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Remarks on the cover

The cover illustration combines two different types of imagery. The first one forms the background: it is a geocoded mosaic of three QuickBird scenes of Tripoli acquired on 26 January 2003, 8 April 2003 and 2 July 2003. This is overlaid by four photographs depicting typical scenes of the city centre of Tripoli. From East to West they display the following sites: waste on the both sides of the main river (Abu Ali River); street-vendors at the entrance to the old souk; daily traffic jam in the old city; disused houses in the old city waiting for a renovation since the end of the Civil War in 1990.

Note: More than one month after the beginning of the disastrous summer 2006 war in Lebanon I submit my thesis with the hope that it will be the last conflict in my country, the country which is known for its multicultural and multireligious structure. I hope that by the conclusion of my work Lebanon will have peace and peace for ever.

Ich habe die vorliegende Dissertation etwas mehr als einen Monat nach dem katastrophalen Krieg im Sommer 2006 im Lebanon eingereicht.
Ich hoffe, daß bis zur Fertigstellung des Drucks dieser Konflikt gelöst ist und endlich dauerhafter Frieden im Libanon einkehrt, dem Land, das für seine Multikulturalität und Multireligiosität bekannt ist.

Dresden, August 2006

Disclaimer

This document describes work undertaken as part of a programme of study at the Dresden University for Technology, Institute of Cartography. All views and opinions expressed therein remain the sole responsibility of the author, and do not necessarily represent those of the institute.

To the memory of my brother Fadi
and
to my fiancé Jenny

TECHNISCHE UNIVERSITÄT DRESDEN

Fakultät Forst-, Geo- und Hydrowissenschaften

Geo-Visualization Tools for Participatory Urban Planning
The Case of Tripoli, Lebanon

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Gutachter: Herr Prof. Dr. phil. habil. Manfred Buchroithner (Betreuender Hochschullehrer)
Korreferent: Herr Prof. Dr. Volker Kreibich
Korreferent: Herr Prof. Dr. Richard Sliuzas

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Herausgeber: Technische Universität Dresden, Institut für Kartographie
M.F. Buchroithner, W.G. Koch

Verfasser: Khaled El Nabbout
Goetting-Str. 8
38106 Braunschweig

Vervielfäftigung: Technische Universität Dresden, Institut für Kartographie

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Bezug über: Technische Universität Dresden, Institut für Kartographie,
Helmholtzstr. 10, 01062 Dresden

E-mail: steffi.sharma@tu-dresden.de

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KHALED EL NABBOUT

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Abstract

Geo-data visualization has always been an important tool in the urban planning process. Recent trends in geo-information technology are, however, offering additional opportunities for the development of new visualization tools. In parallel, developments have also taken place in the field of urban planning, which has evolved from the rational planning model towards a more strategic planning process with a greater emphasis on collaboration and inclusiveness. The changes in urban planning directly reflect shifts in the thinking of the public administration from governing toward governance. Modern urban governance systems are more accountable and transparent and greatly support decentralization. This implies a more important role of the local government in initiating urban planning processes which are inclusive and participatory. This study investigates how an innovative geo-data visualisation tool can be used to develop more inclusive and participatory planning processes, and it tests this approach by means of a case study in Tripoli, Lebanon.

Lebanon is one of many countries whose development lags behind the cutting edge in all of the domains discussed above. However, there exists now a great interest in further development, as can be seen in the example of the Tripoli Metropolitan Area.

In the case of the Tripoli 2000-2020 Master Plan, for the first time a decision was made by the Lebanese Government to establish a committee representing the concerned local government and NGOs active in the region of Tripoli to participate in the planning process. This approach was successful at certain levels but it faced difficulties and conflicts that were not solved for more than 4 years. One major reason for this is the existing planning process in Lebanon which is still highly technocratic and bureaucratic. Second, the government system in Lebanon is still highly centralized. Centralization greatly affects a local planning project which ideally should be the primary responsibility of the local authority and, particularly, the local stakeholders, all of whom have the right to be equally involved in such a process, rather than simply to follow it. Another reason for the difficulties encountered was the use of inappropriate methods and tools, including cartographic visualization tools, during the planning process. It heavily relied on conventional black-and-white paper maps for geo-data visualization. This approach, while acceptable to the members of the planning committee who were all experts in the planning process, did not permit the full participation of other stakeholders.

The study compared two geo-data visualization techniques regarding their potential for an increased involvement of different types of stakeholders in the urban planning processes:

The first technique employed coloured printed transparency maps of the present land-use and the 2000-2020 Master Plan, both geo-referenced to a mosaic of QuickBird satellite imagery used to assist the participant's orientation. The second technique was the Lenticular Foil Display (LFD) using the so-called flip effect, also based on the geo-coding of the same three "layers". By tilting this product the observer was easily able to interpret the changes between present and planned state. The LFD technology is particularly useful for true-3D (auto-stereoscopic) viewing.

For the first time the innovative tool of the “Lenticular Foil Technique” has been tested concerning its usefulness for participatory urban planning. The evaluation of this new cartographic visualization tool, which may be referred to as Multi-Flip Lenticular Foil Display, was based on interviews with 78 stakeholders with different backgrounds, including both experts and non-experts, who were expected to be involved in a participatory planning process. The tested Multi-Flip LFD combined 3 separate spatial information layers based on GIS vector and raster data in one product: a high-resolution satellite image, the present land-use map of Tripoli and the proposed Master Plan for Tripoli with building-height data. The stakeholders were asked to compare the practicability of the Multi-Flip LFD with a more conventional approach for spatial data visualisation using ortho-imagery and two transparent overlays depicting both the land-use and Master Plan data, i.e. the same content as the images combined in the Multi-Flip LFD. 51 % of the non-experts in map-reading preferred the LFD in comparison to the conventional transparency maps, 16 % voted for the transparent foils and 33 % wanted to use both methods. Only 21 % of the experts were in favour of the LFD technique, 33 % for the transparent foils and, anyway, 46 % of the interviewees wanted to work with both methods.

Statistical evaluations of the completed questionnaires concerning sociological and perception-scientific aspects revealed interesting details regarding the role of the new visualization method in the participatory city planning process.

The result of the interviews revealed that all stakeholders were readily able to participate in the planning process and to contribute their ideas by sketch-map drawing and writing, using the LFD technology. Regarding the possibilities to stimulate the participation of different stakeholders in the planning process, the LFD was found to be more effective than the conventional approach using transparencies overlaid over orthophotos. Non-experts, in particular, preferred the LFD technology to the transparent overlays which were, however, the preferred approach for the professionals and experts familiar with Master Plan map-reading. One conclusion of the present study is that an efficient participatory urban-planning process should explicitly consider the level of map-reading skills of the stakeholders. Geo-data visualization products like the Multi-Flip-LFDs and other innovative approaches offer possibilities to improve stakeholder participation. The monograph closes by making concrete suggestions for further research into the development and optimization of LFDs.

Zusammenfassung

Die Visualisierung von Geodaten war schon immer von großer Bedeutung für den Stadtplanungsprozess. Jüngste Entwicklungen im Bereich der Geoinformationstechnologie bieten jedoch weitere Möglichkeiten zur Schaffung innovativer Visualisierungsverfahren. Parallel zur Entwicklung von neuen Visualisierungstechnologien, fand auch eine Weiterentwicklung im Bereich der Planungsmethodik statt. Diese entwickelte sich weg von rationalen Planungsmodellen hin zu strategischen Planungsprozessen mit stärkerer Bürgerbeteiligung. Diese Veränderungen werden begleitet vom Wandel des „Government"- zum „Governance"-Konzept im Bereich der öffentlichen Verwaltung. Moderne „Governance"-Systeme sind transparenter und nachvollziehbarer und fördern darüber hinaus die Dezentralisierung. Dadurch können die Rolle der Stadtverwaltung gestärkt und Stadtplanungsprozesse angeregt werden, die unterschiedliche Personen und Interessensgruppen einbeziehen und beteiligen. Die vorliegende Studie untersucht, wie innovative Geovisualisierungsverfahren für mehr Bürgerbeteiligung in der Stadtplanung verwendet werden können und testet dies am Fallbeispiel Tripolis, Libanon.

Der Libanon gehört zu den Ländern, die sich in den genannten Bereichen noch in der Entwicklung befinden. Es besteht aber ein großes Entwicklungsinteresse, wie vor allem am Beispiel des Großraums Tripoli gezeigt werden kann.

Im Fall des „Tripoli 2000-2020 Master Plans" wurde zum ersten Mal von der libanesischen Regierung entschieden, ein Komitee zu gründen, dass die Stadtverwaltung und die in der Region Tripoli aktiven NGOs in den Planungsprozess einbezieht. Dieser Schritt war in Einzelaspekten erfolgreich, stieß aber auf Schwierigkeiten und Konflikte, die seit über vier Jahren nicht gelöst worden sind. Ein Hauptgrund ist der bereits bestehende Planungsprozess im Libanon, der noch immer sehr bürokratisch und technokratisch verläuft. Zweitens ist die Regierungsform im Libanon noch immer sehr zentralisiert. Dies behindert lokale Planungsinitiativen, die idealerweise in erster Linie in der Hand von Kommunalverwaltung und Bürgern liegen sollten, welche das Recht haben, gleichermaßen in den Planungsprozess einbezogen zu werden, anstatt diesen nur von außen zu verfolgen. Ein anderer Grund für die Schwierigkeiten war die Verwendung bestimmter kartographischer Visualisierungsmethoden während des Planungsprozesses: Hierbei wurden bisher vor allem konventionelle Papierkarten in Schwarz-Weiß eingesetzt. Dies ist für die Mitglieder des (Experten-) Komitees zwar noch akzeptabel, ermöglicht aber kaum die intensive Einbeziehung aller Interessengruppen.

Die vorliegende Studie vergleicht zwei unterschiedliche Techniken der Geodatenvisualisierung auf ihre Möglichkeiten, die Beteiligung unterschiedlicher Interessensgruppen am Planungsprozess zu stützen und zu fördern:

Zum einen wurde geokodierter Plot eines QuickBird-Satellitenbildmosaiks (zur leichteren Orientierung) mit auf Transparentfolien gedruckten Farbdarstellungen der gegenwärtigen und der zukünftigen Landnutzung überlagert. Zum anderen wurde die Lentikularfolientechnik im Wechselbildmodus eingesetzt. Sie ermöglicht, bei leichtem Kippen der Darstellung in identer

Geometrie den Ist- oder den Planungszustand eines Gebietes (auch in Echt-3D, d. h. autostereoskopisch) zu betrachten.

Hierbei wurde erstmals die „Lenticular Foil Technique“ auf ihre Einsetzbarkeit im Bereich der Bürgerbeteiligung in der Stadtplanung getestet. Die Bewertung dieser neuen kartographischen Visualisierungstechnik, die als Multi-Flip Lenticular Foil Display (LFD) bezeichnet wird, basiert auf 78 Interviews mit Interessensvertretern, sog. stake-holders, unterschiedlicher Hintergründe, Experten und Nicht-Experten, die alle in den Stadtplanungsprozess einbezogen werden sollen. Das getestete LFD kombinierte drei „Spatial Information Layers“ der als GIS-Datensätze abgelegten Raster- und Vektordaten in einem Produkt: ein Satellitenbild mit hoher Auflösung, den aktuellen Flächennutzungsplan und den Masterplanvorschlag für Tripoli. Die Interviewpartner wurden, wie oben bereits erwähnt, gebeten, die Vorteile des LFD gegenüber konventionellen Orthophotos, bedeckt mit zwei Transparentfolien (dem aktuellen Flächennutzungsplan und den Masterplandaten gleichen Inhalts wie beim LFD) zu vergleichen. Dieser Vergleich erbrachte, dass alle Interessensvertreter in der Lage waren, ihre Vorschläge mit Hilfe des LFD zu skizzieren und niederzuschreiben. Diese Technik erwies sich darüber hinaus als zeiteffektiver als der herkömmliche Ansatz mit übereinander gelegten Transparentfolien. 51 % der Nichtexperten bevorzugten diese Technik gegenüber dem konventionellen Übereinanderlegen von Transparentfolien; nur 16 % waren für die Transparentfolien-Methode und 33 % wollte beide Methoden benutzen. Lediglich 21 % der Experten waren für die LFD-Technik, 33 % für die Transparentfolien; immerhin 46 % dieser Gruppe wollten mit beiden Methoden arbeiten.

Statistische Auswertungen der Befragungen mit soziologischem und perzeptionswissenschaftlichem Hintergrund zeigen interessante Details hinsichtlich der Rolle der eingeführten neuen Visualisierungsmethode in der partizipativen Stadtplanung.

Die Befragung im Rahmen der Studie zeigte, dass alle Stakeholder bereit waren, am Planungsprozess mitzuarbeiten und unter Benutzung der LFD-Technologie ihre Vorstellungen als Kartenskizzen zu zeichnen oder niederzuschreiben. Hinsichtlich der Möglichkeiten der Einbeziehung unterschiedlicher Gruppen kann im Ergebnis festgehalten werden, daß die LFD-Technologie sich gegenüber den mit Transparentfolien bedeckten Orthophotos als sinnvoller und effizienter erwies. Nicht-Experten bevorzugten vor allem diese Technologie; Experten hingegen stützten sich auf die konventionelle Methode. Hervorzuheben ist, daß für einen effektiven Stadtplanungsprozeß die unterschiedlichen Fähigkeiten des Kartenlesens der Stakeholder berücksichtigt werden müssen. Methoden der Geodatenvisualisierung, wie Multi-Flip-LFDs und andere innovative Ansätze, bieten eine Reihe von Möglichkeiten, die Bürgerbeteiligung zu unterstützen. Abschließend werden in der Arbeit noch Hinweise für weiterführende Untersuchungen und Entwicklungen zur LFD-Visualisierung von Geodaten im Bereich der partizipativen Stadtplanung gegeben.

