessing the current LRS used in the Gaza Strip in addition to the assessment findings. Lots of meetings, field visits, observations and interviews were held with key informants and decision makers from PLA in the Gaza Strip. A SWOT analysis revealed and presented the finding of the whole assessment procedure.

The next chapter illustrates the proposed new methodology for LRS in the Gaza Strip including the proposed templates and forms.

Chapter 5: The Developed LRS

5.1 Introduction

This chapter aims at addressing a new proposed strategy based on automated techniques to register lands in the Gaza Strip. The new strategy is based on previously available data as a source in order to implement the new method. The new strategy has been developed in order to provide easier and simpler technique which is precise and accurate. It will also achieve good level of satisfaction among dealers in the various departments in the Land Authority.

The new approach provides an automated service for land registration process in order to save significant time and costs by all stakeholders involved in the process. For example, Short Message Service (SMS) texts will be used to update clients about the status of their applications and inform them in case further information is required from relevant authorities.

In case of missing documents, the system will stop the application process and inform the client to provide the required documents in order to re-process the application. Both SMS text and email will be the communication channel between land registration authority and the client.

Lands' owners will have an online access to their filed where they can check their information and track any applications in the process.

The software's intended to be used in the research will be discussed briefly by the beginning of the chapter.

5.2 Used Software

Geographical Information Systems (GIS) are used increasingly in variety of application areas. The possibilities to increase the accuracy and to create combinations of all kinds of information sources are available through the GIS technology.

ArcGIS software (ArcMap, Arc SDE ,and Arc Sever) should be used to create a friendly user online LRS. At a high level ArcGIS can be thought of as software that helps you take your geographic information and make it available to others, easily. This data can

be distributed over the Web or through traditional GIS desktop software like ArcGIS Desktop.

ArcGIS Server will need to have access to the data used in the services as well as permissions to view and/or edit the data stored by ArcSDE. ArcSDE provides high availability, backup and recovery, concurrency, scalability, versioning, geodatabase replication and historical archiving.

ArcSDE serves as a gateway between ESRI clients and Relational Database Management Systems (RDBMS) such as Oracle, SQL Server, PostgreSQL, DB2, and Informix. The primary job of ArcSDE is to handle the storage of geographic data within these RDBMS which have traditionally not had integrated spatial data types.

ArcGIS Desktop present digital maps with layers including lands, parcels, blocks besides other geographical features. Microsoft SQL creates a graphical user interface (GUI) for data entry and editing to be linked with both of Website and arc GIS Desktop through ArcSDE. ArcSDE is a connection between both of the programming language (SQL) and geodatabase. ArcServer is a software used for editing digital maps through web. Due to the software scarcity and high cost, in addition to the lack of sufficient practical experiences in the Gaza Strip; this software is not going to be used in this research.

All of the mentioned above software's will be used in developing an online land registration system in the Gaza Strip as shown, figure (5.1) the linkage between program and database.

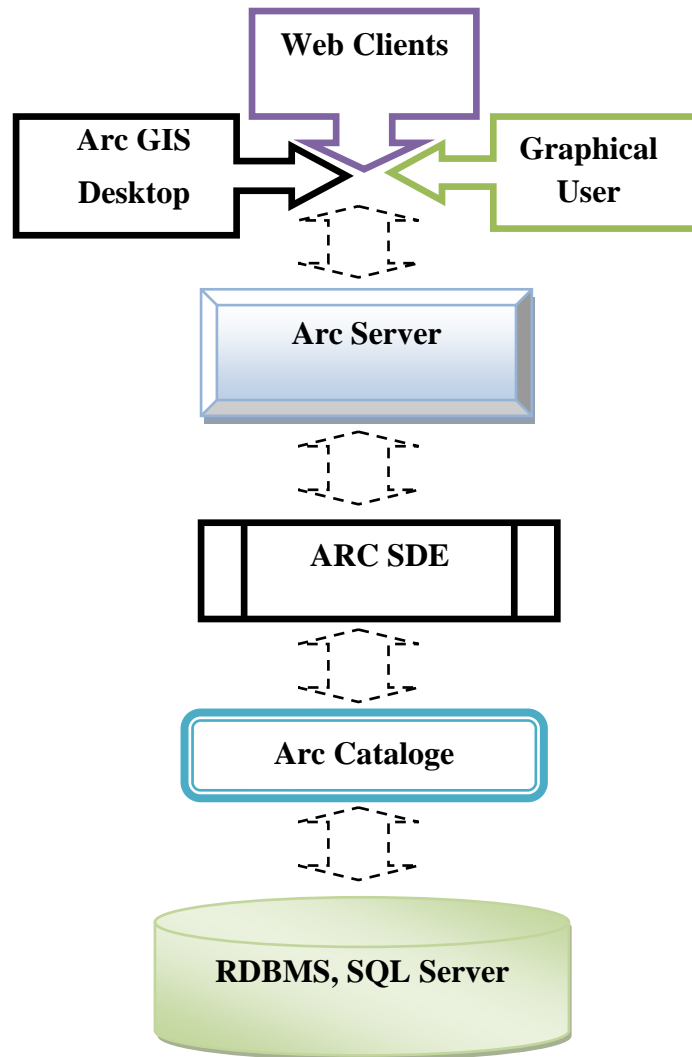


Figure (5.1): Arc GIS Software Architecture.

In theory, a digital land registration system consists of three basic software components as presented in Figure 5.2. The core of the system, represented in blue, is the data repository which stores the Land registration data. Alphanumeric data is usually stored in RDBMS. To be able to store and maintain spatial data, RDBMS are extended with spatial data engines.

The green part of the diagram represents the mapping functionality, which may include a combination of GIS and surveying software with cadastre applications.

The user interface is the outer layer, the visible part of the system through which users interact with the software and data. In reality, digital LRS have multiple user interfaces for different functions and different groups of users.

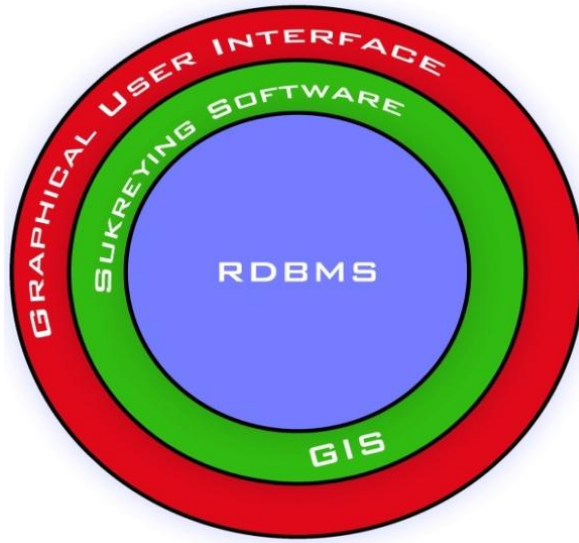


Figure (5.2): Software Components of LRS.

5.3 Proposed Methodology for Land Registration

The new registration depends totally on a fully automated computerized methodology for all the operations and it will replace the traditional manual procedures. Due to utilizing SMS's, land registration transaction will be easily followed via connecting registration server with internet. Data about type of transaction and status will be accessible on a website connected to the registration system.

As illustrated in Figure (5.3), this methodology passes through several stages, starting from the scribes and lawyers who will start the clients' transactions on the website and upload the required supporting documents. The Reception Department in the PLA will double check the validity of the provided data in addition to identifying the land boundaries, and then feedback the clients via SMS and/or email. The audit department will check the land's ownership status. The legal department responsibility will be ensuring the legal status of all the supporting documents and feedback both audit and reception departments (see annex 1).

Guessing committee then will provide an actual price estimation for the land at the date of the transaction in order to identify the exact registration fees. The PLA chief then will approve the whole transaction before the final audit. PLA will provide the client with the feedback on his transaction and archive all of its documents.