Moulakhas

يعد إظهار البيانات الجغرافية المرئية (Geo-data visualization) من اهم الوسائل في عملية التخطيط المدني. و قد ساعدت التوجهات الحديثة نحو تكنولوجيا أنظمة المعلومات الجغرافية (Geo-Information Technology) على خلق فرص اكبر لتطوير وسائل مرئية (Visualization tools) جديدة. و بالموازاة فقد حصلت تطورات اخرى في ميدان التخطيط المدني الذي تطور من نموذج التخطيط العقلاني (Rational planning) باتجاه عملية تخطيط اكثر استراتيجية فيها درجة عالية من التعاون والمشاركة والشمولية (Collaborative and Inclusiveness). تدل هذه التغيرات في ميدان التخطيط المدني على التحول لدى الإدارات المدنية من نظام الحكم المتداول حالياً الى نظام الحكم الجيد (Good Governance)، فأنظمة الحكم الجديدة اكثر مسؤولية و شفافية وتدعم بدرجة كبيرة اللامركزية. و هذا يتطلب دوراً اكثر فعالية للحكومات المحلية لجعل عمليات التخطيط المدني ذات شمولية و تشاركية (Inclusive and Participatory). يقدم هذا البحث دراسة عن كيفية إستعمال وسيلة إظهار البيانات الجغرافية المرئية لتطوير عمليات تخطيط اكثر شمولية و تشاركية، تترجم هذه الفكرة من خلال دراسة تطبيقية على مدينة طرابلس – لبنان.

بالرغم من أن الجمهورية اللبنانية واحدة من الدول التي لاتزال متأخرة في هذه المجالات إلا أنها تبدي إهتماماً كبيراً لتبني هذه الوسائل الحديثة كما اظهرت الدراسة في مدينة طرابلس.

عند النظر في المخطط التوجيهي لمدينة طرابلس للفترة 2000-2020 يلاحظ بأن الحكومة اللبنانية قد قامت و لأول مرة بتشكيل لجنة تمثل البلديات المعنية وجمعيات غيرحكومية لمتابعة عملية التخطيط. لقد حققت هذه الفكرة نجاحاً ملموساً على عدة اصعدة ولكنها واجهت بعض الصعوبات والنزاعات التي لم يتم حلها منذ اربعة اعوام. إن السبب الرئيسي لهذه النتيجة هو عملية التخطيط الموجودة في لبنان اصلاً والتي ما تزال تقنوقراطية وبيرو قراطية (Technocratic and Bureaucratic) الى حد بعيد. كما إن نظام الحكم في لبنان مايزال مركزياً، وهذه المركزية تؤثر سلباًعلى مشاريع التخطيط المحلية والتي من المفترض أن تكون في إطار مسؤولية السلطات المحلية و خصوصاً المشاركين المحليين بالدرجة الأولى (The Stakeholders). فكل من هذه الأطراف لديه الحق في المشاركة بشكل متساو في اعداد المخططات وليس مجرد تطبيقهما فقط. كما يعد استخدام اساليب ووسائل غير ملائمة مثل وسائل عرض الخرائط خلال عملية التخطيط احد الأسباب التي ادت الى هذه النتيجة. فعمليات التخطيط تعتمد بشكل اساسي على الخرائط التقليدية والتي غالباً تكون في الأبيض و الأسود في عرض البيانات الجغرافية. ففي حين كانت هذه الطريقة مقبولة لدى لجنة التخطيط المكونة من خبراء في عملية التخطيط فإنها لم تسمح بالمشاركة الكاملة من قبل الأطراف الأخرى.

قامت الدراسة بمقارنة دور نوعين من التقنيات في إظهار البيانات الجغرافية المرئية لدمج عدة مشاركين من خلفيات مختلفة في عمليات التخطيط المدني.

التقنية الاولى كانت خرائط ملونة مطبوعة على الورق الشفاف ومثبته فوق صورة قمر اصطناعي لمنطقة طرابلس لتسهل عملية الدلالة على المواقع والتقنية الثانية كانت رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) التي تساعد على عملية اكتشاف التغيرات من خلال خريطة واحدة، ومن مميزات رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) ايضا الخرائط الثلاثية الابعاد (auto-Stereoscopy).

تعد هذه اول مرة يتم فيها اختبار الفائدة من وسيلة جديدة مبنية على تكنولوجيا رقائق العدسات (Lenticular Foil Display) إن وسيلة عرض الخرائط الجديدة هذه و التي يعبر عنها باسم عارضة البيانات عن طريقة رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) قد تم تقيمها من خلال مقابلات مع 78 مشارك ذوي خلفيات مختلفة من الخبراء والمعنيين الذين من المفترض مشاركتهم في عمليات التخطيط. تجمع هذه التقنية ثلاث طبقات من المعلومات الجغرافية في منتج واحد: وهي صورة فضائية ذات دقة عالية وخريطة الاستعمال الحالي للأرض والمخطط التوجيجي مظهراً ارتفاع المباني في مدينة طرابلس. لقد تم الطلب من مجموعة المشاركين مقارنة استعمال طريقة رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) مع صورة مركزة وخريطتين شفافتين لطريقة الاستعمال الحالي للأرض والمخطط التوجيجي تحوي نفس البيانات كما في رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display). 51% من ذوي الا خبرة في قراءة الخرائط فضلوا استعمال رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) بالمقارنة مع الخرائط الشفافة و 33% فضلوا استعمال التقنيتين. فقط 21% من ذوي الخبرة فضلوا استعمال رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) ، 33% فضلوا الخرائط الشفافة و 46% فضلوا استعمال التقنيتين.

ان تقييم نتائج الدراسة من الجهة الإجتماعية والعلمية يظهر أهمية إدخال تقنية مرئية جديدة في عملية المشاركة في التنظيم المدني.

أظهرت هذه المقارنة بأنه بمقدور جميع المشاركين المساهمة في رسم و كتابة افكارهم باستعمال تكنولوجيا رقائق العدسات (Lenticular Foil Display) . بالاضافة الى ذلك و فيما يخص الفائدة من المشاركة من قبل الاطراف المختلفة فقد تبين بأن رقائق العدسات متعددة الأوجه (Multi-Flip Lenticular Foil Display) اكثر فاعلية من طريقة الطبقات الشفافة التقليدية وبأن المشاركين من غير الخبراء على وجه الخصوص فضلوا تكنولوجيا رقائق العدسات (Lenticular Foil Display) مقابل الطبقات الشفافة و التي كانت المفضلة لدى الخبراء والمختصين في قراءة خرائط المخططات التوجيهية. يظهر تطبيق هذا العمل بأنه يتوجب اثناء عمليات التخطيط المدني التشاركية الفعالة مراعاة مستوى المهارات في قراءة الخرائط و قدرات المشاركين. إن وسائل عرض البيانات الجغرافية مثل تكنولوجيا رقائق العدسات (Lenticular Foil Display) والطرق الجديدة الأخرى تفتح مجالاً اوسع لتعزيز مشاركة المعنيين (The Stakeholders)، ولذلك ينصح بالقيام ببحوث اكثر لتطويرها و تطبيقها.

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List of Acronyms

CAS	Central Administration for Statistic
CBO	Community Based Organization
CDR	Council for Development and Reconstruction
CIGIS	Community-Integrated Geographical Information Systems
DGGA	Directorate General for Geographical Affairs
DGI	Distributed Geographic Information
DGUP	Directorate General for Urban Planning
DSS	Decision Support Systems
ESCWA	Economic and Social Commission for Western Asia
GIS	Geographic Information System
GIT	Geographic Information Technology
HCUP	Higher Council for Urban Planning
ICT	Information and Communication Technology
IPC	Iraq Petroleum Company
JICA	Japan International Cooperation Agency
LFD	Lenticular Foil Display
MENA	Middle East and North Africa Region
MoPWT	Ministry of Public Work and Transport
MoSA	Ministry of Social Affairs
NCRS	National Centre for Remote Sensing
NGO	Non-Government Organisation
PSS	Planning Support System
RS	Remote Sensing
UNESCO	United Nations Educational, Scientific, and Cultural Organization
VRML	Virtual Reality Modelling Language

1 General Introduction

Chapter 1 is an introduction to the research background, the problem statement, the research objective, research questions and thesis structure. The background section introduces the reader to the conflict in the planning practice in Lebanon and especially in Tripoli, as part of the international debate in the planning process; the problem statement describes the rules and conflicts in planning theory and practice, with reference to the case study of Tripoli and Lebanon in general, leading to the formulation of the research objectives and research questions. A graph of the research model which gives an overview to the discussed topics in the study is discussed.

1.1 Background

Land use planning, both urban and regional, should be based on the participation of the community. The subject of city or urban planning goes back thousands of years (Pettit 1997), over different periods and ages, starting from antiquity and continuing until the present. Furthermore, certain problems and questions in urban planning have remained the same throughout the centuries, although priorities and necessities have changed. In today's world one of the most pressing issues is urban population growth (Davidson 1996). The rate of urbanisation is one of the aspects which urban planners cannot ignore in their planning theory and practice.

A second aspect which the planner should consider is the stakeholders and their engagement in planning and decision-making. The definition of a stakeholder can be understood in several ways, varying from one society to the other. Whatever the role and the definitions are, in the end "stakeholders include all actors or groups who affect and/or all affected by the policies, decision and actions of a project" (Groenendijk 2003: 57). Since they are the elements directly or indirectly affected by the planning result and any decision related to their environment, they should be deeply involved in the decision-making process itself.

The focus of the present study is the urban planning practices in Lebanon and especially a case study of the Metropolitan Area of Tripoli, the second largest city of Lebanon. The case of Tripoli is linked with the general global discussion of planning practice (cf. Chapter 2).The rapid land use/land cover change in most of the developing as well as the developed countries are part of an intensive urbanisation and industrialisation process. This process can be clearly observed in Tripoli.

Different factors have contributed to the high rate of urbanisation and uncontrolled development in Tripoli, some of which are discussed in this study. For example, the

conflict between different Master Plans which have been prepared for and to a greater or lesser extent applied to Tripoli since 1947, and the beginning in 1975 of the civil war, which lasted 16 years resulted in a lack of management and control of the city's development. The civil war also affected the availability of control-supporting Geo-Information Technology (GIT). For example, no aerial photographs were taken between 1973 and 1993, restricting the capability to monitor and regulate development. Topographic maps have not been updated for more than 40 years.

In the present study, shortcomings in the Master Plan preparation regulation are analysed, since these can be and found in other cities which have characteristics similar to Tripoli. Furthermore, it examines the importance of development and presents approach that could help to identify and solve conflicts between different groups regarding decisions which can positively or negatively affect the environment. As "Land use is the product of human decision…" (Mather 1986: 26), the decisions made both by groups and individuals in urban land use planning are a potential for some of conflict.

Within the strategy of the United Nations and especially under the Economic and Social Commission for Western Asia (ESCWA) Project which is concerned with the improvement of quality of life in the urban environment and the role of the local authorities in urban planning has to be both clarified and improved under the subject urban governance (ESCWA 1999). However, the definition of urban governance is still unclear to most of the population and for that reason a detailed discussion is given in Chapter 4 concerning the role of good governance in urban planning.
The concept of governance is a key component of the context of this study. Local governments and public authorities, according to the definition of governance, share the responsibility for public management (Olowu 2002, ESCWA 1999). This issue is discussed in the next chapters. The second part of the first section in Chapter 2 deals with the role of the stakeholders in the planning process in Lebanon and, as part of the base of the study objective, with the question of how the proposed model could help the local authorities to be more closely involved in managing their environment.

The technical part in the study has the aim of evaluating the relative advantages of two geo-data visualization tools for the enhancement of participation in urban planning. The creation of the tools is based on both Remote Sensing (RS) and Geo-Information Systems (GIS), since both techniques are essentially related technologies (Star et al., 1997). The role of means of visualisation for participatory urban planning is examined in a field study that underlines the potential role of geo-visualisation for the improvement of participation in planning practice.

In the case of Tripoli the evolution of urban planning theory and practice is an important issue for analysis and it serves as the basis for the development of the

model. The description of the types of plan used in the area leads to an understanding of the past and current planning practice. A review of the urban planning process in Lebanon can demonstrate the weaknesses of the existing urban planning process by reviewing different cases and, in particular, the recent Master Plan of Tripoli.

The history of urban planning practice is described in order to show that present-day land-use is the result of a Master Plan which was applied instead of the detailed land-use plan of 1964 as a result of political and economic pressures. "Urban planning has gradually changed from the technical-rational model of the 1960ies (cf. Figure 1.1) towards more open and inclusive planning approaches with more emphasis on public participation and collaboration" (Sliuzas 2004: 2). In the case of Tripoli the idea of public participation was adopted for the first time in 2000, but was unsuccessful and some of the reasons were the lack of community planning and effective geo-data visualization tools (cf. Section 1.2).

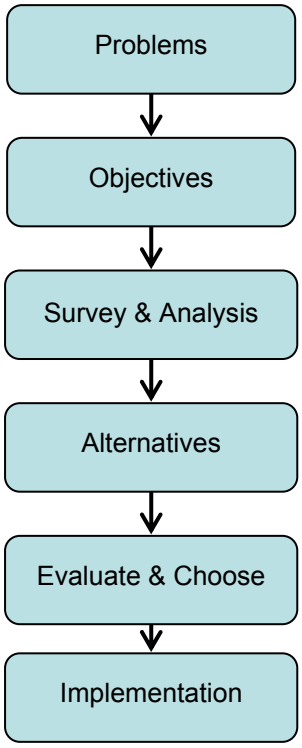

Figure 1.1: Rational planning model.
(Source: Sliuzas 2004)

The major part of the research is concerned with the 2000-2020 Master Plan and the preparation methodology of this plan (cf. Chapter 2). As previously mentioned, in addition a model has been developed, with the goal of emphasising the necessity and the importance of the stakeholders' role in planning practice, and how the different stakeholders should be involved as diverse bodies. That would include

“Politicians, public, pressure groups, developers and many others” (Hague 2000: 1). The model’s focus on geo-visualization means as effective tools and one of the important principles in the community planning approach, since “people can participate far more effectively if information is presented visually” (Wates 2000: 21).
The idea examined here was to use lenticular technology and in particular what Buchroithner called “Lenticular Foil Display” (LFD) (Buchroithner 2006), LFD offers several effects and in this study the Multi-Flip effect was used to assist the non-expert map-reader in being able to read the Master Plan map, the generation of the Multi-Flip LFD is discussed in Chapter 5. Lenticular foils technology has been used in several earlier and current activities in the Institute for Cartography of the Dresden University of Technology (TUD). Several projects were mainly focused on the development of true-3D hardcopies, and on effect combination, with a big advantage for flips and morphing, i.e. “that these effects can be viewed with unaided eyes” (Buchroithner et. al. 2005c: 429)
The idea of integrating this technology for the first time into the planning process was based on the integration of the high-resolution satellite imagery of QuickBird with two spatial data layers displaying the present land use and the 2000-2020 Master Plan to produce a so-called multi-flip display. The creation and the evaluation of this technique are discussed in Chapters 5 and 6.

In general, this method can improve urban governance by analysing problems and opportunities related to the environment and through the engagement of a more widespread group of planning experts and non-experts involved in the planning process, who share a common goal of protecting their society from the possible effects of poor decisions.

1.2 Problem Statement

For more than half a century in Lebanon Master Plans have been the most common planning tool of the Directorate General for Urban Planning (DGUP). Although ostensibly produced with the public interest in mind, such plans were mainly based on technocratic planning approaches and the decision makers’ ideas. Many of the plan proposals were made for the benefit of political leaders and the highest level of society, which had the power to influence the decision. The municipality role was more or less limited to the implementation of the Master Plan and civilian society did not have any role in the planning process.

Tripoli is one of the most appropriate cases for analysing the weaknesses in the urban planning process in Lebanon: First, Tripoli did not have an operational Master Plan for more than 30 years (Harmandayan 2002) apart from some small modifications to the Master Plan of 1971. Second, the modifications were always made by the DGUP on the basis of political decisions and the influence of powerful groups (land owners, political leaders …) without transparency and public

participation, an adequate socio-economic analysis and proper consultation with the local authorities and other groups. However, this situation today is improving slowly in the area of participation and with respect to the integration of local authorities into the decision process. Nevertheless, methods and tools are still lacking.

In spring 2000 the preparation of a new Tripoli Metropolitan Area Master Plan began, under the contract which was signed between the Lebanese Government/Minister of Public Works and Transport (MoPWT) and a selected consultant firm. On 12/07/2000 the first phase of the project began, including the data collection, and the Master Plan draft, is to be ready on 12/07/2001. After more than four years the project was accepted by the DGUP but until summer 2007 it was not yet officially approved by the government (cf. Section 3.2.5). As a result, the situation is even worse than what Harmandayan 2002 describes, i.e. that Tripoli has not had a Master Plan for more than 30 years. Does Tripoli really need a Master Plan and if more than 5 years have passed and the Master Plan has not yet been approved by the national government to be implemented, what and where is the problem? This point is discussed in detail in Chapter 3.

For the first time in Lebanon and under MoPWT Decree 1/62, a committee from different institutions was established to participate in the formulation of the Master Plan, particularly in the case of the Tripoli 2000-2020 Master Plan. Different institutions were selected and invited to discuss the Master Plan Proposal. An unsuccessful step followed, including several meetings with local authorities in Tripoli (Nakouzi 2004). The main reason for this was that no community planning model was used. Moreover, poor quality geo-data visualisation techniques, consisting of paper maps were used. This led to the development of a model to assist the different concerned actors and specially the civil society groups in being equally involved in the urban planning process.

What is the key problem?

Practice has shown that Master planning is ineffective: it takes too long, is bureaucratic and technocratic, controlled by powerful groups in society and does not enjoy the support of a broad base. Several projects have shown the unsuccessfulness of the Master Plan process in Lebanon. One of them is the research case study of the Tripoli 2000-2020 Master Plan.

Tripoli's 2000-2020 Master Plan has been prepared with more public participation than in the past, but the public groups participating were again selected without transparency by the Minister of Public Works and Transport with aim of integrating the local authorities for the first time into the master planning process. In total fourteen persons participated, including the planner and three representatives from the DGUP. Several meetings were rather unsuccessful, mostly because most of the active participants were civil engineers and their main interests were construction

issues (Harmandayan 2005). The NGOs were not strongly represented and the 2 NGO representatives also had an engineering background (cf. Table 3.5).
Based on the project contract, the planner is not obliged to select a method to get the stakeholders fully involved. Hence no stakeholder analysis was made. The GI tools were not greatly used to assist in supporting more effective participation in the planning process and facilitate the acquisition, analysis and sharing of knowledge of the local environment. The proposal for the Tripoli Master Plan was presented and discussed on the basis of an analytical 2D map (Harmandayan 2005). This alone limits the chance for non-experts to become fully involved in the discussion.

The key problems are interrelated and, as the research model shows, the development tendencies of the three domains of political, economic and public administration form one side and urban planning practice with Geo-Information Science and Technology form the other side which lead to developing the study questions.

1.2.1 Questions

To structure the thesis on the basis of the main objective and the related sub-objectives, the following study questions were used to achieve the result and to provide a structure for the content of the thesis

Urban Planning Practice in Lebanon and Tripoli:

What type of urban planning approach does the Lebanese government use?
What has been the development of urban planning practice in Tripoli?
Are these planning processes effective?

Stakeholders' Role in Planning Practice in Lebanon:

Who are the key stakeholders in urban planning in Lebanon?
How were the local authorities selected for participation in the Master Plan process of Tripoli Metropolitan Area?
Why was participation in the Tripoli Master Plan process unsuccessful?
What kinds of knowledge and tools did the public stakeholders lack?

The tools used in the planning process of Tripoli Metropolitan Area 2000-2020 Master Plan:

What kind of tools did the planner use to analyse the interests of stakeholders?
To what degree geo-data visualization tools are used in the community planning participation?
Can geo-data visualization tools play an important role in assisting stakeholder participation to be more effective, and how?

What characteristics should geo-data visualization tools have to enable effective participation in urban planning?
What is a Multi-Flip LFD and how does it compare with current conventional maps?
What is the advantage of the Multi-Flip LFD as a tool for testing the role of participating groups in planning practice in Lebanon?

The above questions are answered supposed to be answered in the following sections in accordance to the structure of the thesis.

The research objectives will mainly focus on the role of geo-data visualization in participatory urban planning. In Chapter 4, a review on the developmental tendencies of the three domains of the research model is discussed with an elaborated model dealing with the role of geo-data visualisation in urban planning practice, based on the evaluation of Tripoli Metropolitan Area 2000-2020 Master Plan as an empirical case study.

1.3 Research Objectives

The main objective of the study is to develop a model based on geo-data visualization tools to assist the broadening of participation in urban planning practice. These tools were tested in an empirical case study of the Tripoli Metropolitan Area 2000-2020 Master Plan preparation.

1. Analysis of the urban development in the study area based on a review of the Urban Planning practice in Tripoli with a review on the weakness of participation in the master planning process.

2. Identifying the decision-makers and stakeholders with their roles in the planning process and testing the role of the public authorities in the decision making by looking at the role of good governance in urban planning project.

3. Development of a model based on innovative geo-data visualization tools to assist public authorities in the planning process integration and with the aim of protecting their environment from a poor planning and decision-making.

An elaborated model is discussed in chapter 4, focusing on the topics surrounded by the discontinued line polygon in the research model (cf. Figure 1.2).

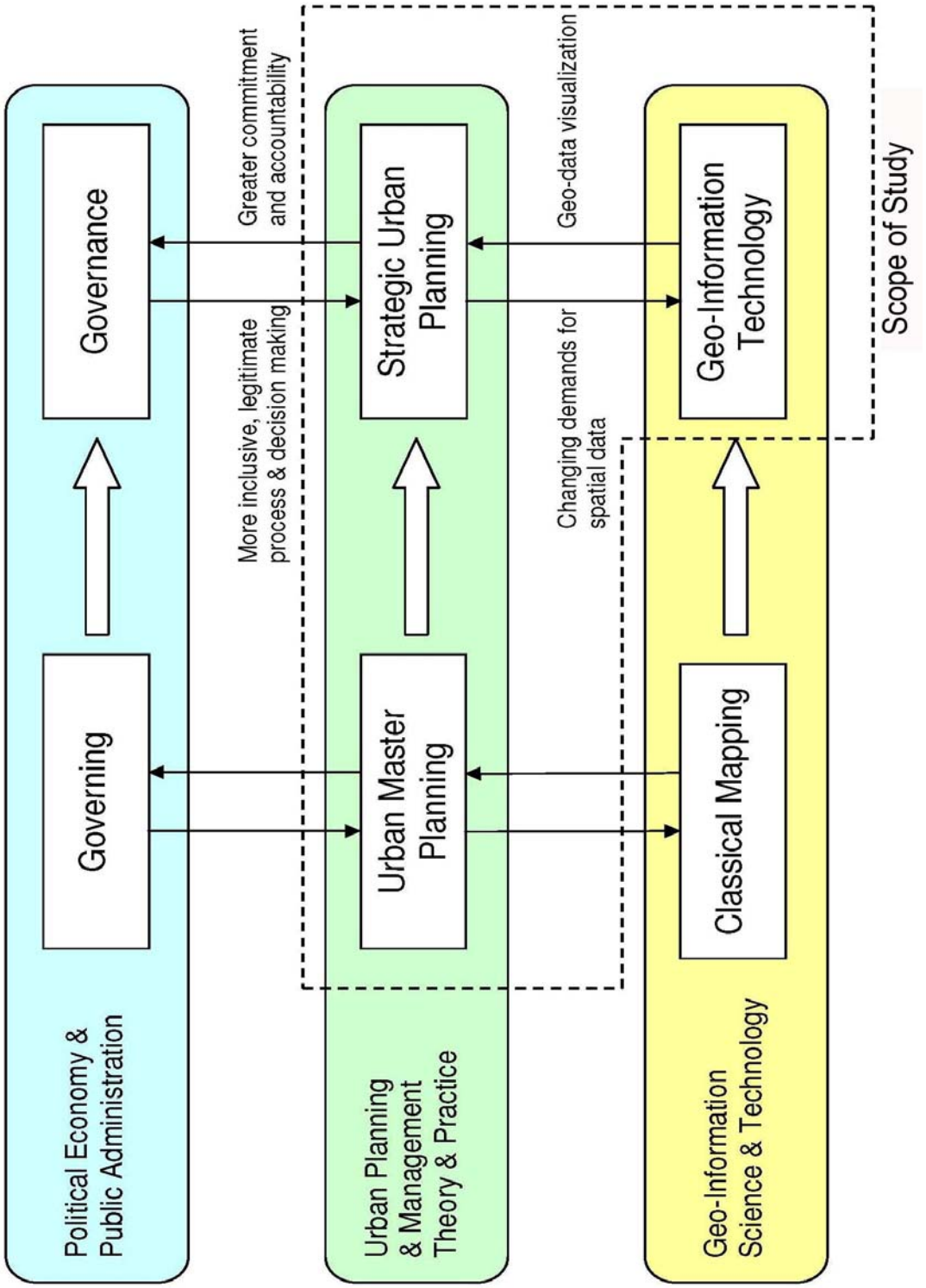

Figure 1.2: Research model

Note: Explanation of different shapes of flow chart modules cf. Figure 1.3

1.4 Thesis Structure

The study is divided into 7 chapters. What follows is a brief overview of these chapters.

Chapter 1: is a general introduction to the thesis, starting with the background of the research. The second part identifies the problem statement and gives the reason for the selection of the case of Tripoli. The research model and the main objectives followed by the research questions are discussed.

Chapter 2: review of urban practice in Lebanon. The history of urban planning and the types of plan used and the planning process procedure are discussed and analyzed, and also the stakeholders' roles in the Planning Process. Who are they? And who are the decision-makers?

Chapter 3: introduction to the study area including the General Description: Physical Environment, "Location, Relief and Climate", Social Aspect, "Population and Social Structure" and Economic Aspect, "Physical Infrastructure and Economic Situation".
The second part of this chapter discusses development of the City of Tripoli reflecting the planning practice, with a review of the different Master Plans, an historical analysis of the urban development and land use change detection, based on Remote Sensing.

Chapter 4: this chapter about the settings of and the drivers for the study is divided into three sections. Each section deals with one of the three sub-objectives of the thesis. The Section One deals with the planning process development trends and the weakness of the existing planning practice in Lebanon, proposing an alternative to the master planning process. Section Two is the stakeholders' analysis and proposed tools and methods for participatory efficiency, looking into the governance component from the urban planning point of view.
The third and the last section discuss the role of geo-data visualization tool for community planning with introducing the Multi-Flip LFD as new tool for participatory urban planning.

Chapter 5: description of the production of a Multi-Flip LFD is discussed and the types of data selected for the integration of this type of tool into the urban planning process.

Chapter 6: analysis of the data collected by interviewing different participants, based on the case of Tripoli 2000-2020 Master Plan evaluation, with the result from measurement of the stakeholders' attitudes and their readiness to participate in the planning process is presented and discussed. The evaluation of the role of 2 geo-

data visualization tools in participatory urban planning is summarized in a discussion of the weaknesses and strengths of the Multi-Flip Display.

Chapter 7: Conclusion of the research, summarizing the lesson to be learned from this study. A recommendation for further research is discussed.

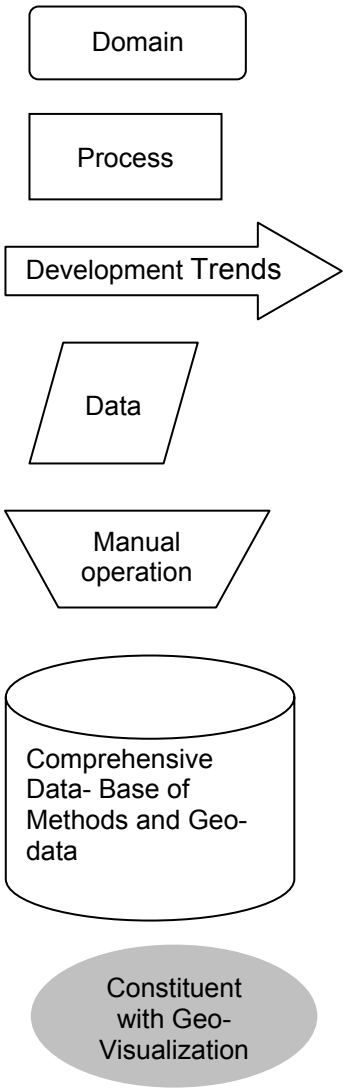

Figure 1.3: Explanation of different shapes of flow chart modules used in this monograph

2 Urban Planning in Lebanon

Chapter 2 discusses urban planning practice in Lebanon in the period after independence from France in 1943. A review of the history of urban planning practice during that period and of the existing planning process in general and in Tripoli in particular is presented. The second section of this chapter focuses on the types of plan used in Lebanon from the Master Plan to the detailed plan. The third section describes the planning procedure and the chapter ends with the identification of the stakeholders and their role in the planning process.