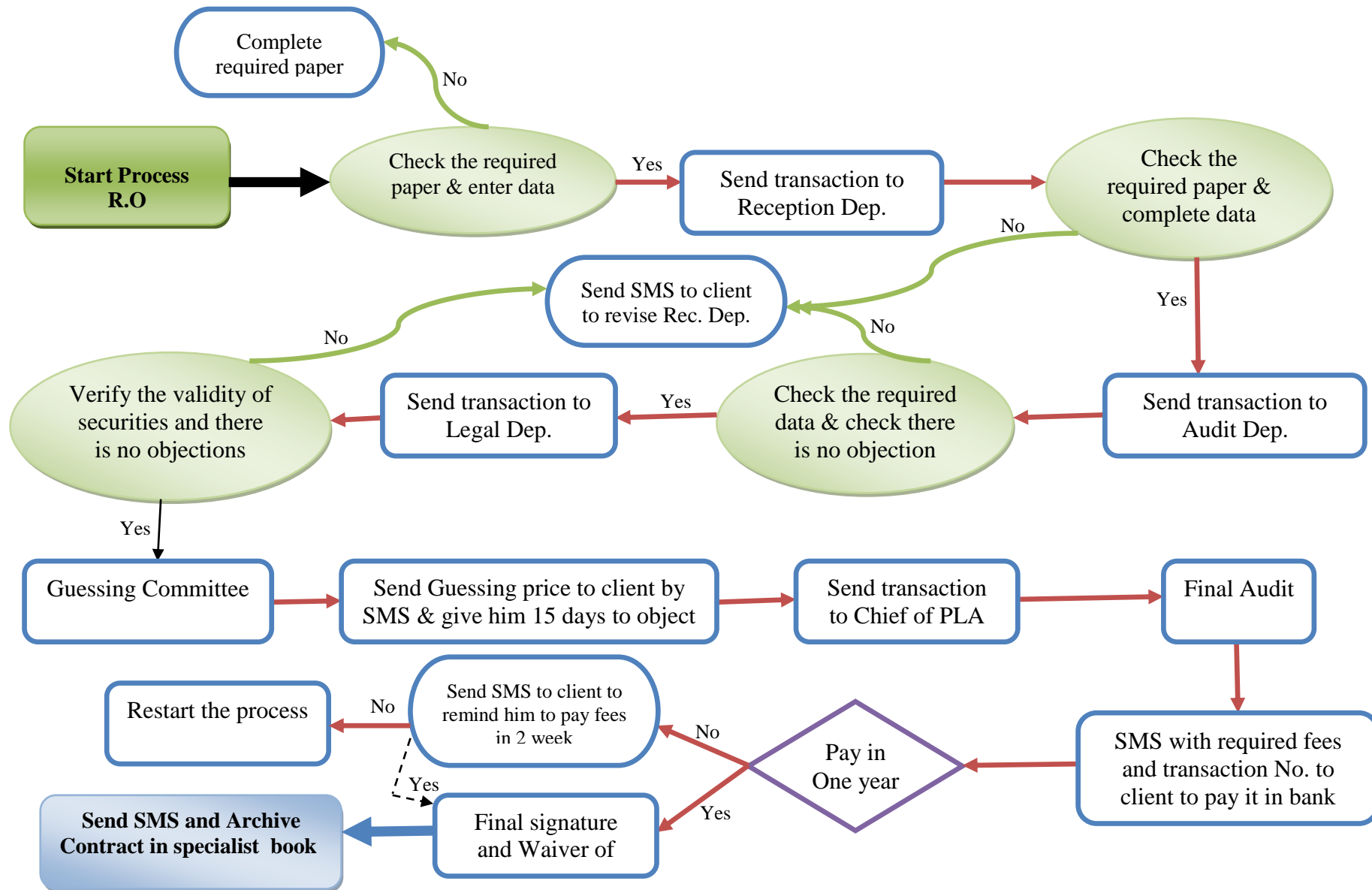


Figure (5.3): Procedure of modified method of land registration

5.3.1 Scribes' and lawyers' stage

Firstly, the new technique will be explained for either new registrations or updated registration. All procedures adopted by Land Authority will be considered in order to compile with Palestinian intellectual properties laws and settlements regulations in order to rely on the data available for other operations, in addition to the currently available data at Land Authority which will be considered as a reference for the new technique.

Sales transactions are divided into two types. Each type has different terms and conditions. This study covers the registering property transactions in two ways; update the registry or new registry.

Each phase requires a set of required papers which are required to be submitted to one of licensed offices which met a certain criteria in order to ensure effective process.

The registration process starts by in-person visit for the clients who wants to register a land to his private ownership "Tabu" or to transfer an unregistered ownership of another person to his ownership .

5.3.1.1 Client

The client is firstly expected to go to one of the licensed offices in order to update or open new registration file. The client is expected to provide the following documents.

- 1 - Tax-free certificate
- 2 – Original IDs
- 3 – Primary contract sale
- 4 – Final contract sale "Koshan"

The client will be required to provide contact details (i.e. Mobile number and email address) in order to activate an instant-updating-system which enables the client to receive emails and SMS about the progress of the registration application.

New application will be attached to a serial number which will be used for future communication between the client and the Land Authority.

5.3.1.2 Eternal Registration Offices

Registration offices (RO) as previously highlighted have been established after meeting selection criteria set by the Ministry of Interior Affairs. RO will be under continuous monitoring by governmental authorities in order to ensure full functionality and effective services. RO is expected to be equipped with comfortable furniture for audience. Each RO has access to the main database system which will be used to apply new applications. RO accounts have restricted access enabling them to add, view and edit client's data. RO staff will choose the type of the transaction (e.g. new transaction, updating etc.). RO staff should check all documents in order to start filling in the on-line application.

After the on-line application, all documents will be scanned and uploaded. Then, a copy of the application will be printed, stamped and delivered to the Reception Department at the PLA. Thus the service of the licensed office will end. Figure (5.4) shows the Web based page that is used by RO.

Ownership certificate may be requested by Land Authority in order to check the status of their properties after submitting the on-line application. Therefore, RO staff will apply for an ownership certificate for the client. In order to get an ownership certificate, the client should provide the following documents:

- 1 - A death certificate or deed legacy if the person to be investigated
- 2 - The investigation of a person other than the above-mentioned immovable money if there is a court decision.
- 3 - Institutions formal or semi-formal right to investigate ownership under the law.

“Ownership Certificate” can be produced by RO staff after submitting an online application and uploading the required documents. Then, printed copy of the application will be sent to the Reception Department in order to be processed by the GUI. Then the employee will check the data on the record through the system. In case of any error or differences in the data between the application and the system, Director of Registration department is the only one can edit the application which will be moved then to the Registry Lands officer in Gaza for signature.



Registration Office Form

General Information

Transaction No.
Transaction Date
Transaction Type
Reason of transfere
Land No.
Parcel No.
Governarate
Sale Price
Area m²
Area Donom
Mobile No.
Email

Client Information (Transferee)

Transferee Name
Gender
ID No.
Date of Birth
Address

Buyer

Buyer Name
Gender
ID No.
Date of Birth
Address

Border

#	EAST	WEST	NORTH	SOUTH
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

The Paper Required

ID Photo
 No file selected.

Kuchan
 No file selected.

Tax Free Certificates
 No file selected.

Office Information

Office_Name
office_licn

Figure (5.4):Web based page used by RO.

5.3.2 Reception Department

The main function of the Reception Department is the receipt of applications from licensed RO, in addition to it offers inquiry services for clients who are seeking further advice.

After the receipt of the application, the RO will inspect the application first, the postage and then electronic check via the system and check the serial number of the application and ensure that the application has right information. Finally, he has to make sure that the land has no legal problems or reservations or objections, and have attachment extractor constraint so that the receptionist to call the courier and request him to bring extractor limitation of Registration Department if they were not present to Reception Department and for the speed of registration.

After finishing the inspection process, the Reception Department officer will add the land parcel details (e.g. Geographical Coordinates) to the system. Adopted methods to calculate the geographical coordinators will be discussed later.

After the completion of data entry, the employee submits the application online after writing his name and, other details (i.e. day, date, time, computer IP).

Additional information related to the legal issues for the displayed file can be viewed by the officer if he found any defect or any incorrect information or problems and reservations or objections on the piece of land or problems with contracts or any condition. Therefore, an employee at the legal department has to clarify the problem and write notes which are visible by the users of the system. If the problem needs further investigation, SMS text will be sent to the client in order to inform him about the status of the application. Figure (5.5) illustrates the web based page that will be used by the reception department.



Reception Form

General Information

Transaction Date	<input type="text"/>
Transaction Type	<input type="text"/>
Reason of transfere	<input type="text"/>
Land No.	<input type="text"/>
Parcel No.	<input type="text"/>
Governarate	<input type="text"/>
Sale Price	<input type="text"/>
Area m ²	<input type="text"/>
Area Donom	<input type="text"/>
Mobile No.	<input type="text"/>
Email	<input type="text"/>

Completing Information

New Parcel ID	<input type="text"/>
---------------	----------------------

Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

Legal Department Information

Computer Name	<input type="text"/>
Last Update	<input type="text"/>
Legal User	<input type="text"/>
Find Obstacles	<input type="text" value="Yes"/>
Notes	<input type="text"/>

<input type="button" value="Save"/>	<input type="button" value="Confirm"/>	<input type="button" value="Revise"/>
-------------------------------------	--	---------------------------------------

Figure (5.5): Web based page used by Reception Department.

To get point survey after processing the transaction at the legal department and verifying the validity of the transaction, a SMS will be sent to the client to hire a certified surveying team to register the coordinates of the land in order to be very accurate data for a fixed fee of space or the number of points. As shown in figure (5.6) coordinates can be registered by high-resolution GPS device or Total Station so that the information can be recorded in a GIS program with the details of the transaction which will be entered manually. It's recommended to use ARC-Servers to enter the information automatically.

Land Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Land Info.

NO.	X	Y
1	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>
5	<input type="text"/>	<input type="text"/>
6	<input type="text"/>	<input type="text"/>
7	<input type="text"/>	<input type="text"/>
8	<input type="text"/>	<input type="text"/>
9	<input type="text"/>	<input type="text"/>
10	<input type="text"/>	<input type="text"/>

Submit

Figure (5.6): Web based page that use by Surveying office.

5.3.3 Auditing Department

The Auditing Department follows the Reception Department. After processing the transaction in the Reception Department, the auditor also reviews the data to make sure of the validity of the data and the absence of any error or the occurrence of any future malfunction that may expose the owner of the land to the problems or legal accountability. The auditor can amend information in the case of spelling and then he can move to the next stage. The client will receive SMS informing him that the application has passed the auditing stage. In the event of any reservations or objections, auditor will send the application back the Reception Department. A message will be send to the client to inform him about the action so that he can go to the Reception Department to get feedback. Figure (5.7) shows the web based page that will be used by the audit department.



Audit Form

General Information

Transaction Date	<input type="text"/>
Transaction Type	<input type="text"/>
Reason of transfere	<input type="text"/>
Land No.	<input type="text"/>
Parcel No.	<input type="text"/>
Governarate	<input type="text"/>
Sale Price	<input type="text"/>
Area m ²	<input type="text"/>
Area Donom	<input type="text"/>
Mobile No.	<input type="text"/>
Email	<input type="text"/>

Completing Information

New Parcel ID	<input type="text"/>
---------------	----------------------

Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

Legal Department Information

Computer Name	<input type="text"/>
Last Update	<input type="text"/>
Legal User	<input type="text"/>
Find Obstacles	<input type="text" value="Yes"/>
Notes	<input type="text"/>

Figure (5.7): Web based page used by Audit Department.

5.3.4 The Legal Department

The Legal Department is one of the crucial steps to complete the process of land registration by verifying the originality of documents.