2.1 Overview of Urban Planning

A survey made by the National Centre for Remote Sensing (NCRS) in Lebanon shows that only 10.3 percent of Lebanon's total areas had Master Plan in 2001 and many other urban Master Plans are under preparation (MoE 2001, Bakhos 2001). The Directorate General for Urban Planning (DGUP) under the Ministry of Public Works and Transport (MoPWT) planned that by 2005 more than 20 % of Lebanon's total surface area would have some form of Master Plan. However, this project faced some difficulties, especially in that a great percentage of the Lebanese territory did not have a cadastral map (cf. Section 2.3.2 and Figure 2.4)

As mentioned above the review of urban planning practice focuses on the last five decades. The French colonial administration had a great influence on Lebanese architecture and on urban planning practice, starting with Michel Ecochard, who worked as an architect in Lebanon during and after the French colonial period. Ecochard was asked to prepare Master Plans for Beirut and several other cities between the early 1940ies and late 1950ies (Ghorayeb 1998, Saliba 2000, Saade 2002, Verdeil 2004). Ecochrard was not the only French planner who shaped Lebanon's urban planning history. During the presidency of Fouad Chehab (1958-1964) Louis-Joseph Lebert was as well very well known (Verdeil 2003, 2004).

In the early 1950ies the first Ministry of Planning was created; however, due to the unstable political situation and other difficulties, the ministry "was not able to prepare a land use plan …" (Plan Bleu 1999: 18). Later, in 1977, this ministry was replaced by the Council for Development and Reconstruction (CDR), which is directly linked to the Council of Ministers. CDR responsibilities cover different functions related to construction and development projects in the field of urban planning and land use management (MoE 2001; Plan Bleu 1999).
On the other hand, on the 24th of September 1962, the first statute law for urban planning and land use management was approved, was updated later in 1983 and is still in use through the DGUP/MoPWT. The CDR and the DGUP are both

governmental institutions and have almost the same responsibility in urban planning projects.
In 1989 under the Government Decree Number 2/89 the Higher Council for Urban Planning (HCUP) was founded under the Directorate General for Urban Planning (DGUP), which is a department of the MoPWT. It played an important role in the decision-making and advising on urban planning projects in the country. HCUP members were drawn from different ministries, authorities and planning experts including the CDR and the role of each member is discussed in detail later in this chapter in Section 2.4.
The HCUP has "the mandate to review and approve or reject specific development proposals and detailed land use plans" (Plan Bleu 1999: 18). But the final decision must be approved by the Council of Ministers (cf. Section 2.3). i.e. The central government level should agree and finally approval from the president of the country needed to make the project ready for implementation.

In the early 1980ies the "Institute d'aménagement urbain pour l'Ile-de-France" (IAURIF) became involved in urban planning in Lebanon. Their Master Plan report for "Great Beirut" under the presidency of Amin Gemayel, the "Schéma directeur de la région métropolitain de Beyrouth" (SDRMB) was completed in 1986 but not officially approved. The project was directly supervised by President Gemayel, which made it greatly influenced politically which in turn served political leaders' interests more than those of the others. The war context at that time was the reason that the project was rejected even after the civil war (Verdeil 2004).

The main interests of the Lebanese Government in urban planning projects were concentrated mostly on coastal zones and specifically on Beirut and on the two harbour cities of Tripoli and Saida. Until recently, the average of unplanned area was over 80 % and most of the zoned areas were situated along two axes, the main axis being the coastal zone and the second being the Damascus Road (cf. Figure 2.1).
The coastal zone plays an important role in the Lebanese economy specially that most of the major cities lie on this axis and play an important role as trade cities and in tourism, due to their historical background and the 210 km long beachfront on the Mediterranean coast.
The second axis follows the Damascus road. It starts in Beirut and crosses the Lebanon Mountains into the Bekaa Valley where it crosses the border with Syria on the way to Damascus. This area played an important role in the trade connection to Syria and other Arab countries in the gulf region, especially in the beginning of the seventies and during the occupation by the Israelis in south Lebanon until May 2000.

Planning faced significant problems and difficulties from internal and external politics, which affected the whole development of the country and the management of a national land use plan over decades. Several "sector-specific national plans are developed and implemented such as for water supply and sanitation, solid waste,

industrial area…" (Plan Bleu 1999: 18) but no national land use plan was made to guide and coordinate implementation.

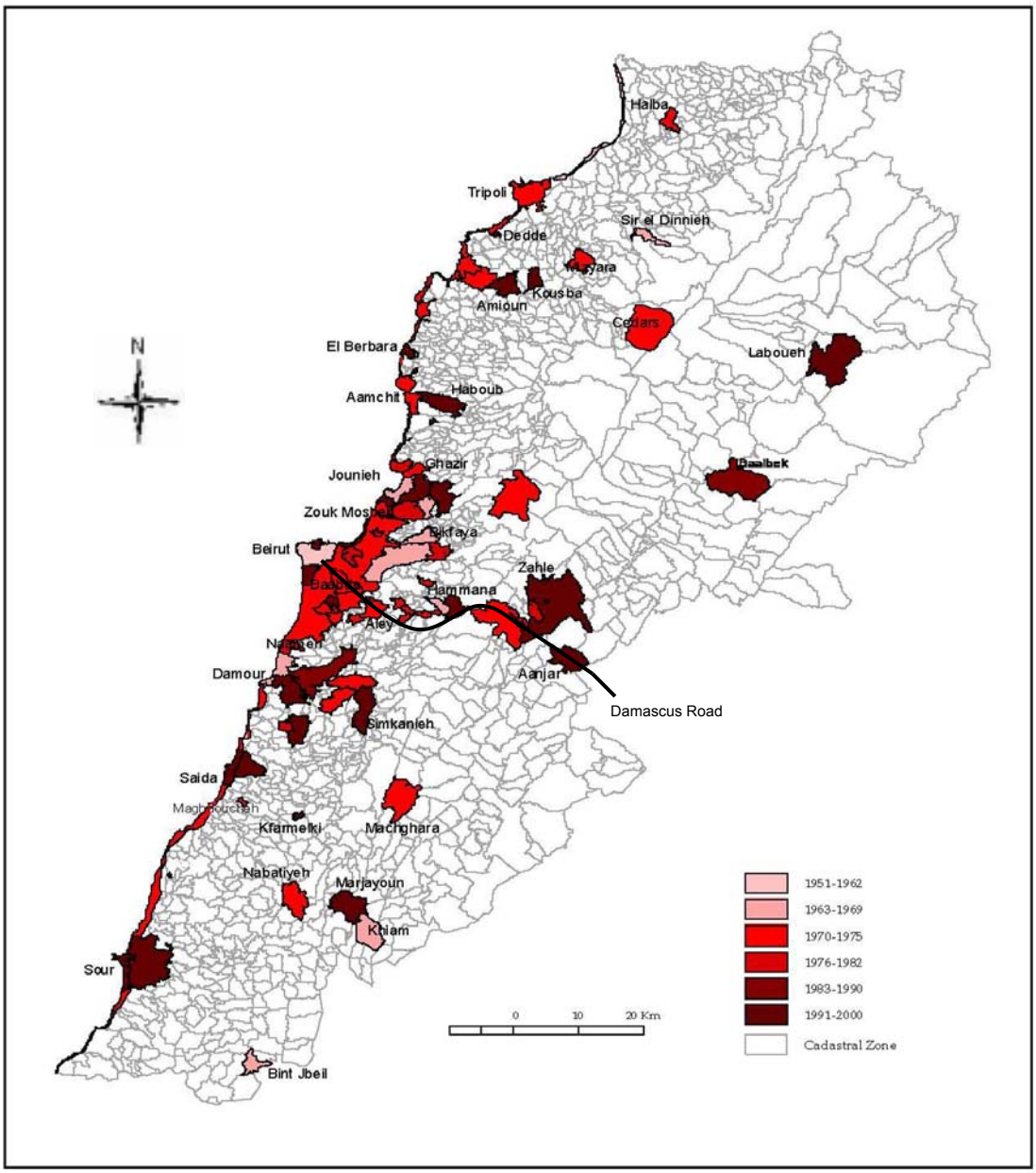

Figure 2.1: Master Plans in Lebanon: coloured areas depict zones with Master Plans from different periods.
Source: NCRS and CERMOC 2000

The Civil War, which started in 1975 and lasted 16 years, had a dramatic effect on both national and local development. In 1991 a new government was established in

accordance with the Ta'if Accord[1]. After 16 years of Civil War, the economy and the infrastructure of the country were seriously damaged.

After 1991, the goal of the national government was the reconstruction of the destroyed infrastructure and in particular the coastal areas, especially Beirut, which had been heavily damaged during the Civil War.
In 1991, the Council of Ministers, approved a Master Plan prepared by the "Société Libanaise pour le développement et la reconstruction du centre ville" (SOLIDER) an anonymous real estate society working for the reconstruction of downtown Beirut (CDR 1997). The project was launched in 1992.The strategy of the government was to build the infrastructure and economy of Lebanon up to its pre-war level within a short period. However, the focus on the capital Beirut was not enough, because the structure of the whole country had been affected and a policy at the national level was necessary, since many other urban areas had developed without control during the war.

Due to the high pressure on the coastal zone stemming from the high rate of urbanisation and industrialisation, most of coastal cities grew without any strategic plan and protection for the important heritage and environment of this zone. In line with the so-called Millennium Development Goals (2000) several projects were launched to protect the environment in Lebanon in general and the coastal zone in particular.
Supported by the CDR, the Minster of Environment (MoE) setup an international programme entitled "Strategic Environmental Assessment and Land Use Planning in Lebanon" (SEA). Within this programme several projects were launched involving physical planning in Lebanon with the financial support of several international and national institutions (CDR 2001; MoE 2003).
According to the CDR 2001 Report, "Environment and Physical Planning" several projects were decided on. Some of them have been completed, while some are still in the process. Below is a selected list:

1. Integrated Coastal Zone Management (ICZM): The aim of the project is to protect the coastal zone and assist the MoE in preparing an integrated environmental strategy for Lebanon's coastal area, involving different organizations such as the DGUP, The Ministry of Interior and Municipalities, etc.
2. Preservation of Cultural Heritage and Development of Tourism: The aim of this project is to protect the cultural heritage of the country and create

[1] It is called the Ta'if Accord because it was a signed in the City of Ta'if in Saudi Arabia as the blueprint for national reconciliation, to establish a new political system by distributing the power of the different religions in the country in an equitable way.

conditions for sustainable cultural tourism in five cities with old urban structure: Baalbek, Tripoli, Byblos, Sidon and Tyre.

3. National Land Use Planning (NLUP): The aim of this project is to prepare a National Land Use Plan for the Lebanese territory, based on satellite images and aerial photos.

The last project was initiated by the CDR in coordination with the DGUP and through a decision of the Council of Ministers (CDR 2001). The NLUP was prepared by a joint venture of the same company which prepared the Metropolitan Master Plan of Great Beirut in 1986, "IAURIF" and "Dar Al-Handasah Shair and Partners s.a.l.", one of the well-known firms in Lebanon (Verdeil 2004). As with most other Master and Detailed Plan projects in Lebanon, the consultants were selected by the Minister of Public Works and Transport without any bids, on the basis of the consultant's experience and qualification. The way of selecting the consulting units is discussed in more detail with the planning process procedure (cf. Section 2.3) and is linked to the issue of the role of national and local government in urban planning in Lebanon.

Many conditions and strategies have recently been changed in the urban planning practice, especially from the technical side. For example, there is the role of the local authorities in the Master Plan preparation. This role is discussed on the basis of the last Tripoli Master Plan and the planning practice in Tripoli (cf. Section 3.2).

2.2 Types of Plans

The kinds of plan for urban areas in Lebanon, which were prepared before and after the Civil War and the planning process have not significantly changed. In Lebanon the name Master Plan or what is very well known all over the country as "Almukhatat Altawjihi" is a directive blue-print with a detailed land use table describing the state of the land use in every zone of the study area. A detailed description is given in the following 2 sections.

As mentioned above, there has been no land use plan at the national level apart from the recent project which was completed in 2004 (CDR 2004). Parallel to this, there are research projects by universities and institutions concerning the management of Lebanese resources like, the National Centre for Remote Sensing (NCRS), supported and financed by international institutions. For more information the reader referred to "http:/www.NCRS.com".

After the Civil War several planning projects related to policy report[2] types of plan were launched by the CDR (cf. Section 2.1). Such plans were produced in nearly

[2] Ian Masser and Henk Ottens in "Urban Planning and Geographic Information Systems" Berlin 1999, discussed the three types of plans by defining the "Policy reports" type of plan is relevant policies for a large region or a country in global, e.g. for transportation infrastructure, major business areas, nature conservation, etc).

every European country, for large regions or at the national level to improve natural resource management, infrastructure and transportation (Masser and Ottens 1999).
An example of such a plan is “The Study of Environmental Friendly Integrated Transportation Plan for Greater Tripoli” from the Japanese International Cooperation Agency (JICA) and CDR in 2001. Another project of the same type was launched in 2004 by JICA jointly with the CDR for the water resource management in Lebanon.

Since this study is looking at the weaknesses of the Master Plans in Lebanon and in particular in the case of the Tripoli Metropolitan Area, it is necessary to present the different types of plan in use at this level.
In the procedure of the planning process described in Section 2.3, it is normally divided into two phases. The first phase includes the data collection and analysis. Phase Two is the Master Plan proposal preparation, which leads to the detailed plan “Alnizam Altafsili Alaam” or what is sometimes known the Detailed Land Use Plan.

2.2.1 Master Plans

The Master Plan has been the common type of urban planning process in Lebanon for about half a century and no basic update has been made. **The master planning process has been greatly influenced by the French system of urban planning. The French system has been changed to a more collaborative process, where as in Lebanon the Master Plan is, even today still a highly technocratic and bureaucratic system.** This issue will be discussed in the review of different Master Plans in the case study for Tripoli (cf. Section 3.2).
In Lebanon several Master Plan projects were conducted before the Civil War and no updating has been made for most cities for more than thirty years (cf. Figure 2.1). For example in the case of the Metropolitan Area of Tripoli. A high rate of urbanisation, which is an issue all over the world, is also found in Lebanon. A particular concern is the large percentage of the urban areas in Lebanon that have been developed without any planning.

The Master Plan process is based on the conditions made and contracts signed between the Government (i.e. the planning authority) and the planning consultancy firm. This contract document is signed under Law 405, dated 2nd March1942, which dates from the time of the French colonial administration. Several modifications of this document were made and the last version is translated and presented in Section 2.3.
One particular result of different Master Plans prepared over the last forty, fifty years is very common (cf. Figure 1.1). Based on the contract conditions, the consultant has to submit a report about the study area in Phase One of the study, which must include a survey of the social-economic situation, population, infrastructure, transport and climate etc. Based on this survey and analysis of the population density and

population growth rate, etc. the planner is requested to prepare a proposed Master Plan map to accompany the detailed plan (cf. Figure 2.2 and Table 2.1).