After meeting the criteria of both Reception and Auditing Departments, the transaction moves to the Legal Department. The Legal Department officer will have a restrict access to view all the information provided by the Reception and Auditing Department team. However, he will not be allowed to modify the data when there are errors or problems with data but he can enter notes in system to which can be viewed by the relevant employee. So that, employee can check the date and correct it if he can or send a notification to the client to in order to arrange for urgent visit to review his application. Figure (5.8) shows the web based page that will be used by Legal Department.



Legal Dept. Form

General Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Completing Information

New Parcel ID

Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

Auditing Department

Computer Name

Last Update

Legal User

Legal Department Information

Correct Information

Papers Complete

Find Obstacles To Auditing Department

Notes To Auditing Department

Find Obstacles To Reception Department

Notes To Reception Department

Figure (5.8): Web based page used by Legal Department

5.3.5 Guessing Committee

After processing the transaction in the Legal Department, it will be sent to the Guessing Committee which contain the Chief of PLA, two representatives from the Ministry of Agriculture and the Ministry of Internal Affair and two officers from the PLA. The evaluating committee aims at evaluating the land price per meter in all areas of the sector in order to estimate the fees required for registration process. This committee was mainly structured to stop citizens who change sale price by typing two different contract to sell the land, the first one is real price and the other is lower price so they can reduce the registration fees.

After estimating the price, a SMS with the required fees will be sent to the citizen. The citizen has the right to object once via e-mail. After a final decision is made by the estimating committee, the client has to receive new SMS with the required final fees and pay it in account of PLA in Bank . Figure (5.9) shows the web based page that will be used by Guessing Committee.



Guessing Committee Form

General Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Land Information

#	LANDS GAZA REGISTERED ESTIMATE	REPRESENTATIVE OF SURVEY DEPARTMENT ESTIMATE	ESTIMATE	MARKDOWN
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note

Is There any obligation

Approved Obligation

Final Price

Figure (5.9): Web based page used by Guessing Committee

5.3.6 Chief of PLA

Chief of PLA that he can sign it electronically through system after reviewing the transaction. Generally, the Chief of PLA has an access to write any notes or comments which will be sent automatically to the relevant officer in order to review the application. The Chief has no direct access to change the entry by himself but he is the only person who can confirm the transaction. Figure (5.10) shows the web based page used by Chief Land Authority.



Cheif Form

General Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Final Acceptance

Revise To

Notes

Figure (5.10): Web based page used by Chief Land Authority.

5.3.7 Finance Department

As a final stage, the transaction will be forwarded to the auditing team to produce the invoice for the client so that he can pay the fees. The client can pay the fees in any bank which is linked to the system.

After the payment, the auditing officer will receive a message from the bank confirming the payment. Then the transaction moves to the Registration Department where it will

be reviewed for the last time before the ownership moves to the buyer. This final step should be conducted in the presence of all parties involved in the transaction. The client should confirm the receipt of the full amount by the buyer.

5.3.8 Contract Book

After signing the final documents of the transaction, the transaction will be recorded in the contracts book as a safety procedure. Each record will be given unique reference number, and calculating the quotas in the area decades widget coupon space.

The methodology of calculating quotas, there are two cases ; full registration of the land which is owned by the citizen or purchased by the citizen or partial registration if the client wants to register part of land. Both cases are highlighted below:

1 - If the quota is sold 1-1 with a total surface area, it should be registered by a new contract.

2- But if the share sold part of the space owned by the seller, which is part of the area.

Parcel total area = X

Area of the land to be sold = Y

Area of the seller's quota = $\frac{A}{B}$

The quota want to be sold = $\frac{(Y*B)}{(X*B)}$

The remained quota = $\frac{(A*X) - (B*Y)}{(B*X)}$

As example: assume total parcel area (X) is 6000 m² , and the seller has quota $\frac{A}{B} = \frac{3}{7}$ and the area of land to be sold (Y) is 1100 m² ,then:

The quota want to be sold = $\frac{(1100*7)}{(6000*7)} = \frac{7700}{42000} = \frac{77}{420}$

$$\text{The remain quota to the seller} = \frac{(A*X) - (B*Y)}{(B*X)} = \frac{(3*6000) - (7*1100)}{(6000*7)} = \frac{10300}{42000} = \frac{103}{420}$$

After calculating quotas old contract is modified, and divided into two new recorded contract in the window one to the buyer to the new area that sale, and the other to the residual area to the seller.

And also must enter transaction to contracts book that contains a number of the contract and the contract date, the transaction number \ year, number of land and Parcel, Governorate, the names of buyer and seller them, the type of transaction, the quota calculated, , guessing price and any comments. Figure (5.11) shows the Web-based page to print contract.

In addition to that the contracts number that included in the transaction and the date of registration in the book of contracts



Printing Contract Form

General Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Contract Info

CONTRACT NO.	CONTRACT DATE	TRANSACTION TYPE

Land Info

OWNER NAME (BUYER)	QUOTAS	NOTE	AREA M ²	EDITOR	TRANSFER
				<input type="text"/>	<input type="text"/>

Figure (5.11): The Web-based page to print contract.

Figure (5.12) shows the final product of the land registration certification including all relevant information about the land ownership, exact global location with key points coordination and boundaries with an illustration map.

Rights, Booking And Property Info

State Of Palestine
Palestine Land Authority
Land Registration Department

General Info.

Transaction No. _____

Contract No. _____

Land Info.

TRAN. TYPE	QUOTAS	OWNER AREA M ²	LAND NO.	PARCEL NO.	QUOTAS SUMMATION
sell					
Previous Owner					
Current Owner					

Print Contract Print Reg. Cert.

Figure (5.12): The Web-base page to print Registration certification.

5.4 Land registry GIS Based Tool

A friendly user interfaced GIS based data entry and modification system was developed. this GIS tool will be used by the GIS specialists and decision makers in the PLA to retrieve data from the web based LRS. Through connecting attribute data with the spatial data; this system will provide an easy technique for data accessibility sharing, tracking and manipulating public requires in a transparent way.

As the data will be collected and documenting through the land registry web based system; the GIS tool will be used to visualize the actual surveyed lands and its data, in addition to the interpretation of these pre-entered data.

Visual Basic Applications (VBA) language available in Arc Object via Arc GIS was utilized in order to develop a proposed GIS based land registration tool. This tool consists of three main pages including: land, parcel and block. Each main page contains several sub-pages as follows (see annex 2):

5.4.1 Land main page

Data entry and query page contains six subpages: Land holding data; Neighboring land holders data; New landholder data; Previous landholder data; Location and General registration data. The following bullet points illustrate the details of the sub-pages:

- **Land holding data:** contains general information about the land: the new land code, number of landholders, land value, governorate, area, land type, land use. Also; parcel and block information are available in addition to the registration and transfer date beside the reason of transfer. Figure (5.13) illustrate the interface of this sub-page. This sub-page provides a query service for the users about registered lands.

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | New Land holder | Previous Land Holder | General

<p>Land Data</p> <p>New Land Code <input type="text"/></p> <p>Previous Land Code <input type="text"/></p> <p>No Of Land Holder <input type="text"/></p> <p>Land Value <input type="text"/></p> <p>Governarate <input type="text"/></p>	<p>Area & Use</p> <p>Area m2 <input type="text"/></p> <p>Area Donom <input type="text"/></p> <p>Land type <input type="text"/></p> <p>land Use <input type="text"/></p>
<p>Parcel Contains</p> <p>Parcel Code 1 <input type="text"/></p> <p>Parcel Code 2 <input type="text"/></p> <p>Parcel Code 3 <input type="text"/></p> <p>Parcel Code 4 <input type="text"/></p>	<p>History</p> <p>Transfer Date <input type="text"/></p> <p>Registry Date <input type="text"/></p> <p>Reason of Tranfer <input type="text"/></p>
<p>Block Contains</p> <p>Block Code 1 <input type="text"/></p> <p>Block Code 2 <input type="text"/></p> <p>Block Code 3 <input type="text"/></p> <p>Block Code 4 <input type="text"/></p>	

Zoom to Selected | Select on Map | Save | Load

Figure (5.13): Interface of the landholding sub-page.

- **Neighboring landholders:** this is the second sub-page and it includes the neighbors from four sides as illustrates in Figure (5.14).

The screenshot shows the 'LandRegistrationTool' window with the 'Neighboring Land holders' tab active. The interface is organized as follows:

- Window Title:** LandRegistrationTool
- Navigation Tabs:** Land, Parcel, Block (selected), Landholding Data, Neighboring Land holders (selected), Location, New Land holder, Previous Land Holder, General.
- Main Section:** Land Boundary Neighbor
- East Neighbor Section:** Four input fields labeled East Neighbor 1, 2, 3, and 4.
- West Neighbor Section:** Four input fields labeled West Neighbor 1, 2, 3, and 4.
- North Neighbor Section:** Four input fields labeled North Neighbor 1, 2, 3, and 4.
- South Neighbor Section:** Four input fields labeled South Neighbor 1, 2, 3, and 4.
- Bottom Buttons:** Zoom to Selected, Select on Map, Save, Load.

Figure (5.14): Interface of the neighboring lands sub-page.

- **Location:** this is the third sub-page and it includes the (X, Y) coordination for the land's corners as illustrates in Figure (5.15).

The screenshot shows the 'LandRegistrationTool' application window. The title bar reads 'LandRegistrationTool'. Below the title bar, there are three tabs: 'Land', 'Parcel', and 'Block'. The 'Location' tab is selected. Underneath, there are five sub-tabs: 'Landholding Data', 'Neighboring Land holders', 'Location', 'New Land holder', 'Previous Land Holder', and 'General'. The 'Location' sub-tab is active, displaying a 'Coordination System' section. This section contains two columns of input fields. The left column is labeled 'Point 1 (X)' through 'Point 10 (X)', and the right column is labeled 'Point 1 (Y)' through 'Point 10 (Y)'. Each label is followed by an empty text input box. At the bottom of the window, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

Figure (5.15): Interface of the location sub-page.