These kinds of plans were mostly meant to be valid for ten to twenty years. They are also known as Structure Plans, a very common type of spatial plan (Masser and Ottens 1999). The municipalities and/or the municipal federations receive a copy of the Structure Plan (cf. Figure 2.2) accompanied by the so-called Detailed Land Use Plan (cf. Table 2.1), with a document to guide the municipality for implementation including all construction and land use. In most cases the Land Use Permit can be received from the DGUP. Only in some areas like Beirut, Tripoli, the Federation of Municipalities Jbail, Kesrouan and Metn are the municipalities allowed to issue this permit (MoE 2001).In the case of Tripoli, for example, the last Master Plan was made before the Civil War in 1971 and still serves as the basis for the current Master Plan, apart from modifications and changes in regulations by the Detailed Plan (cf. Section 3.2). The common type of planning process, observed in Lebanon at the urban and regional level, is related to the two plan types “Structure Plans” and “Zoning Plans”, which fit the description of Masser and Ottens that the aim of these plans “regulates the use of land and buildings at parcel level” (Masser and Ottens 1999, 4). It is mostly designed for land development control of the height of building’s and conditions of construction (cf. Table 2.1).

The most critical points in the Master Plan approach were: the time required, sometimes it took years to be prepared with “the lack of coordination between development agent” (Sliuzas 2004: 23), no role for local authorities and public sector participation. A review on this type of plan is discussed in Chapter 4 (cf. Section 4.2). From the critical point of time required different examples in Lebanon can be given, for instance, the 2000-2020 Master Plan of Tripoli Metropolitan Area, which is selected as an empirical case study for this thesis. The decision to prepare a Master Plan for Tripoli Metropolitan Area was made in the beginning of 2000. The contact between the DGUP/MoPWT and the consultant firm was signed in March 2000 and until summer 2007 the draft plan had not been approved. There was a delay of 5 years (cf. Chapter 3).

Figure 2.2: Master Plan of El Bedaoui Municipality, part of the 2000-2020 Tripoli Metropolitan Area Master Plan
Source: Proposal for the DGUP/El Bedaoui 2000-2020 Master Plan

The Master Plan was dominant before the Second World War and until the late 1960ies among western countries. The Second World War was a turning point in planning practice and traditions. Especially the local authorities gained an important role in participation and controlling the development of their environment (Masser and Ottens 1999). This approach has been badly used in Lebanon until today, and this issue is intensively discussed with the Stakeholders Role in Section 2.4.

As the discussion above shows: in many developed counties or those at an advanced stage of development the planning approach has been basically changed in the last 5 decades. In Lebanon and especially at the regional level, the Master Plan or the Directive Blue-Print is still used. This is mainly related to the centralised political system in Lebanon which is facing difficulties in moving to a decentralization policy and giving a strong role to the local authorities. The need for more to be done in the issue of improving the local government role, which can play essential role in the governance systems, the issue of urban governance and the positive impact on the collaborative urban planning systems, are all discussed later in Chapter 4.

2.2.2 Detailed Plans

The aim of the Detailed Plan is to give an overview of the land use in each zone, represented in the Master Plan map, starting with using types of land use to label the area on the map, showing the way that the land is allowed to be divided from the minimum surface size to the minimum facade length and depth in meters.
The fourth column describes the conditions in the existing land in each zone after the planning process and the possibilities for it to be used in accordance with the rules of the minimum surface areas use and certain facade and depth measurements.
The set back columns describe the minimum in meters allowed from the border of the property to the frame of the building with the permitted distance from the edge of existing or planned roads and from all sides of the adjacent parcels.
The Land Use columns are divided into two parts: one is the percentage limit of the whole parcels which can be built on and the second is the multiple factor of maximum general use of the same parcels.
The last columns are the height columns discussing the number of floors and the maximum elevation of the buildings. Sometimes the summary can include remarks on the columns including some additional details.
As I mentioned above, more details are included in the accompanying document, mostly related to architectural and engineering aspects and sometimes, environmental ones.

The detailed plan describes the condition for the dividing of lots and with construction permits in each types of land use (cf. Table 2.1) i.e. it is at the land parcel level and is concerned with detailed use for building construction. Furthermore, some contemporary architectural details have been included, like the kind of iron which should be used for the balcony and the windows and so on. They are described in a separate document in the detailed plan.

Table 2.1: Summarizing table of the proposal for the DGUP/El Bedaoui 2000-2020 detailed plan

Area	Area Label on Map	Land Division			Existing actionable land for construction			Set back per m.			Land Use		Hight		Remarks
		Minimum Area sq.m	Minimum Facade L.m	Minimum Depth L.m	Minimum Area after planning sq.m	Minimum Facade after planning L.m	Minimum Depth after planing L.m	from the Planned roads or border	from the left & right sides	from the back side	Maximum average of land use	Maximum factor of general use	Number of Floors	Maximum elevation m.	
The Old City extending	U1	600	18	18	300	13	13	adhesive to the Planning or roads border retreating	*	*	60	1.6	4	14	in case of unadhesive 3m retreating
Residential & Commercial	U6	800	20	25	400	15	15	adhesive to the Planning with minimum 3m retreating from the roads limits	3	3	60	2.4	9	29	
Residential & Popularity	U16	1000	25	30	500	16	16		3	3	40	1.2	4	13	
Residential	U7	800	20	25	400	15	15	Minimum 3 m.	3	3	40	1.6	9	29	commerce
Residential	U10	800	20	25	400	15	15		3	3	40	1.6	7	23,5	
Residential & Agriculture	U2	4000	40	50	200	30	30	Minimum 5 m.	4	4	10	0.2	2	7	
Residential	U9	2000	30	40	1000	22	22	5m over the earth			30	0.8	5	16.5	
Craft Industry & Commercilal	U8	2000	30	40	1000	22	22	Minimum 5 m.	4	4	50	1.5	4	15	
Industry	U5	2000	30	40	1000	22	22	5m over the ground floor	4 (7)	4 (7)	50	1.2	3 4- commerce	10 12-commerce	roads commerce
Industry	U17	2000	30	40	1000	22	22		4 (7)	4 (7)	50	0.8	2 3-commerce	10 12-commerce	roads commerce
Industry	U14	1500	30	30	800	20	20		4 (7)	4 (7)	50	1.2	3 4-commerce	11 13-commerce	roads commerce
Industry	U11	1500	30	30	800	20	20		4 (7)	4 (7)	50	1.2	3 4- commerce	11 13-commerce	on the roads commerce
Industry & Public Services	U12							Minimum 5 m.			40	0.8		10	

Source: Proposal for the DGUP/El Bedaoui 2000-2020 detail plan being part of the Tripoli 2000-2020 Metropolitan Master Plan, translated by the author.

The aim of the detailed plan is to control the development and the use of the land in each zone. However, no clear time horizon could be found for the prepared Master Plans, because most of them were either modified or changed completely, as a result of political influence.
Table 2.1 is an example of the form and the typical way in which the generalised Detailed Plans were to be prepared and accompanied by the map representing the respective zone in the Master Plan (cf. Figure 2.2).

2.3 Planning Process Procedure

In addition to examining types of plan, it is important to understand the process through which these plans are created. The best way to understand the planning process model in Lebanon is to check the Design Office/Directorate General for Urban Planning/Ministry of Public Works and Transport conditions document and contract for the Master Plan preparation.

The planning process in Lebanon is based on the contract between the Lebanese government, represented by the MoPWT/DGUP, and the consultancy firms, which are in most cases engineering offices belonging to architects with urban planning knowledge and experience.

The goal of the Master Plan project is to prepare a directive plan with a detailed plan for the selected areas. The contract is signed between the MoPWT, represented by the Minster, and the selected consultancy firm, represented by the planner or the responsible person from the firm. The selected municipalities have to be marked on a topographic map attached to the contract document with a scale of 1:20000.

The contract is divided into thirty items. It is briefly described to give an idea of the recent version used for planning in Lebanon. The goal is to analyze the existing planning procedure rules and to find out at which stage the research model can be best integrated to assist the local authorities in their role as stakeholders.
The planning process in Lebanon is divided into two basic phases (cf. Figure 2.3):

- Phase 1 comprises the survey and data analysis with an estimation of the existing socio-economic and environmental situation with regard to the buildings and the infrastructural conditions in the study area.

- Phase 2 prepares the general Master Plan, “Almukhatat Altawjihi”, for future land use for a period of about twenty years. Furthermore, this plan has to contain a document which describes the construction regulation and the system of parcel division.

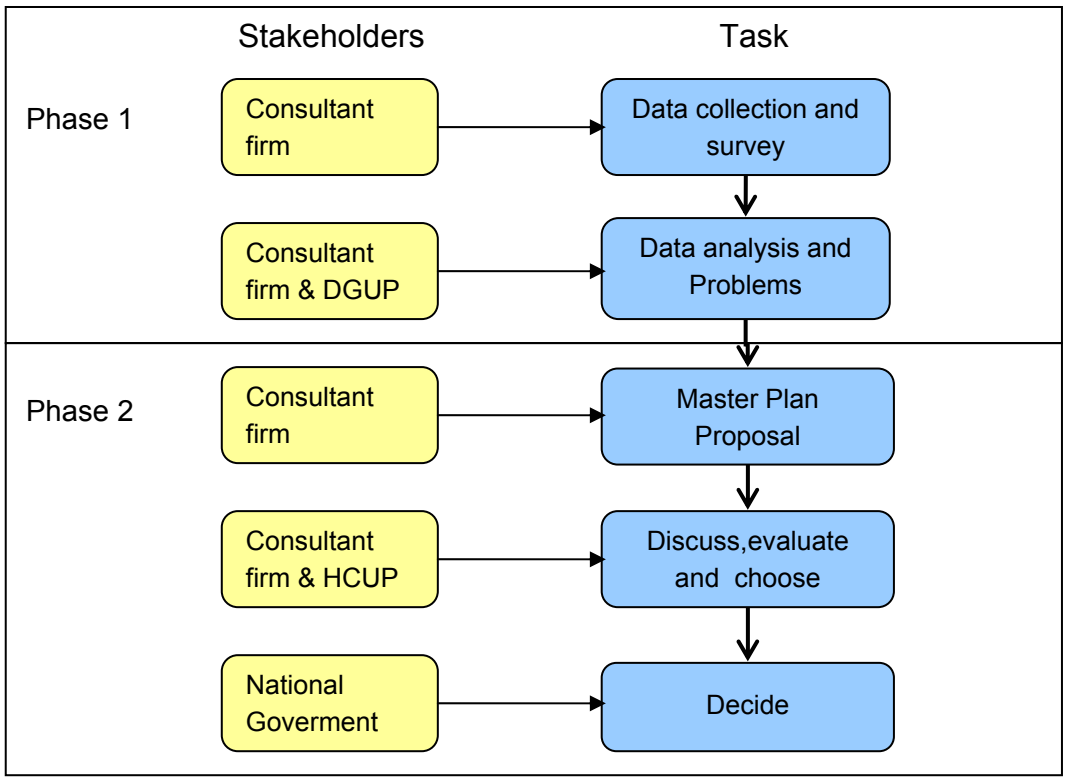

Figure 2.3: Planning process stages in Lebanon

2.3.1 Phase One

Phase One is the survey and analysis information about the selected area. This survey is carried out by filling in a standard form including information about every parcel selected by the Design Office/DGUP. A collection of scientific literature concerning the history, geography and economy of the selected area is also compiled.

Furthermore, a collection of all existing statistics and studies which have been conducted or which are still in process has to be included. This part is described in detail in the contract conditions document of the DGUP. At this point, further details concerning the number of copies and the way the project should be prepared, regarding font type, size and the software to be used for the figures and tables preparation is not mentioned (For more detailed information please refer to the Design Office/DGUP/MoPWT conditions document and contract for Master Plan preparation).

1 The report has to present the population growth estimate and the need for infrastructure projects with land management improvement in the areas concerned. The planner should present possible solutions to the existing problems, based on this information. This information should contain:

1.1 The location of the study area with a brief description of it, its history and the building style, climate, land use and land value, evaluation as agriculture land.

1.2 The population demography including age and gender percentages, migration, population density and its distribution, estimation of population growth rate for the next twenty years, the income per capita in every economic sector (Agriculture, Industry, Trade, craft, etc.), age and condition of residential buildings.

1.3 The road network and its condition, the amount of open space and public space available, parking, public transport stations, transport types and situation, e.g. train, bus, taxi, etc.

1.4 The state of the infrastructure, including water supply, electricity, telephone, sewage network, waste collection and waste disposal.

1.5 The heritage sites including their age, type and of their history.

1.6 The environment quality: air and water pollution.

1.7 The existing social organizations and public services, including but not limited to the role of Non-Government Organizations (NGO's), educational, social, health and religion.

1.8 The economic situation

1.9 An analysis of the existing lands and presenting them in tables based on the categories of size and condition.

2 All this information should be put into an Access or Excel database to allow the link to GIS software.

3 In addition, a document comprising a photo montage of selected areas should be included to show the current situation.

4 Maps

4.1 The required maps, based on the information collection and survey made, should be prepared and printed at a scale of 1:5000 but the scale it is changeable if necessary in accordance with a DGUP request.

4.2 All the required maps should be prepared using Arc Info or Arc Map with 3D analysis within the predefined conditions for the maps layout. "No 3D analyst was made in any of the Master Plan prepared in Lebanon" until now today (Nakouzi 2005).

The size of the maps should be A0 with a legend recommended by the Office of Design of the DGUP and in the following order:

a. A Topographic map which contains the existing buildings from older map with the recently constructed buildings.

b. A contour-line map with the existing retaining walls.

c. Land-use maps showing agricultural, industrial, residential, commercial, tourist use in addition to a map showing the mixed-activities and use in the area in greater detail such as schools, health care, religion and so on.

d. Building maps each in a colour which shows the existing situation of the buildings, with the age of each and the number of floors or elevations, building density and the land suitable for building, for agriculture and for reforestation. The historical buildings are listed according to their role and age. Furthermore, the deteriorating buildings should be identified and it should be noted if it is possible to repair them or if they have to be demolished.

e. A road network map with the existing and proposed roads, with traffic density of each of the most-used roads and the direction travelled.

f. A parcel values map which is based on the topographic maps.

g. A soil map which shows the land tested for agriculture use and its stability with the existing types of the vegetation cover in different classes.

h. A map showing the public land which belongs to the government and the municipalities and a report on its size and its ownership.

i. A summary map including contours lines, road network, land use, and building elevation.

j. Preliminary land use proposal map based on the statistics and analysis with suggestions for the building elevation and its architecture, including the contour lines layer.

k. The old zoning maps and the present construction conditions in land distribution and division, and other maps for a comparison between the existing Master Plan and the proposed map.