- **New landholder:** this is the fourth sub-page and it includes main information about the new landholder as: name, ID number, gender, date of birth as illustrated in Figure (5.16).

The screenshot shows a software window titled "LandRegistrationTool" with a close button in the top right corner. Below the title bar are three tabs: "Land", "Parcel", and "Block". Underneath these are five sub-tabs: "Landholding Data", "Neighboring Land holders", "Location", "New Land holder", "Previous Land Holder", and "General". The "New Land holder" sub-tab is selected. The main area contains a form with the following fields:

- A text field for "Name of New Landholder".
- Five sections, each for a "Land Holder" (1 to 5). Each section contains:
 - A text field for "Name".
 - A text field for "ID".
 - A dropdown menu for "Gender".
 - A text field for "Birth Day".

At the bottom of the window, there are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

Figure (5.16): Interface of the new landholder sub-page.

- **Previous landholder:** this is the fifth sub-page and it includes main information about the previous landholder as: name, ID number, gender, date of birth as illustrates in Figure (5.17).

The screenshot shows a software window titled "LandRegistrationTool" with a close button in the top right corner. Below the title bar are three tabs: "Land", "Parcel", and "Block". Underneath these are five sub-page tabs: "Landholding Data", "Neighboring Land holders", "Location", "New Land holder", and "Previous Land Holder" (which is currently selected), and "General".

The main content area is a form for entering data for "Previous Land Holder". It is organized into five vertical sections, each labeled "Land Holder 1" through "Land Holder 5". Each section contains four input fields: "Name", "ID", "Gender" (a dropdown menu), and "Birth Day".

At the bottom of the window, there are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

Figure (5.17): Interface of the previous landholder sub-page.

- **General:** this is the sixth sub-page and it includes main information about the registration as: recorder name, auditor's name, authorized person name, chief's name, specific site and the estimated price as decided in the guessing committee as illustrates in Figure (5.18).

The screenshot shows a software window titled "LandRegistrationTool" with a close button (X) in the top right corner. The window contains several tabs: "Land", "Parcel", "Block", "Landholding Data", "Neighboring Land holders", "Location", "New Land holder", "Previous Land Holder", and "General". The "General" tab is selected and displays a form with the following fields:

- General
- Land Code:
- Register No:
- Recorder's Name: Date:
- Checked by Name:
- Approved by Name:
- Cheif Name:
- Specific Site Name:

Below the main form are two sections:

- Gussing Committies:**
 - Name 1:
 - Name 2:
 - Name 3:
- Land Value Estimation Jordan Dinar:**
 - Estimation 1:
 - Estimation 2:
 - Estimation 3:

At the bottom of the window are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

Figure (5.18): Interface of the general sub-page.

5.4.2 Parcel main page

Data entry and query page contains three subpages: Parcel data, parcel boundaries and location. The following bullet points illustrate the details of the sub-pages:

- **Parcel data:** contains general information about the parcel: the new parcel code, number of lands, governorate, area, land type, land use. Also; block information are available in addition to the registration date. Figure (5.19) illustrates the interface of this sub-page. This sub-page provides a query service for the users about registered parcels.

The screenshot shows a software window titled "LandRegistrationTool" with a standard Windows-style title bar (minimize, maximize, close buttons). Inside the window, there are three main tabs: "Land", "Parcel", and "Block". The "Parcel" tab is currently selected. Underneath, there are three sub-tabs: "Parcel Data", "Parcel Boundaries", and "Location". The "Parcel Data" sub-tab is active. The interface is divided into several sections:

- Parcel Data:** A group box containing five input fields: "New Parcel Code" (with a cursor), "Previous Parcel Code", "No of Land", "Governarate", and "Registry Date".
- Area & Use:** A group box containing four input fields: "Area m2", "Area Donom", "Land type" (a dropdown menu), and "land Use" (a dropdown menu).
- Block Contains:** A group box containing four input fields labeled "Block Code 1", "Block Code 2", "Block Code 3", and "Block Code 4".

At the bottom of the window, there are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

Figure (5.19): Interface of the parcel data sub-page.

- **Parcel boundaries:** this is the second sub-page and it includes the neighboring parcels' codes from the four sides as illustrates in Figure (5.20).

The screenshot shows a software window titled "LandRegistrationTool" with a close button in the top right corner. The window has three main tabs: "Land", "Parcel", and "Block", with "Parcel" currently selected. Below these, there are three sub-tabs: "Parcel Data", "Parcel Boundaries", and "Location", with "Parcel Boundaries" selected. The main content area is titled "Parcel Sharing Boundary" and is divided into four quadrants, each representing a different direction of sharing:

- East Sharing Boundary:** Contains four input fields labeled "East Sharing 1", "East Sharing 2", "East Sharing 3", and "East Sharing 4".
- West Sharing Boundary:** Contains four input fields labeled "West Sharing 1", "West Sharing 2", "West Sharing 3", and "West Sharing 4".
- North Sharing Boundary:** Contains four input fields labeled "North Sharing 1", "North Sharing 2", "North Sharing 3", and "North Sharing 4".
- South Sharing Boundary:** Contains four input fields labeled "South Sharing 1", "South Sharing 2", "South Sharing 3", and "South Sharing 4".

At the bottom of the window, there are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

Figure (5.20): Interface of the parcel boundaries sub-page.

- **Location:** this is the third sub-page and it includes the (X, Y) coordination for the parcel's corners as illustrates in Figure (5.21).

LandRegistrationTool

Land Parcel Block

Parcel Data Parcel Boundaries Location

Coordination System

Point 1 (X)	<input type="text"/>	Point 1 (Y)	<input type="text"/>
Point 2 (X)	<input type="text"/>	Point 2 (Y)	<input type="text"/>
Point 3 (X)	<input type="text"/>	Point 3 (Y)	<input type="text"/>
Point 4 (X)	<input type="text"/>	Point 4 (Y)	<input type="text"/>
Point 5 (X)	<input type="text"/>	Point 5 (Y)	<input type="text"/>
Point 6 (X)	<input type="text"/>	Point 6 (Y)	<input type="text"/>
Point 7 (X)	<input type="text"/>	Point 7 (Y)	<input type="text"/>
Point 8 (X)	<input type="text"/>	Point 8 (Y)	<input type="text"/>
Point 9 (X)	<input type="text"/>	Point 9 (Y)	<input type="text"/>
Point 10 (X)	<input type="text"/>	Point 10 (Y)	<input type="text"/>

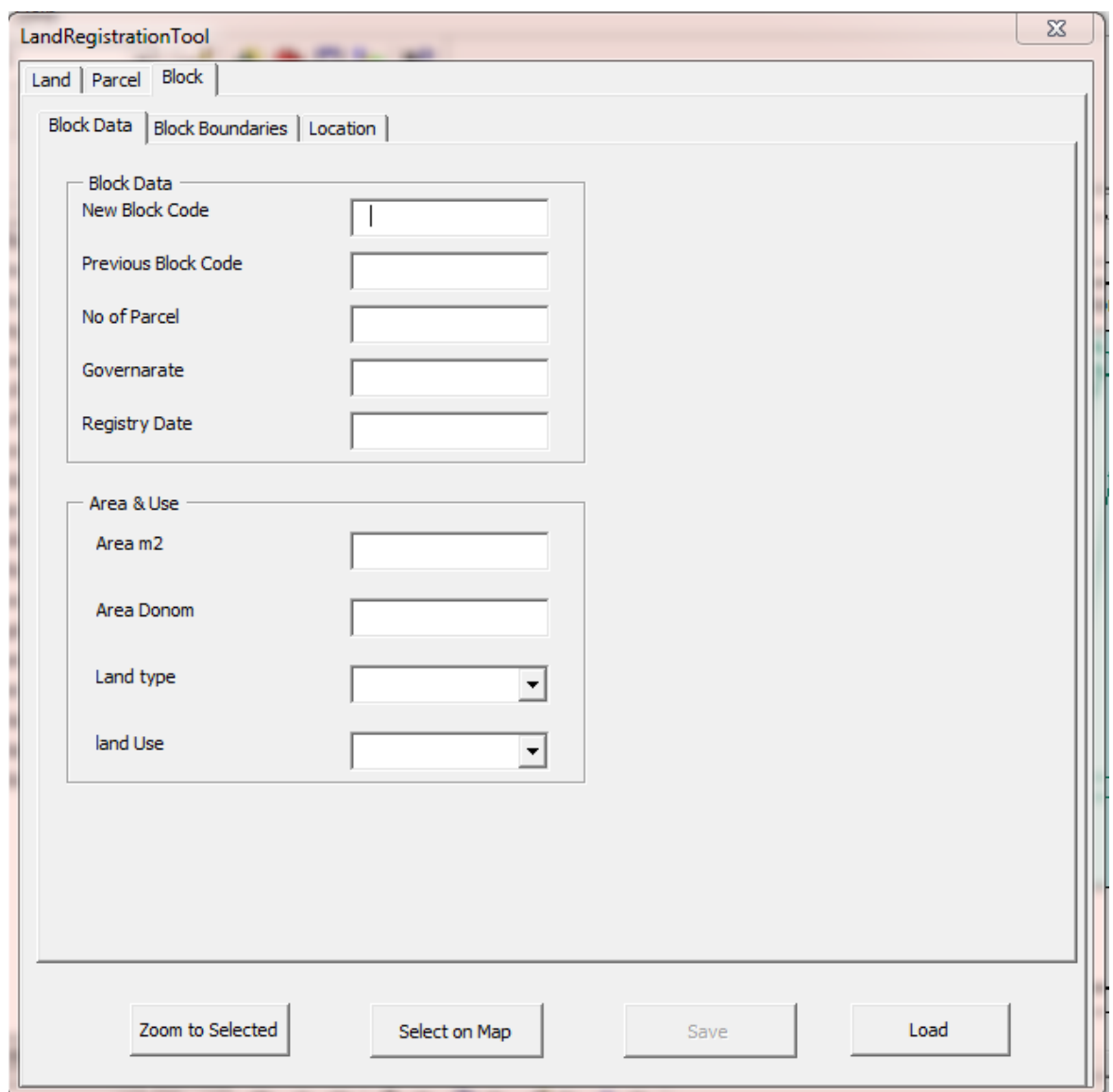
Zoom to Selected Select on Map Save Load

Figure (5.21): Interface of the parcel's location sub-page.