5 The consultant should prepare a physical 3D model presenting in detail the topography of the area and the land use and this should be approved by the Design Office/DGUP.

6 A recent satellite or aerial photo not older than the year 2000 with a maximum scale of 1:5000, a resolution of 1m and other maps including the administrative borders of the study areas with the proposed maps, geo-referenced in the Lebanese Stereographic System.

7 All the above information and the full document have to be submitted to the Design Office in hard and digital copy. The duration of whole process including Phases 1 and 2 depends on the case study, for example, in Tripoli 2000-2020 Master Plan in the preparation it was planned that the whole process it should not take more than one year. (The actual submission is discussed later following the description of Phase Two).

2.3.2 Phase Two

Phase Two is concerned with the interpretation of and conclusions from Phase One. It has to contain a detailed report and several maps which are described below.

The presentation has to include a proposal for an improved road network. Furthermore, it should include the existing open spaces and public parks and all proposed ones.

The zoning map has to display areas with different needs. It should include a proposal for green spaces like public gardens and protection measures for public buildings and heritages sites.
It should also contain construction rules for building with detailed studies based on formulae showing the population density in each zone of the future plan in comparison to the existing situation.

In Lebanon the Cadastre Department is the main archive of the country cadastral maps. This department is part of the Ministry of Finance. In 2000 with financial help of the World Bank, the Lebanese Government launched a project to transform the existing cadastral map in Lebanon into a digital one. It called Cadastre Operations Modernization and Automation Project (COMAP).
Most of the cadastral maps go back to the late 1920ies, on the beginning of the 1940ies under the French administration. The cadastral maps have never been revised, because of the World War II and the unsuitable political situation up until the end of the Civil War in 1991.
Furthermore, until today a high percentage of the Lebanese territory does not have a cadastral map and some parts are still un-surveyed (cf. Figure 2.4).

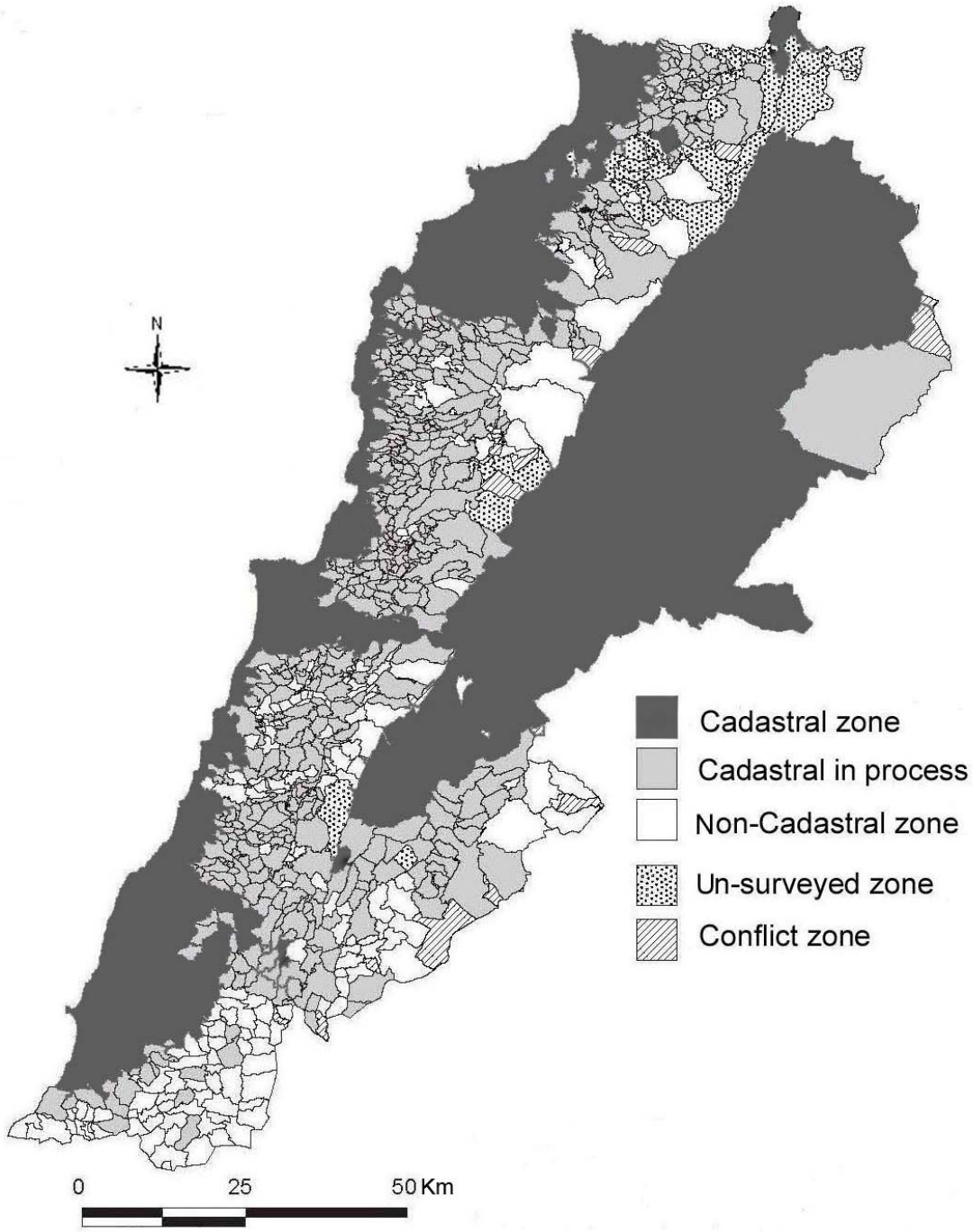

Figure 2.4: Cadastral zones in Lebanon
Source: Bakhos et al. 2004 (translated by the author)

As a result of this situation in the zones with no cadastral maps but surveyed or with no cadastral maps and un-surveyed, in the case of Lebanon the consultant is requested to prepare the Master Plan document maps to contain the following information:

- For the existing cadastral map zone, on the basis of the topographic map of the study area, the consultant is requested to collect all the project maps already made. Later he is responsible for changing the scale of the project to the Master Plan document map scale.

- In the surveyed but not cadastrally-mapped zones (meaning that a surveyed information exists but no official cadastral map is available in this zone) the consultant should prepare the project in the same way as for the cadastrally mapped zone with a note on the legend that it is based on non-existent cadastrally zoned maps (meaning a sketch map).

- For the areas without cadastral maps and un-surveyed zones the consultant should enlarge the scale of the Lebanese territory map to the scale of 1:20000 to the required scale and then follow the same procedures as the previous two zone types.

A preliminary Master Plan has to be submitted to the Design Office/DGUP. This office checks it and if necessary makes comments on it, and then returns it to the consultancy firm for the preparation of the final version.

The complete Master Plan document has to be in Arabic with scientific expressions in English or French, if necessary. It must be submitted to the Design Office/DGUP in two copies including the report, maps, rules, and the construction regulations. After the corrections, it is returned to the consultant for preparation of the final version. The final version has to be submitted in three copies to the Higher Council for Urban Planning (HCUP), with fourteen copies of A3 size including the analysis report and the zoning map with the table of construction and division regulations.

After approval by the HCUP it is returned to the consultant. He/she prepares the final version in addition with a copy printed on transparent paper. A report in A3 format should be submitted to describe the reason and the logic of the Master Plan proposal and including an analysis of the size of the parcels and verifications of the parcels division regulations, and the suitability of the land for development. This report should include graphs, charts and tables with a description and references for these data sources.

In addition, this report should include photo files covering the study area accompanied by a topographical map showing the photo locations.

The maps in this final report should be submitted at two different scales 1:2000 and 1:5000. This can, however, be modified by the Director of the DGUP if necessary.
The consultant is responsible for organising the Phase Two maps in the following order:

1 Zoning maps including: the zoning distribution map, the lots protected with aim of heritage and forest protection and the proposed public garden and parking

2 Road network maps

3 Zoning system with the constructions condition and use percentages, parcel division rules

4 General and specific laws in the standard form of the DGUP, including a list of possible and prohibited land use and investment, a detailed description of the building construction material (e.g. stone, steel, brick, painting colour...), the method and percentage of garden reforestation with type and size, and other aspects if necessary.

During the project periods the consultant has the full responsibility for having a highly qualified team work and for accident insurance. It is the consultant's responsibility to present and discuss the project progress including the cost of the project and the way in which it should be paid for during the process with the Design Office/DGUP. This part of the contract is not addressed in this study.

This summary of the planning process has been translated by the author, based on the recent version of the Condition Document and Contract of the Master Plan preparation of the Design Office/DGUP/MoPWT. As previous sections have described: in the two phases of the urban planning process in Lebanon the role of stakeholders' involvement, apart from the key stakeholders or the decision maker, which is discussed in detail in the following section has not been mentioned at all.

2.4 Major Stakeholders in Urban Planning

This section is divided into two sub-sections. The first discusses the role of the key stakeholders and the way the Master Plan is discussed before the final decision. The second concentrates on how the final decision is made and on who decides in the end of the process.

2.4.1 Key Stakeholders

The different nominal steps and duties in Master Plan preparation have been described above. From this it is clear that a major stakeholder is the DGUP, because of its responsibility to select and supervise the consultant firm.
When the first draft of the proposed Master Plan and the Detailed Plan are ready they have to be submitted to the Higher Council for Urban Planning (HCUP) for approval. If no comments are received from the local government side, the HCUP sends the plan to the national government for official and final approval.

The Urban planning process in Lebanon involves mainly four stakeholders which is traditional technocratic view the citizens and private sectors are not mentioned and they don't play any role in the planning process, the four stakeholders are:

1. The Directorate General for Urban Planning (DGUP)
2. The Higher Council for Urban Planning (HCUP)
3. The Council for Development and Reconstruction (CDR)
4. The Municipalities.

The DGUP is responsible for preparing the Master Plan and realising it over two phases (cf. Section 2.3) through the services of a consultancy firm under the supervision of the Design Office Department of the DGUP. Below is a short description of the key stakeholder roles in the urban planning process (cf. Table 2.2)

In section 2.3 it was mentioned that the DGUP is the main responsible during Phase One and gives advice to the consultant until Phase One is finished. The stakeholders play their roles in Phase Two and after the submission of the Master Plan. The meetings of the key stakeholders take place when the complete document has been submitted to the HCUP, where it is to be discussed. There the following authorities and ministries are represented:

1. Ministry of Interior Affairs and Municipalities
2. Ministry of Housing
3. Ministry of Public Work and Transport
4. Ministry of Justice
5. Ministry of Environment
6. Council for Development and Reconstruction (CDR)
7. Urban planning specialists.

The HCUP mainly consists of senior representatives from government organizations that are involved in urban development activities.

After the discussion of the Master Plan and the decision, if there is no modification required by the HCUP, the Master Plan is sent to the municipality council concern-ed, in order to give their agreement and make their comments, if they have any. The municipality has the right to add comments if necessary. Good reasons for modifications given by the municipality council are then discussed within the HCUP.

Table 2.2: Key stakeholders in the urban planning process in Lebanon

Directorate General for Urban Planning (DGUP)	The DGUP falls under the authority of the Ministry of Public Works and Transport. Its mandate is to develop regulations and orchestrate urban planning. It defines urban Master Plans and issues building permits for municipalities that do not have a municipal council or an engineering department (this includes most of the municipalities in Lebanon except Beirut, Tripoli, Federation of Municipalities of Jbail, Kesrouan and Metn).
Higher Council for Urban Planning (HCUP)	The HCUP is presided by the DGUP and consists of the Director Generals of select ministries (Interior and Municipalities, Housing, Transport, Public Work, Justice and Environment), representatives from several institutions (CDR), and urban planning specialists. It makes recommendations on urban planning projects and regulations, and large-scale development projects.
Council for Development and Reconstruction (CDR)	The CDR is a public institution established in 1977. It is directly linked to the Council of Ministers. The CDR is responsible for the planning and programming of reconstruction/rehabilitation projects in all sectors and across Lebanon. It is also mandated to develop a Master Plan for urban planning. Almost 85 % of all funds earmarked for reconstruction transit through the CDR. It could replace all public institution to implement projects as necessary.
Municipalities	Municipalities and municipal federations have many responsibilities (all that concern physical development in their territorial limits). They implement urban projects; follow up on cleanliness and public health issues, water works, public transport and tax collection. They may also request from the DGUP the definition of urban Master Plans and could implement such plans with the DGUP's accord, provided the municipalities have the necessary resources. Municipalities are also responsible for receiving applications for construction permits and issue permits.

Source: MOE 2001

If the HCUP feels that the municipality's arguments are convincing and worthwhile to change the planning proposals, then modifications are made and sent to the municipality for their agreement with the final version. If not, the HCUP has the right to send the Master Plan to the Council of Ministers together with the municipality's comments. The final decision is then made by the Council of Ministers.

The following sub-section describes how the final decision is made, giving some historical examples related to conflicts between the different key stakeholders and the government as the final decision maker.

2.4.2 Decision Making in Urban Planning

In the end the official decision maker in the Master Plan preparation process is the Council of Ministers. Six of the stakeholders in the HCUP are already members. The Council of Ministers studies the comments of the respective municipality and the HCUP and decides on the final Master Plan version.
The Master Plan is valid after the Council Ministers, approval and is sent back to the DGUP. The latter has to send a copy of the final Master Plan to the municipality concerned to implement it. If the decision is against the municipality's wishes the implementation of the project will probably face difficulties, especially in the case of municipalities which are responsible for giving building permits, like Beirut, Tripoli, Federation of Municipalities of Jbeil, Keseroun and Metn. For the thesis case study, Tripoli Metropolitan Area the Master Plan Process is discussed in detail in the Chapter 3, and especially the importance of the stakeholders' participation in the 2000-2020 Master Plan preparation for Greater Tripoli.

The history of Lebanese urban planning shows that there have always been several conflicts before the final approval and in the end the government and the President played important roles influencing the decision. Below are two historical case examples.