5.4.3 Block main page:

Data entry and query page contains three subpages: Block data, block boundaries and location. The following bullet points illustrate the details of the sub-pages:

- **Block data:** contains general information about the block: the new and previous block code, number of parcels, governorate, area, land type, land use. Figure (5.22) illustrates the interface of this sub-page. This sub-page provides a query service for the users about registered blocks.



The screenshot displays the 'LandRegistrationTool' application window. At the top, there are tabs for 'Land', 'Parcel', and 'Block', with 'Block' selected. Below this, there are sub-tabs for 'Block Data', 'Block Boundaries', and 'Location', with 'Block Data' selected. The main area contains two sections: 'Block Data' and 'Area & Use'. The 'Block Data' section includes input fields for 'New Block Code', 'Previous Block Code', 'No of Parcel', 'Governorate', and 'Registry Date'. The 'Area & Use' section includes input fields for 'Area m2', 'Area Donom', and dropdown menus for 'Land type' and 'land Use'. At the bottom of the window, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

Figure (5.22): Interface of the block's data sub-page.

- **Block’s boundaries:** this is the second sub-page and it includes the neighboring blocks’ codes from the four sides as illustrates in Figure (5.23).

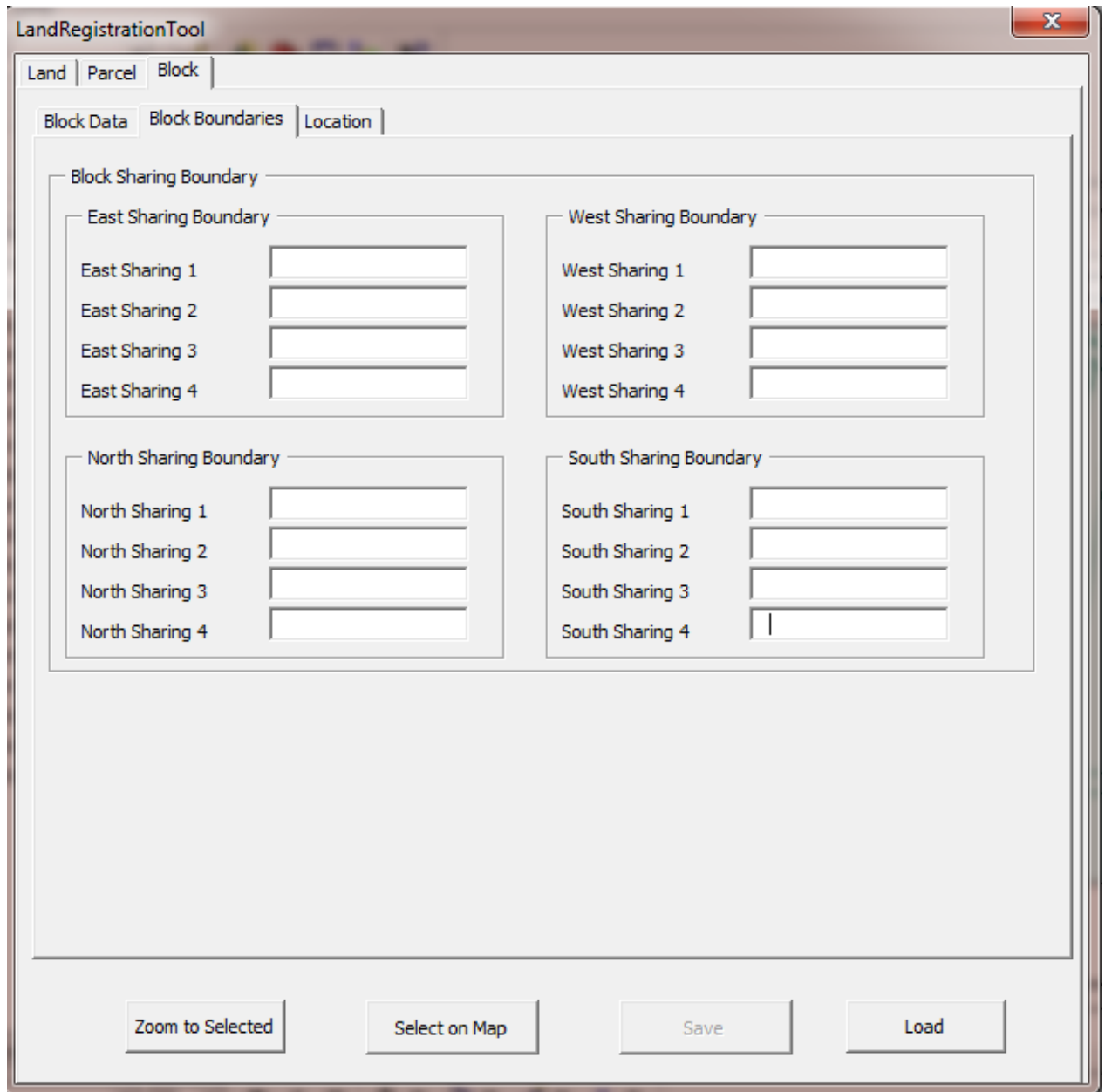


Figure (5.23): Interface of the block’s boundaries sub-page.

- **Location:** this is the third sub-page and it includes the (X, Y) coordination for the block's corners as illustrates in Figure (5.24).

LandRegistrationTool

Land | Parcel | Block

Block Data | Block Boundaries | Location

Coordination System

Point 1 (X)	<input type="text"/>	Point 1 (Y)	<input type="text"/>
Point 2 (X)	<input type="text"/>	Point 2 (Y)	<input type="text"/>
Point 3 (X)	<input type="text"/>	Point 3 (Y)	<input type="text"/>
Point 4 (X)	<input type="text"/>	Point 4 (Y)	<input type="text"/>
Point 5 (X)	<input type="text"/>	Point 5 (Y)	<input type="text"/>
Point 6 (X)	<input type="text"/>	Point 6 (Y)	<input type="text"/>
Point 7 (X)	<input type="text"/>	Point 7 (Y)	<input type="text"/>
Point 8 (X)	<input type="text"/>	Point 8 (Y)	<input type="text"/>
Point 9 (X)	<input type="text"/>	Point 9 (Y)	<input type="text"/>
Point 10 (X)	<input type="text"/>	Point 10 (Y)	<input type="text"/>

Zoom to Selected | Select on Map | Save | Load

Figure (5.24): Interface of the block's location sub-page.

5.5 SWOT Analysis

To enhance our understanding for the benefits of bringing the new proposed methodology alive, several in depth interviews with the main stakeholders were conducted in order to consult them about the new proposed LRS. The following SWOT analysis table (5.1) is a consolidation for the whole collected data from relevant stakeholders.

Table (5.1): SWOT analysis to the proposed new LRS.

<p>Strengths</p> <p>supported Stakeholder participation and awareness.</p> <p>Full integration between Tabu information's and GIS map.</p> <p>System is acceptable/legitimate to community</p> <p>Actors' roles and tenure rules/types are clear.</p> <p>Improved perception of tenure security.</p> <p>Good security of land tenure information.</p> <p>Local expertise in land measurement.</p> <p>Access to information for the public users.</p> <p>Full Automated System.</p> <p>Save time and effort.</p> <p>Easy to dealing with system.</p> <p>Tracking transaction through SMS and E-mail.</p> <p>Easy in re-establishing surveyed boundaries to be connected with GIS.</p>	<p>Weaknesses</p> <p>Take time to systemize the old data with new system.</p> <p>Lack of GIS developer in the Gaza Strip.</p>
<p>Opportunities</p> <p>Improved LRS.</p> <p>Capacity building to current team in GIS developing.</p> <p>People will accept and support the new system.</p> <p>Improved perception of land security.</p> <p>Integrate spatial data with other sources of data.</p> <p>Involvement of public organizations/CSOs.</p>	<p>Threats</p> <p>Disruption of program.</p> <p>Lack of fund to activate the system.</p>

5.6 Summary

This chapter proposed a new methodology for LRS in the Gaza Strip including the potential forms to be used in addition to the exact approach handling each of these forms. The proposed LRS is a web based system utilizing GIS. the new system started by the licensed ROS, then to the Reception Department; Audit Department; Legal Advisor; Guessing Committee; Chief of PLA; final Auditing; and finally to the sign off and archiving.

Next chapter will present the conclusion and recommendations.

Chapter 6: Conclusion and Recommendations

6.1 Conclusion

The purpose of this study basically focused on land registration system on Gaza Strip, In addition, the study attempts to suggest new method that create automated land registration system. Depending on the data and outputs of the study, it draws the following results:

- Considering the rapid growth of urbanization in the Gaza Strip, GIS is the only valuable tool for handling spatial data for the effective upgrading and formalization of LRS.
- This study shows that the current LRS is a traditional and mainly paper based procedure. This traditional LRS is in a crucial need to be adapted with new technology.
- One of the most critical findings of this study is that the automated system will effectively manage the continuously increasing demand on PLA offices.
- The automated LRS will save time and efforts for both PLA employees and the clients. LRS will provide clients with the opportunity to track their transactions via SMS and e-mail.
- Utilizing GIS technology; this study provided a tool to produce high quality and accurate digital maps. The produced digital maps were connected to a database for the Gaza Strip lands.
- This study revealed the need for developing PLA's technicians and employees' capacities on more advanced GIS and technological based LRS.

6.2 Recommendations

- There is a crucial need for a centralized and unified geographic information unit in the Gaza Strip. MOP can lead and facilitate GIS sector. MOP in coordination and collaboration with all relevant governmental institutions should work on the institutionalization and standardization of GIS sector including land registration. Such a participatory approach will ensure sufficient data sharing and accessibility for the different land information users, beside avoiding undesirable monopolizations.
- For efficient and effective online retrievable LRS; technicians with proven experiences in Arc Server are needed. PLA should mobilize different resources in order to develop GIS specialists' capacity in regard to Arc Server.
- All land in Palestine should be registered. Land registration is very important for protecting ownership rights according to the Basic Law. Registration is also important for non-private land and all land in Palestine should be registered. An important element in implementing this recommendation is the adoption of a clear system of land classification that includes private land, public land and Waqf land. It is important that these classes are clearly defined and that simple, efficient and equitable procedures be developed to determine the land class and undertake the registration of rights for each land class. The classification and procedures should be widely disseminated in the community.
- Registration Processes should be simplified with a focus on service delivery. The number of processes and preconditions required for any Land Administration Service should be minimized. There should be a clear definition of the legal and administrative requirements and procedures for registration.
- PLA needs to adopt formal recognized standards for all transactions, and provide quality services to clients with clear promises on time and cost for each type of registration. The PLA should design, printout and publish the forms and

procedures for all kinds of registration activities, to meet the needs of the customers.

- All the Land Registration Offices should be automated to increase the efficiency, improve the existing processes, speed up and secure the register, and secure the integrity of the register.
- PLA should adopt a clear client's focus for other agencies. As part of the strategy of focusing on improved service delivery, PLA should improve the service for other agencies and the municipalities. These institutional clients should have ready access to PLA records and steps should be taken to provide on-line access for key institutional clients.
- Ensure that there is legal status for digital information. The law should enable the Register to be held in digital form, as well as the paper form. To services and facilitate access to land registration office work should move from the current system to a fully automated system. This system will support reporting system and provide statistics data. The law also should provide legal status to digital information and printouts and ensure that digital data can be accepted as evidence in court.
- There should be public access to the land records. The land records in PLA should be available for public inspection, with appropriate safeguards for privacy. Ensuring the access and openness in register data will provide a high step of transparency and accountability.
- An efficient monitoring and reporting system should be established in PLA. This monitoring and evaluation system will focus on improved service delivery and assess key performance indicators such as the accuracy of PLA records, the time and cost of key services to clients and an overall assessment of PLA services.
- Comprehensive public awareness campaigns should be implemented. Public awareness campaigns should guide the landholders and businesses and explain the needs to update the register whenever any change takes place. Public awareness should be made particularly upon receipt of their title.

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Annexes

Annex 1: Example of land registration according to proposed LRS.

1.1 Web based page used by RO

LAND REGISTRATION

Registration Office

🔍

Registration Office Form

General Information

Transaction No.	<input type="text" value="20130004"/>
Transaction Date	<input type="text" value="5/11/2013 12:00:00 AM"/>
Transaction Type	<input type="text" value="Modified"/>
Reason of transfere	<input type="text" value="Buy"/>
Land No.	<input type="text" value="5"/>
Parcel No.	<input type="text" value="15"/>
Govermarate	<input type="text" value="Gaza"/>
Sale Price	<input type="text" value="57600"/>
Area m²	<input type="text" value="576.567"/>
Area Donom	<input type="text" value="0.576567"/>
Mobile No.	<input type="text" value="9000000"/>
Email	<input type="text" value="pal.land.auth@gmail.com"/>

Client Information (Transferee)

Transferee Name	<input type="text" value="Mahmoud Ahmed Ali Nour"/>
Gender	<input type="text" value="Male"/>
ID No.	<input type="text" value="800289654"/>
Date of Birth	<input type="text" value="3/12/1985 12:00:00 AM"/>
Address	<input type="text" value="Gaza- Alnaser"/>

Buyer

Buyer Name	<input type="text" value="Saady Mohammed Saed Abed"/>
Gender	<input type="text" value="Male"/>
ID No.	<input type="text" value="123456789"/>
Date of Birth	<input type="text" value="12/12/1981 12:00:00 AM"/>
Address	<input type="text" value="Gaza- Alnaser"/>

Border

#	EAST	WEST	NORTH	SOUTH
1	<input type="text" value="Ahmed I S Eid"/>	<input type="text" value="Luay Y B Sami"/>	<input type="text" value="Mohammed R S Abed"/>	<input type="text" value="Yehya M L Najar"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

The Paper Required

ID Photo	<input type="text" value="Yes"/>	<input type="button" value="Browse..."/> No file selected.	
Kuchan	<input type="text" value="Yes"/>	<input type="button" value="Browse..."/> No file selected.	
Tax Free Certificates	<input type="text" value="Yes"/>	<input type="button" value="Browse..."/> No file selected.	

Office Information

Office_Name	<input type="text" value="Alkarama RO"/>
office_licn	<input type="text" value="2013005"/>

1.2 Web based page used by Reception Department



LAND REGISTRATION

Reception Department

To search type and hit enter...

Reception Form

General Information

Transaction Date: 5/11/2013 12:00:00 AM
Transaction Type: Modified
Reason of transfere: Buy
Land No.: 5
Parcel No.: 15
Governarate: Gaza
Sale Price: 57600
Area m²: 576.567
Area Donom: 0.576567
Mobile No.: 8377339
Email: pal.land.auth@gmail.com

Completing Information

New Parcel ID: G009015005


Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	15	9	Gaza
2			
3			
4			

Legal Department Information

Computer Name:
Last Update:
Legal User:
Find Obstacles: Yes
Notes:

1.3 Web based page that use by Surveying office



LAND REGISTRATION

Survey Office

Survey Office Form

Land Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Land Info.

NO.	X	Y
1	<input style="width: 150px;" type="text" value="92.20168"/>	<input style="width: 150px;" type="text" value="90.76707"/>
2	<input style="width: 150px;" type="text" value="92.21594"/>	<input style="width: 150px;" type="text" value="90.76302"/>
3	<input style="width: 150px;" type="text" value="92.20825"/>	<input style="width: 150px;" type="text" value="90.7262"/>
4	<input style="width: 150px; border: 2px solid #00aaff;" type="text" value="92.19391"/>	<input style="width: 150px;" type="text" value="90.72739"/>
5	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>
6	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>
7	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>
8	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>
9	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>
10	<input style="width: 150px;" type="text"/>	<input style="width: 150px;" type="text"/>

1.4 Web based page that use by Audit Department



LAND REGISTRATION

Audit Department

To search type and hit enter...

Audit Form

General Information

Transaction Date:

Transaction Type:

Reason of transfere:

Land No.:

Parcel No.:

Governarate:

Sale Price:

Area m²:

Area Donom:

Mobile No.:

Email:

Completing Information

New Parcel ID:

Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	<input type="text" value="15"/>	<input type="text" value="9"/>	<input type="text" value="Gaza"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

Legal Department Information

Computer Name:

Last Update:

Legal User:

Find Obstacles:

Notes:

1.5 Web based page used by Legal Department



LAND REGISTRATION

Legal Department

Q
Submit

Legal Dept. Form

General Information

Transaction Date

Transaction Type

Reason of transfere

Land No.

Parcel No.

Governarate

Sale Price

Area m²

Area Donom

Mobile No.

Email

Completing Information

New Parcel ID

Parcel Contain Land:

#	PARCEL	BLOCK	GOVERNARATE
1	<input type="text" value="15"/>	<input type="text" value="9"/>	<input type="text" value="Gaza"/>
2	<input type="text"/>	<input type="text"/>	<input type="text"/>
3	<input type="text"/>	<input type="text"/>	<input type="text"/>
4	<input type="text"/>	<input type="text"/>	<input type="text"/>

Auditing Department

Computer Name

Last Update

Legal User

Legal Department Information

Correct Information

Papers Complete

Find Obstacles To Auditing Department

Notes To Auditing Department

Find Obstacles To Reception Department

Notes To Reception Department

Save
Confirm
Revise

1.6 Web based page used by Guessing Committee



LAND REGISTRATION

Guessing Committee

To search type and hit enter...



Submit

Guessing Committee Form

General Information

Transaction Date	5/11/2013 12:00:00 AM
Transaction Type	Modified
Reason of transfere	Buy
Land No.	5
Parcel No.	15
Governarate	Gaza
Sale Price	57600
Area m²	576.567
Area Donom	0.576567
Mobile No.	8377339
Email	pal.land.auth@gmail.com

Land Information

#	LANDS GAZA REGISTERED ESTIMATE	REPRESENTATIVE OF SURVEY DEPARTMENT ESTIMATE	ESTIMATE	MARKDOWN
1	100000	100000	100000	0

Note	No markdown
Is There any obligation	No
Approved Obligation	
Final Price	100000

[Save](#) [Confirm](#) [Revise](#)

1.7 Web based page used by Chief Land Authority

LAND REGISTRATION
Chief of PLA

To search type and hit enter...