1. The case of Louis-Joseph Lebert with his ideas for the Beirut Metropolitan Master Plan in 1958-1964 was closely connected to the support of President Chehab at that time. "As soon as Chehab's mandate was over the IFRED[3] plan was quickly replaced by others."(Verdeil 2004: 18).
2. Another example is that of the "Schéma directeur de la région métropolitain de Beyrouth" (SDRMB) under the presidency of Amin Gemayel, which was long-discussed but never officially approved. In many instances the Civil War was the reason that the Master Plan was never updated or was replaced by new plans as in the case of "Société Libanaise pour le développement et la reconstruction du centre ville" (SOLIDER) instead of the SDRMB.

Figure 2.5 shows that the Master Plan, both on the maps and in the detailed plan summary, the project is approved following the decision of the HCUP by six signatures including those of:

[3] IFRED is a French consultant firm which was directed by Louis-Joseph Lebert and was very dominant in the urban planning field in Lebanon during the presidential mandate of Fouad Chehab.

1. The Director of the Design Office, from the aspect of arranging the procedure
2. The Director of the Study Department, that he checked the study
3. The General Director of the DGUP, that he checked the study
4. The Minister of Public Work and Transport, that he checked the study
5. The President of the Council of Ministers' agreement
6. The President's approval.

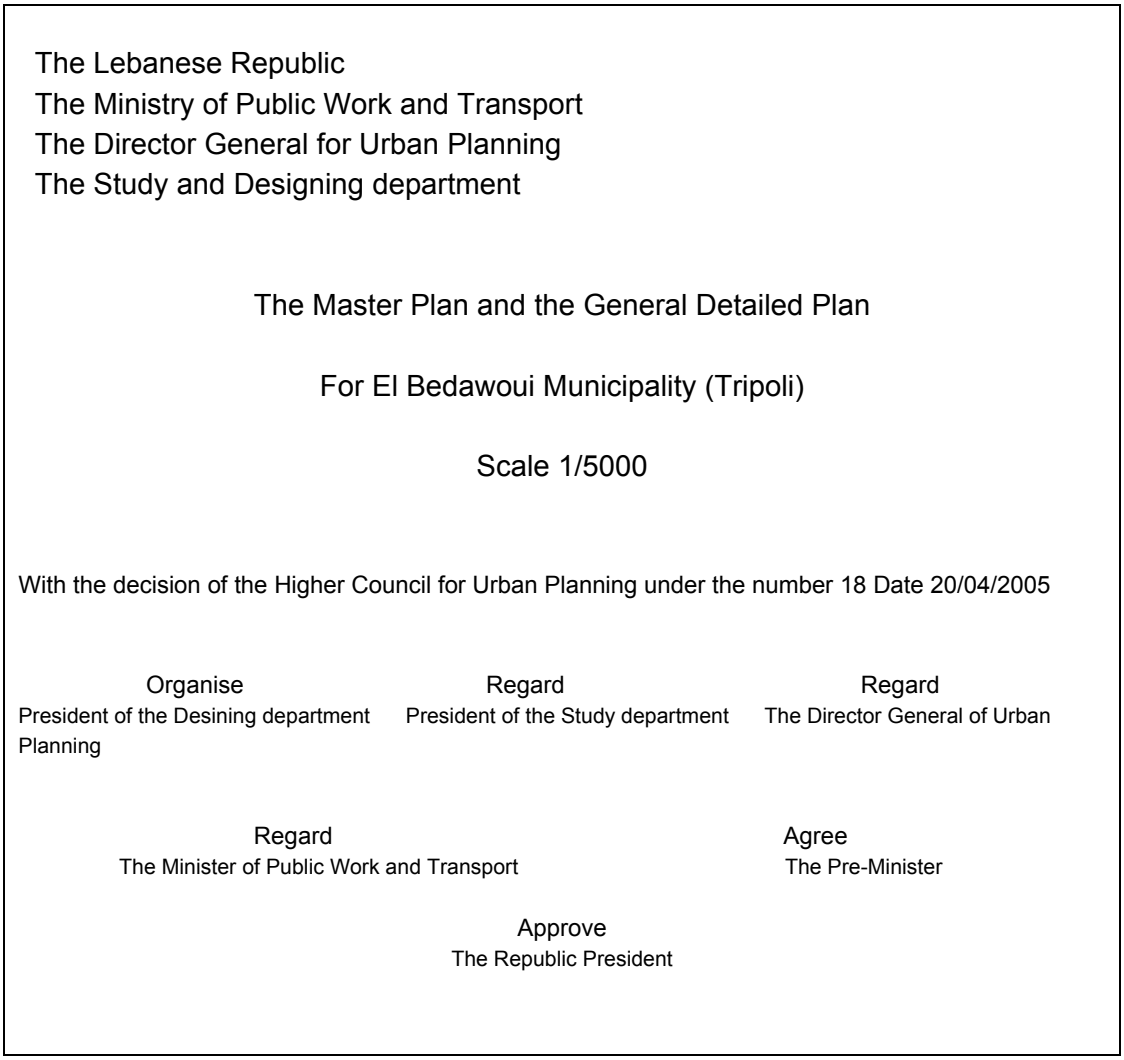

Figure 2.5: Types of final Master Plan and detailed plan approval

This shows the clear influence of the Government in the final decision.
The case study of this thesis is discussed in the next chapters showing/describing the first attempt of the government to establish a broader stakeholder community in the planning process.

The discussion of Tripoli case shows that the system is still strongly centralized and that no role for local authorities and public participation at all is foreseen in the planning process. The first time it was decided to open the

planning process for public participation was in the case of the Tripoli Metropolitan Area Master Plan. In the end however, it was an unsuccessful step (Nakouzi 2004). Why was it unsuccessful and what were the reasons for such steps being unsuccessful? This is the main objective which this study of Tripoli is based on as the empirical case study (cf. Section 1.2)

3 Tripoli: Features and Planning Practice

The main reason for the selection of Tripoli as case study was the unsuccessful step of integrating the local authorities into the 2000-2020 Master Plan process, the first attempt to do this in Lebanon (Nakouzi 2004).
The study area chapter is divided into two parts: the first part introduces the general characteristics of the physical environment classes and the social-economic situation of the Tripoli Metropolitan Area. The second part analyses the urban development in the area, reflecting the planning practice in Tripoli, with a review of the different Master Plans. In addition, this part includes an analysis of the historical development in land use change detection, based on existing research studies and historical remote sensing data.
In the last section the recent Master Plan process in Tripoli is analysed and discussed with regard to the role of the public participation, urban governance and a review of the tools and methods used concerning stakeholder participation.

3.1 General Characteristics

Tripoli is the second largest metropolitan area in Lebanon after the capital Beirut. The following sections describe the city's characteristics with a short introduction to the city's history, the physical environment, and a description of the existing social and economic situation of the study area.

3.1.1 Historical Background

The history of Tripoli goes back to 1400 B.C. The present name "Tripoli" (or Trablous), based on the Greek name of "Tripolis" used by the Phoenicians means "three cities" (Danawoui 1998, MoPWT 2001). These three cities were Kayssa, Massya and Moukhlat. Over the reigns of several rulers who settled and they established a state in Tripoli from Roman to Byzantine times until the first Arabic states from the seventh until the beginning of the twelfth century, when the crusaders were victorious against the Arabs and subsequently ruled until in the end of the thirteenth century. The Mamluk sultan Al-Mansur Qalawun then entered the city in 1289 and the old town of Tripoli was destroyed (Danawoui 1998). A new town was built by on a hill around the citadel[4]. And this is still the historic citadel until today.

[4] It is a castle which was built in 1103 A.D. by the crusader leader Raymond IV of Toulouse, which was later built around the existing Mamluk city of Tripoli which still exists due to the strategic location of this castle.

The Mamluks ruled the city until the Turkish Ottoman Era from the beginning of the sixteenth century until the beginning of the twentieth century, when the French and English defeated the Ottomans.

Part of “Jabal Libenan” and Great Syria became French colonies and since that time Tripoli was no longer “Tripoli di Syria” or “Tarablous al Sham”. It became the Capital of the North Lebanon Province (cf. Section 3.1.2.1) and the second city of the Great Lebanon Republic (Danawoui 1998).

3.1.2 Administrative and Physical Environmental Aspects

Lebanon is divided into 6 administrative regions called “Muhafazah*”,* which are further sub-divided into 25 districts, called “Cazas” (cf. Figure 3.1); (MoE 2001). Tripoli is the capital of the Northern Region, which is the second largest province after Bekaa, with 2,025 km^2.

The study area contains 5 cadastral zones: Tripoli, El-Mina, El Bedaoui, Ras-Maska and Mejdlaya. Each has its own municipal council. There is a federation of municipalities called Al Fayhaa[5], comprising the three municipalities of El Bedaoui, El-Mina and Tripoli. All 5 cadastral areas together form Greater Tripoli (cf. Figure 3.1).

3.1.2.1 Location

The study area is located along the northern part of the Lebanese Mediterranean coast and exactly in the middle of the North Lebanon Province coast, 85 km north of the Lebanese capital, Beirut and 32 km south of the border to Syria (MoPWT 2001).
Over thousands of years the area was an attractive location for settlement especially because of its topography and its peninsula with the natural harbour, which has played an important role as a trade centre. The economic power of the area was traditionally based on agriculture, mainly citrus fruits and olives, which existed until the beginning of the last century which is typical pre-modern urban place and this type of city is known by the “agro-town” (Kreibich 2003).
The coastal plain covers about 14.5 km^2. This represents 30 % of the study area, which has 17 km of seashore with mixed land use nowadays: recreational, residential, zones under construction and agricultural zones and two harbours, one commercial and the other a fishing port.

[5] Al Fayhaa was known from the 17th century due to its strong lemon odor in the whole area and especially in the plain covered by the three municipalities El Bedaoui, El –Mina and Tripoli.

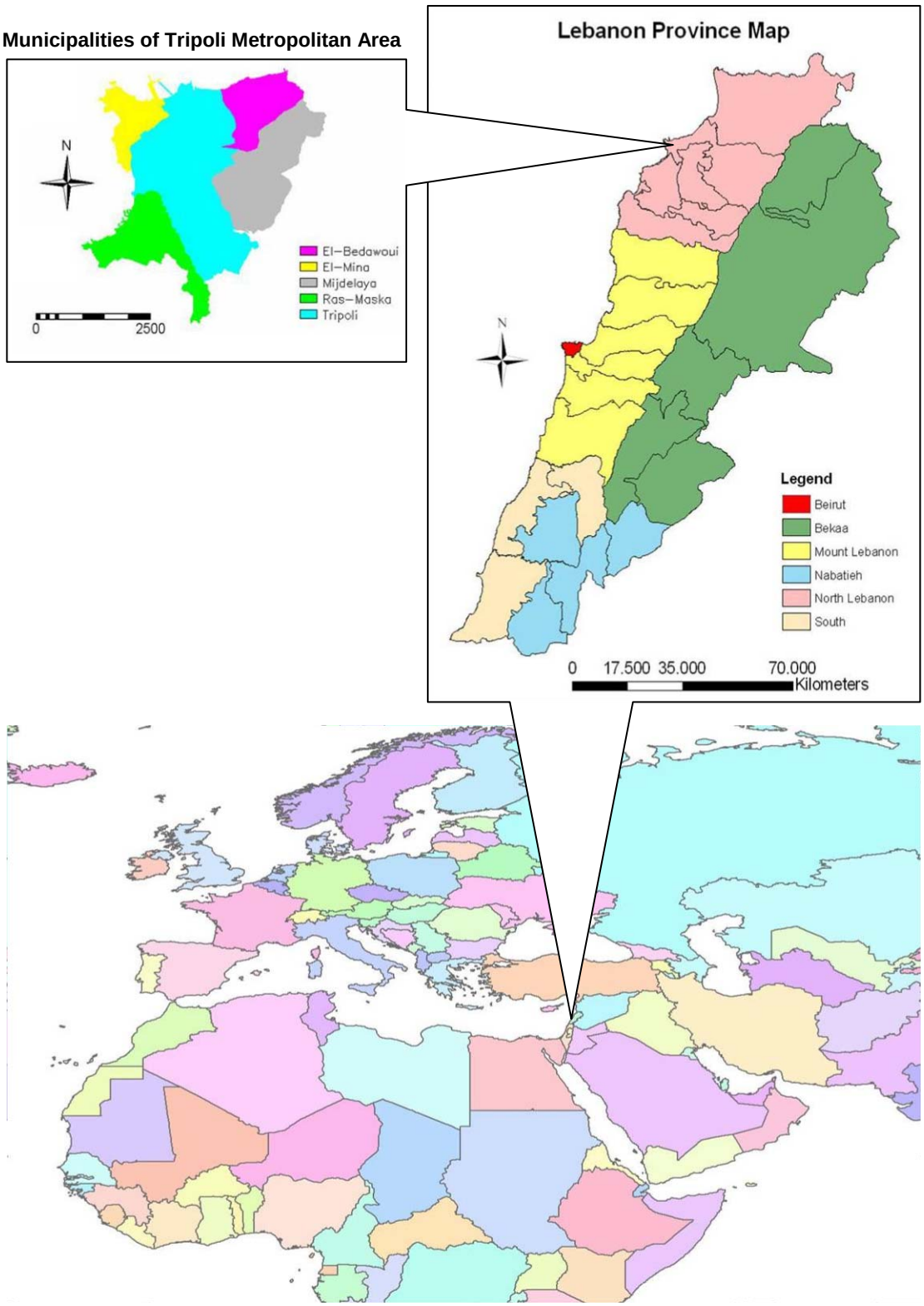

Figure 3.1: Location map

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Source: 1. Lebanon and wider surrounding (ESRI), 2. Country map prepared by the author in ArcMap, 3. Map of Tripoli Metropolitan Area prepared by the author in ArcMap

The location of Tripoli played an important role in the middle of the last century, especially with the construction of the oil refinery with an oil pipeline from Iraq (cf. Section 3.1.4.2). It was one of the most important harbours for oil export to the western world around that time.

The plateau gives the best view over the plain area and covering the geographical path to the highest peak in Lebanon, the Almukamal Mountain 3088 m, called the Black Peak “Qurnet al Sawda”.

Three of the rivers from Almukamal mountain flow into the Mediterranean Sea and cross the study area, making a natural division into different geographic shapes (cf. Section 3.1.2.2). They are the main water resources for irrigation of agriculture and also for the urban water supply in the study area.