Chief Form

General Information


Transaction Date	5/11/2013 12:00:00 AM
Transaction Type	Modified
Reason of transfere	Buy
Land No.	5
Parcel No.	15
Governarate	Gaza
Sale Price	57600
Area m ²	576.567
Area Donom	0.576567
Mobile No.	8377339
Email	pal.land.auth@gmail.com

Final Acceptance

Revise To:

Notes:

1.8 The Web-based page to print contract



LAND REGISTRATION

Printing Contract

Printing Contract Form

General Information

Transaction Date:

Transaction Type:

Reason of transfere:

Land No.:

Parcel No.:

Governarate:

Sale Price:

Area m²:

Area Donom:

Mobile No.:

Email:

Contract Info

CONTRACT NO.	CONTRACT DATE	TRANSACTION TYPE
5642	07-11-2013	Modified

Land Info

OWNER NAME (BUYER)	QUOTAS	NOTE	AREA M²	EDITOR	TRANSFER
Mahmoud Ahmed Ali Nour	1/1		576.567	<input type="text" value="See Contract No 2562"/>	<input type="text" value="Yes"/>

1.9 New contract form for the new proposed LRS

State Of Palestine
Palestine Land Authority
Land Registration Department

Transaction No. : 20,130,004

Date: 5/11/2013 12:00:00AM

Transaction Type: Modified

Reason of transfere: Buy

Land No.: 5

Parcel No. : 15

Governarate: Gaza

Sale Price: 57600

Area m²: 576.57

Area Donom: 0.58

Mobile No.: 8377339

Email: pal.land.auth@gmail.com

Contract No	Controt Date	Transaction Type
5642	30/12/1899	Modified

Owner Name (Buyer)	Quotas	Note	Area m ²	Editor	Transfer
Mahmoud Ahmed Ali Nour	1/1		576.57	See contrac	Yes

#	Coordinaton X (km)	Coordinaton Y(km)
1	92.201682	90.767076
2	92.215944	90.763018
3	92.208255	90.726194
4	92.193906	90.727391

Land Special Site



Annex 2: Example of using Land Registration Tool

2.1 Interface of the landholding sub-page

The screenshot displays the 'LandRegistrationTool' application window. The 'Land' tab is selected, and the 'Landholding Data' sub-tab is active. The interface is divided into several sections for data entry:

- Land Data:** Includes fields for New Land Code (9015005), Previous Land Code (5), No Of Land Holder (1), Land Value (57600), and Governarate (Gaza).
- Area & Use:** Includes fields for Area m2 (576.568587294773), Area Donom (0.57656), Land type (Mulak), and land Use (Resedentail).
- Parcel Contains:** Includes fields for Parcel Code 1 (15), Parcel Code 2, Parcel Code 3, and Parcel Code 4.
- Block Contains:** Includes fields for Block Code 1 (9), Block Code 2, Block Code 3, and Block Code 4.
- History:** Includes fields for Transfer Date (5/11/2013), Registry Date (7/11/2013), and Reason of Tranfer (Buy).

At the bottom of the window, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

2.2 Interface of the neighboring lands sub-page

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | New Land holder | Previous Land Holder | General

Land Boundary Neighbor

East Neighbor

East Neighbor 1: Ahmed I S Eid

East Neighbor 2:

East Neighbor 3: |

East Neighbor 4:

West Neighbor

West Neighbor 1: Luay Y B Sami

West Neighbor 2:

West Neighbor 3:

West Neighbor 4:

North Neighbor

North Neighbor 1: Mohammed R S Abed

North Neighbor 2:

North Neighbor 3:

North Neighbor 4:

South Neighbor

South Neighbor 1: Yehya M L Najar

South Neighbor 2:

South Neighbor 3:

South Neighbor 4:

Zoom to Selected | Select on Map | Save | Load

2.3 Interface of the location sub-page

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | New Land holder | Previous Land Holder | General

Coordination System

Point 1 (X)	<input type="text" value="92.201682"/>	Point 1 (Y)	<input type="text" value="90.767076"/>
Point 2 (X)	<input type="text" value="92.215944"/>	Point 2 (Y)	<input type="text" value="90.763018"/>
Point 3 (X)	<input type="text" value="92.208255"/>	Point 3 (Y)	<input type="text" value="90.726194"/>
Point 4 (X)	<input type="text" value="92.193906"/>	Point 4 (Y)	<input type="text" value="90.727391"/>
Point 5 (X)	<input type="text"/>	Point 5 (Y)	<input type="text"/>
Point 6 (X)	<input type="text"/>	Point 6 (Y)	<input type="text"/>
Point 7 (X)	<input type="text"/>	Point 7 (Y)	<input type="text"/>
Point 8 (X)	<input type="text"/>	Point 8 (Y)	<input type="text"/>
Point 9 (X)	<input type="text"/>	Point 9 (Y)	<input type="text"/>
Point 10 (X)	<input type="text"/>	Point 10 (Y)	<input type="text"/>

Zoom to Selected | Select on Map | Save | Load

2.4 Interface of the new landholder sub-page

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | **New Land holder** | Previous Land Holder | General

Name of New Landholder

Land Holder 1

Name: Mahmoud Ahmed Ali Nour Gender: Male

ID: 800289654 Birth Day: 3/12/1985

Land Holder 2

Name: Gender:

ID: Birth Day:

Land Holder 3

Name: Gender:

ID: Birth Day:

Land Holder 4

Name: Gender:

ID: Birth Day:

Land Holder 5

Name: Gender:

ID: Birth Day:

Zoom to Selected Select on Map Save Load

2.5 Interface of the previous landholder sub-page

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | New Land holder | Previous Land Holder | General

Name of Previous Landholder

Land Holder 1

Name: Saady Mohammed Saed Abed Gender: Male

ID: 123456789 Birth Day: 12/12/1981

Land Holder 2

Name: Gender: ID: Birth Day:

Land Holder 3

Name: Gender: ID: Birth Day:

Land Holder 4

Name: Gender: ID: Birth Day:

Land Holder 5

Name: Gender: ID: Birth Day:

Zoom to Selected Select on Map Save Load

2.6 Interface of the general sub-page

LandRegistrationTool

Land | Parcel | Block

Landholding Data | Neighboring Land holders | Location | New Land holder | Previous Land Holder | General

General

Land Code: G009015005

Register No: 5642

Recorder's Name: Sami Omer Date: 7/11/2013

Checked by Name: Saleh Ahmed

Approved by Name: Fadi Mahmoud

Chief Name: Waleed yousef

Specific Site Name: Gaza- Alnaser

Gussing Committies

Name 1: Ala Nadij

Name 2: Ahmed Wael

Name 3: Yaser Mjd

Land Value Estimation Jordan Dinar

Estimation 1: 100000

Estimation 2: 100000

Estimation 3: 100000

Zoom to Selected Select on Map Save Load

2.7 Interface of the parcel data sub-page

The screenshot displays the 'LandRegistrationTool' application window. It features a tabbed interface with 'Parcel' selected. Under the 'Parcel Data' sub-tab, there are two main sections: 'Parcel Data' and 'Area & Use'. The 'Parcel Data' section includes fields for 'New Parcel Code' (G009015), 'Previous Parcel Code' (15), 'No of Land' (1), 'Governarate' (Gaza), and 'Registry Date' (7/11/2013). The 'Area & Use' section includes 'Area m2' (576.568587294773), 'Area Donom' (0.57656), 'Land type' (Mulak), and 'land Use' (Resedentail). A third section, 'Block Contains', has four fields for 'Block Code 1' through 'Block Code 4', with 'Block Code 1' containing the value '9'. At the bottom, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

Field	Value
New Parcel Code	G009015
Previous Parcel Code	15
No of Land	1
Governarate	Gaza
Registry Date	7/11/2013
Area m2	576.568587294773
Area Donom	0.57656
Land type	Mulak
land Use	Resedentail
Block Code 1	9
Block Code 2	
Block Code 3	
Block Code 4	

2.8 Interface of the parcel boundaries sub-page

The screenshot displays the 'LandRegistrationTool' application window. At the top, there are tabs for 'Land', 'Parcel', and 'Block'. Below these, there are sub-tabs for 'Parcel Data', 'Parcel Boundaries', and 'Location'. The 'Parcel Boundaries' sub-tab is active, showing a 'Parcel Sharing Boundary' section. This section is divided into four quadrants: 'East Sharing Boundary', 'West Sharing Boundary', 'North Sharing Boundary', and 'South Sharing Boundary'. Each quadrant contains four input fields for sharing values. The 'East Sharing 1' field contains the value '16', and the 'West Sharing 1' field contains '17'. The 'North Sharing 1' field contains '19', and the 'South Sharing 1' field contains '18'. At the bottom of the window, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

Boundary Type	Sharing 1	Sharing 2	Sharing 3	Sharing 4
East Sharing Boundary	16			
West Sharing Boundary	17			
North Sharing Boundary	19			
South Sharing Boundary	18			

2.9 Interface of the parcel's location sub-page

The screenshot shows a software window titled "LandRegistrationTool" with a close button in the top right corner. The window has a tabbed interface with three main tabs: "Land", "Parcel", and "Block". The "Parcel" tab is active, and within it, there are three sub-tabs: "Parcel Data", "Parcel Boundaries", and "Location". The "Location" sub-tab is selected.

Under the "Location" sub-tab, there is a section titled "Coordination System". Below this title, there are two columns of input fields for entering coordinates for 10 points. The first column is labeled "Point 1 (X)" through "Point 10 (X)", and the second column is labeled "Point 1 (Y)" through "Point 10 (Y)".

Point (X)	Value	Point (Y)	Value
Point 1 (X)	92.201682	Point 1 (Y)	90.767076
Point 2 (X)	92.215944	Point 2 (Y)	90.763018
Point 3 (X)	92.208255	Point 3 (Y)	90.726194
Point 4 (X)	92.193906	Point 4 (Y)	90.727391
Point 5 (X)		Point 5 (Y)	
Point 6 (X)		Point 6 (Y)	
Point 7 (X)		Point 7 (Y)	
Point 8 (X)		Point 8 (Y)	
Point 9 (X)		Point 9 (Y)	
Point 10 (X)		Point 10 (Y)	

At the bottom of the window, there are four buttons: "Zoom to Selected", "Select on Map", "Save", and "Load".

2.10 Interface of the block's data sub-page

The screenshot displays the 'LandRegistrationTool' application window. At the top, there are tabs for 'Land', 'Parcel', and 'Block', with 'Block' being the active tab. Below this, there are sub-tabs for 'Block Data', 'Block Boundaries', and 'Location', with 'Block Data' being the active sub-tab. The main area contains two sections of input fields:

- Block Data:**
 - New Block Code:
 - Previous Block Code:
 - No of Parcel:
 - Governarate:
 - Registry Date:
- Area & Use:**
 - Area m2:
 - Area Donom:
 - Land type:
 - land Use:

At the bottom of the window, there are four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

2.11 Interface of the block's boundaries sub-page

LandRegistrationTool

Land | Parcel | Block

Block Data | Block Boundaries | Location

Block Sharing Boundary

East Sharing Boundary

East Sharing 1	<input type="text" value="10"/>
East Sharing 2	<input type="text"/>
East Sharing 3	<input type="text"/>
East Sharing 4	<input type="text"/>

West Sharing Boundary

West Sharing 1	<input type="text" value="11"/>
West Sharing 2	<input type="text"/>
West Sharing 3	<input type="text"/>
West Sharing 4	<input type="text"/>

North Sharing Boundary

North Sharing 1	<input type="text" value="12"/>
North Sharing 2	<input type="text"/>
North Sharing 3	<input type="text"/>
North Sharing 4	<input type="text"/>

South Sharing Boundary

South Sharing 1	<input type="text" value="8"/>
South Sharing 2	<input type="text"/>
South Sharing 3	<input type="text"/>
South Sharing 4	<input type="text"/>

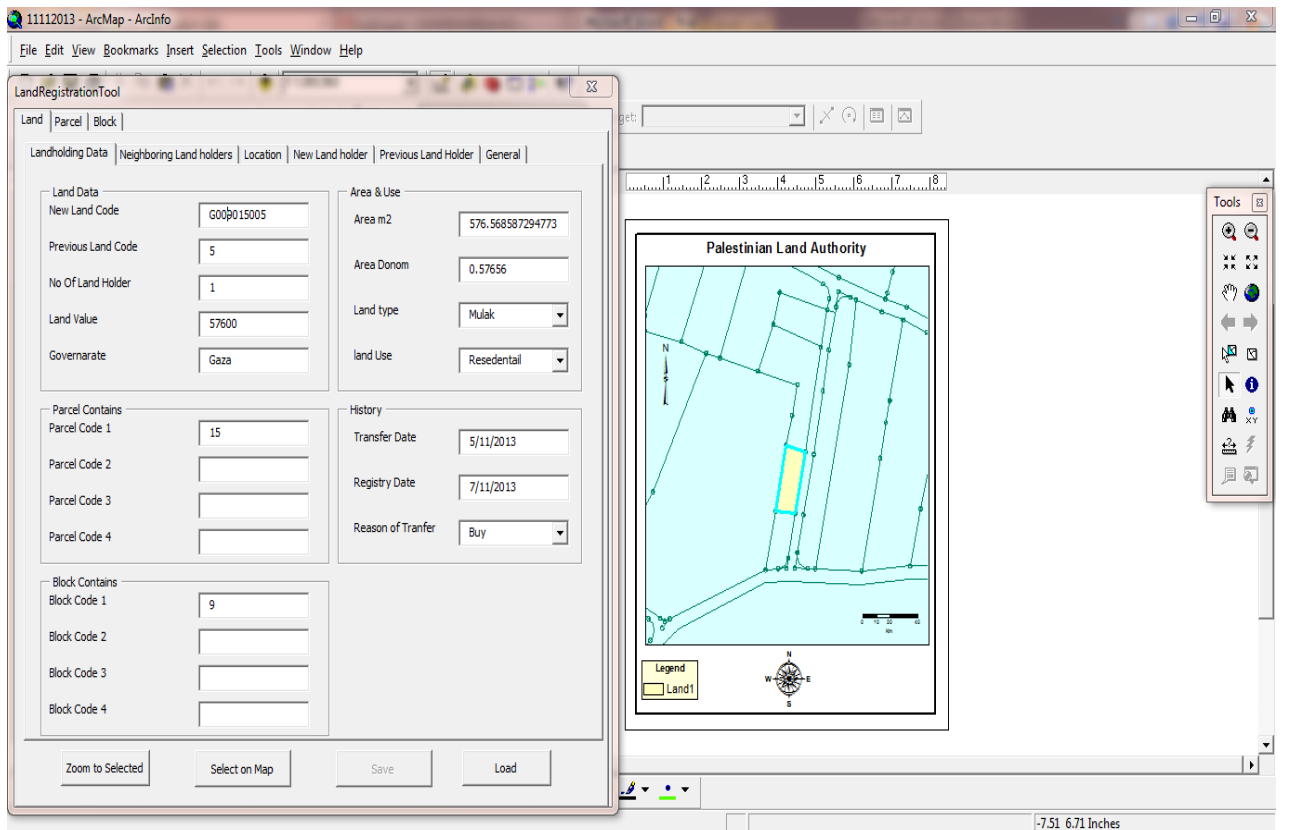
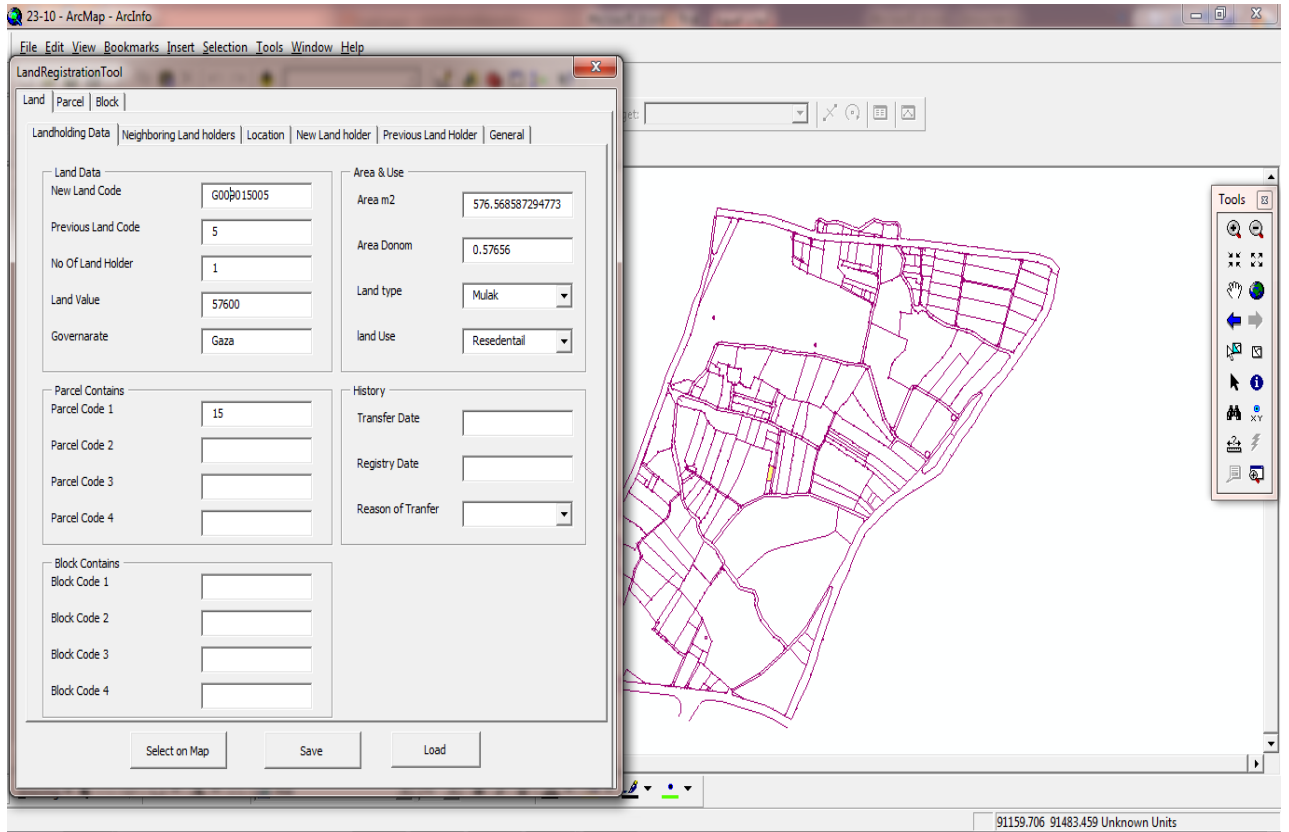
Zoom to Selected | Select on Map | Save | Load

2.12 Interface of the block's location sub-page

The screenshot displays the 'LandRegistrationTool' application window. The 'Block' tab is selected, and the 'Location' sub-page is active. The 'Coordination System' section contains two columns of input fields for 10 points. The first column is for X-coordinates and the second for Y-coordinates. The first five points have numerical values entered, while the last five are empty. The bottom toolbar contains four buttons: 'Zoom to Selected', 'Select on Map', 'Save', and 'Load'.

Coordination System			
Point 1 (X)	93128.935	Point 1 (Y)	91295.772
Point 2 (X)	92014.727	Point 2 (Y)	91447.709
Point 3 (X)	912421.873	Point 3 (Y)	90262.001
Point 4 (X)	92273914	Point 4 (Y)	90080.272
Point 5 (X)	92562.893	Point 5 (Y)	90634.397
Point 6 (X)		Point 6 (Y)	
Point 7 (X)		Point 7 (Y)	
Point 8 (X)		Point 8 (Y)	
Point 9 (X)		Point 9 (Y)	
Point 10 (X)		Point 10 (Y)	

2.13 Using query about land, select, and zoom to selected



Annex 3: List of interviewed people.

No.	Interviewee Name	Organization	Title
1	Eng. Omar Zayda	Palestinian Land Authority	Governmental lands General Manager
2	Eng. Mohammed Abu Sabha	Palestinian Land Authority	Head of Reception department
3	Eng. AmaniMohammedain	Palestinian Land Authority	Audit and department
4	Eng. Mahmoud Salaha	Palestinian Land Authority	GIS technician
5	Eng. Maisaa' Alaa'waj	Palestinian Land Authority	Programme developer
6	Eng. Ali Almasri	Palestinian Land Authority	Surveying department
7	Eng. Mohammed Abu Sha'ar	Palestinian Land Authority	Surveying department
8	Eng. Ibrahim Alastal	Ministry of labors	Head of Khanyounis Directorate