Due to its natural location, Tripoli Metropolitan Area always played an important role as a trade city. It connected the Lebanese coastal cities to the Syrian border and the inland cities to the western world over the Mediterranean Sea. It was always the administrative centre of North Lebanon Province.
The boundaries of the study area are:
From the north and east side the Mediterranean Sea with 17 km of coast.
From the North-East to the South, different municipalities which are mostly rural areas.
Tripoli Metropolitan Area is located in the north of the country, on the Mediterranean coast between 34°25’ and 34°34’ north, and 35°48’ and 35°53’ east, and covers an area of 48 km^2 (cf. Figure 3.1).

The 48 km^2 of the study area is separated into the five municipalities with:

Tripoli: 20.4 km^2
El-Mina: 3.8 km^2
El Bedaoui: 5.5 km^2
Ras-Maska: 7.5 km^2
Mejdlaya: 10.8 km^2

Tripoli is the social and administrative centre. The commercial activities are concentrated in the heart of the city and the old city which is located around the crusader citadel and the old market, “alsuq”. Situated west of the city is El-Mina, which is known as a harbour city. As a result of urbanisation in the second half of the last century, El-Mina and the old city of Tripoli merged along the main streets.
To the north is the entrance to the Tripoli city centre through the district of El-Bedawoui, which was mainly built during the last century. It developed without any control. Most of its streets and buildings were constructed in a random fashion

especially during the civil war. One of the main industries in this area is oil refining, which was built up in the middle of the last century.

Ras-Maska, like El Bedaoui, was mainly a rural area until recently and it was developed for two reasons: relatively low land value ranging form $6 to $100 per square meter in comparison to places in the city of Tripoli which range from $500 up to $1500, and the other reason is the panoramic views (cf. Figure 3.2).
Mejdlaya is located in the eastern part of the study area and it was also mainly an olive growing area with a small village in the centre. It was greatly developed in the second half of the last century, especially because of two main roads and one secondary road which cross the area and connect Tripoli to the inland districts and furthermore to cross Lebanon Mountains and goes from there into the Bekaa Province.

3.1.2.2 Relief and Rivers

The topography of the area is naturally-structured by an escarpment between the low-land, with an altitude below 15 m, and the highland, which forms an almost flat plateau at an altitude above 70 m above sea level (cf. Figure 3.2). This escarpment crosses the area from south-west to north-east with a width of 100 -150 m and with steep slopes of up to 40 %.

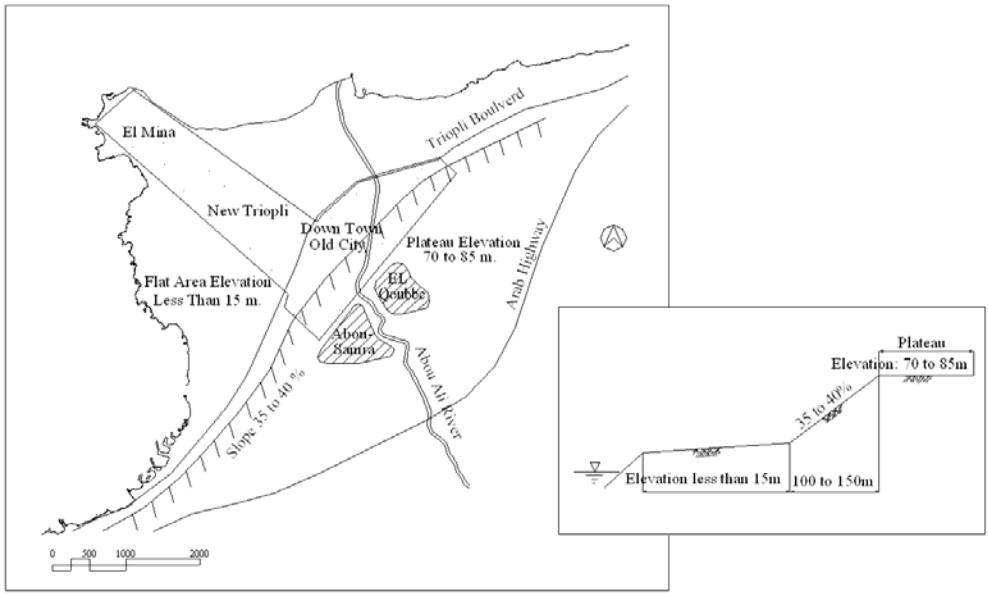

Figure 3.2: Topographic and urban map of Tripoli Metropolitan Area
Source: CDR and JICA 2001

The plateau is divided into four parts by three rivers. Two of them are located in the southern part of the city and are almost dry in summer. The third is the main river Abu Ali River, which divides the Tripoli Metropolitan Area right in the centre into a western and eastern part (cf. Figure 3.2).

The rivers drain into the Mediterranean Sea. They used to be important sources of water for irrigation, especially for the citrus orchards, which covered most of the lowland but. Today, due to the hot summers they frequently fall dry and are also locally used as waste dumps.
On the east and northeast of the highland is a Mejdlaya administrative boundary, part of the El-Bidawoui area and al Qoubbe, a cadastral zone of Tripoli. To the southeast is the olive growing area, which is called Zaytoun Tarablous because it still has mainly olive fields and is again divided into cadastral zones within Tripoli's administrative borders. Abu Ali River crosses, as mentioned before, both these areas and is the natural and the administrative border between Tripoli and Mejdlaya.

3.1.2.3 Climate

The climate of the Tripoli area is for two reasons sub-tropical:

2. The location of the Tripoli area on the eastern Mediterranean Sea, which is the warmest part of the sea.
2. The high Lebanese mountain chain with the highest peaks of the 3088m high Qurnet al Sawda, have a great advantage for the area's climate by protecting it from the influences of the continental climate and especially from the Syrian Desert climate effect.

The annual average temperature is around 20°C and rarely drops below 9°C in a heavy winter or goes higher than 28°C in the summer (MoPWT 2001).
The year is divided into four seasons: winter, spring, summer and autumn. Tripoli has the coolest winter among the coastal cities in Lebanon, which lasts up to 5 months. The summer is the same length and hot and dry. The spring and autumn have the most moderate weather in the area but are mostly very short, being of two months each.
The area, like most of the area on the eastern coast of the Mediterranean Sea, has heavy rain in the winter due to the western winds. This number of rainy days can go as high as 73 days. The annual precipitation is between 400 and 900 mm and it has barely decreased in the last years with the increase in temperature and decrease in annual precipitation. The year 1999 was the lowest, with 338 mm (MoPWT 2001).

3.1.3 Social Aspects

The old city was surrounded by a high wall, with several gates. The reason for this was to protect the city form an enemy attack. The life in the city mainly started in the

early morning with the opening of the City Wall gates and finished with their closing at sunset. The Ottomans started to be more interested in the western world in the second half of the nineteen century and they were fascinated by the western products and wanted to have trade with Europe, mainly via Tripoli. This was the beginning of the city's urban development westwards towards the harbour city of El-Mina and the residents of the city, especially the Christian residents started to be interested in moving out of the old city (Kayal and Aatieh 2001).

3.1.3.1 Population

The problem of taking a census of the population is one of the most critical factors in Lebanon. Until now they are no definite figures on the Lebanese population: "The two latest government surveys have produced significant differences in their estimation from 3.1 million (1996) to 4 million people (1996-97)" (MoE 2001). This huge discrepancy of about one million between the censuses of the Ministry of Social Affairs (MoSA) and the Central Administration for Statistics (CAS)[6] respectively was caused by the CAS census, which included the Syrians and the Palestinians, who have lived in Lebanon for long time but without Lebanese citizenship.

The last Report on Environment and Development Indicators, prepared and compiled by Tripoli Environment and Development Observatory/Federation of Municipalities of Al Fayhaa, which dealt with the population of Tripoli, was based on housing units and average residency data from the survey of the CAS on 1997 and the study entitled "Bringing the young generation into the job market" which was made by the Saint Joseph University. Both show that the North Lebanon Province has the highest average family size among the seven Provinces (cf. Table 3.1).

Based on this study of the community Al Fayhaa Municipalities in the Report of Environment and Development Indicators, the same formula was selected as the planner used for calculating the population of the year 2001, and is based on housing units and family size. See the formula below:

Population of 2001 = housing units * 5.4

[6] The CAS was established on 1978 with the aim of collecting and publishing statistical information in the field of the economy and social affairs to replace the Directorate of Statistics which was part of the Ministry of Planning until 1977. Because of the war, it did not start functioning until 1993. See SOER, p.10.

Table 3.1: Family size average 1997-2001

2001	1997	Provinces/Mohafazas
3,9	4,3	Beirut
4,5	4,5	Beirut Suburbs
4,2	4,4	Rest of Lebanon Mountains
5,1	**5,4**	**North**
4,8	4,9	Bekaa
4,6	4,4	Nabatieh
4,8	5	South
4,7	4,8	Average

Source: Federation of Municipalities of Al Fayhaa. Report on environment and development indicators 2001.

The estimate of the population in 2004 was based on the population growth rate established by the MoSA program of the UNDP: "Population and Housing Survey", 2001, which is 1.6 %, and the study of the architect Harmandayan during the survey of the housing units for the Master Plan of Tripoli Phase One, using the formula:

$$\text{Population of 2004} = \text{Population of 2001} * (1 + 0.016)^3$$

The result obtained from using the two formulae is presented in Table 3.2, which gives an overview of the great difference of population density per hectare between the five different municipalities of Tripoli Metropolitan Area.

Table 3.2: Distribution and density of population in Tripoli Metropolitan Area according to districts

Cadastral Zones	Area in ha	Number Units of 2001	Population of 2001	Population of 2004	Population density 2004; P/ha
Tripoli	2039	39863	215260	225757	111
El-Mina	373	9394	50727	53200	142
El Bedaoui	553	6389	34501	36184	65
Ras-Maska	748	2196	12100	12690	17
Mejdlaya	1080	1481	8000	8390	7
Total	4795	59323	320588	336221	70

Source: prepared by the author on the basis of the "Report on environment and development indicators" of the Federation of Municipalities of Al Fayhaa, the Master Plan of Tripoli Metropolitan Area 2001 Phase One and Mejdlaya Municipality Report.

According to international standards, the population density of Lebanon is very high; this is especially true in the coastal zone, where more than 70 % of the Lebanese population lives and which has a population density up to 1.610 persons/km² (Khawlie 1986; Plan Bleu 1999).

In the following the statistics on population distribution in the study area and the area size distribution are compared (cf. Figure 3.3) On the basis of Table 3.2, we can see that from the population perspective the Mejdlaya Municipality has the lowest population among the municipalities of the study area with 2 %. If we compare this to the distribution of the area size, we see that Mejdlaya is the second largest area among the different municipalities in the study area.

a) b)

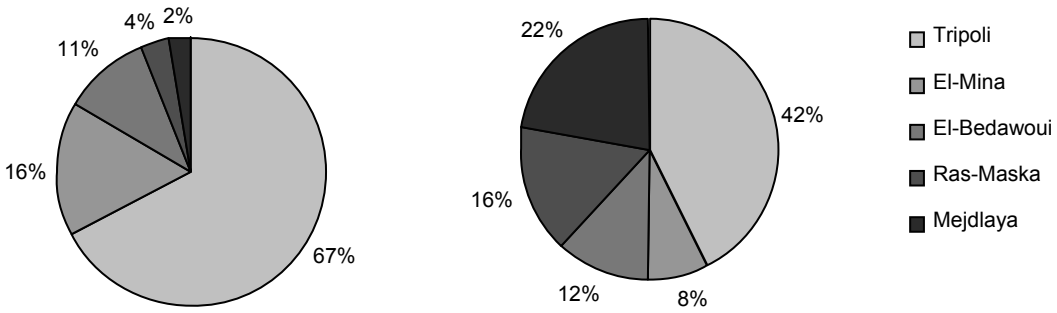

Figure 3.3: a) Population distribution; b) Area distribution of the administrative districts within Tripoli Metropolitan Area

This gives Mejdlaya the lowest density, with 7 persons per hectare, One of the critical points on the 2000-2020 Tripoli Metropolitan Area Master Plan from the population density side is that the Mejdlaya area was not included in the project for political and administrative reasons and that in urban planning at the city level it is known that impossible to take administrative borders into account any more because of the urban sprawl.

Previous studies show that in the Tripoli Metropolitan Area there lives more than a third of the population of Northern Lebanon (UN-HABITAT, 2004). The youth class (0-20years) dominates the age distribution (cf. Table 3.3).
The high percentage of youth is discussed in the following section with an interpretation of the reason behind this great difference, especially with the significant role of this aspect in urban planning.

Table 3.3: Population age distribution in Tripoli Metropolitan Area

Population age group Years	Percentage of total population %
0-20 Years	41 to 45
20-60 Years (Working category)	48-50
Over 60 Years	6 to 8

Source: UN-HABITAT 2004

3.1.3.2 Social Structure

As the population cross-section above shows, the percentage of youth is very high in comparison to the older generation. This can be attributed to different causes: Tripoli is an oriental city first and a “conservative” Islamic city (Danawoui 1998, Kayal and Aatieh 2001) second. The concept of having bigger families and more children is more established than in the western or the developed countries. Another reason is the civil war and the fact that the life expectancy in Tripoli and North Lebanon is in general the lowest in the country. This is related to the social situation in this area (MoE 2001).

The study area has high internal immigration or movement from one part to the other in the city, from a low class to a higher class area, which is mainly determined by the social conditions in these different parts of the city.

A research study of the Social Institute in the Lebanese University of Tripoli divided the residents of Tripoli into three classes: Lower class (simple people), Middle class and high class with the relation to the income of each class. For more information on this study see the last part of “Tahawulat Al Zaman Al Akhir“ in Kayal and Aatieh 2001 and “Tarablous min Al dakhil”, since the same authors recently published and discussed the social situation from a very sensitive point of view based on a field study and interviews.

I will not discuss this issue in more detail. However, to sum up: I have described the case of Tripoli: **The old city is usually the most expensive and most attractive place to live, especially in a historically important city like Tripoli. Surprisingly, in Tripoli the situation is the opposite as well as in the old city district of El-Mina. It is the place where the low-income people are concentrated because both the social and infrastructural conditions are unsatisfactory and it is possible to afford to rent a home even for very little money.**

The history and the importance of Tripoli’s old city have been discussed in the Historical Background Section (cf. Section 3.1.1). The internal immigration or movement from the old city to the newly-developed areas in Tripoli started at end of the 19th century and mainly at the beginning of the 20th century, when the city started to develop beyond the historic wall and mainly in the direction of the harbour city of El-Mina. Another reason is the conflict in 1969 between different groups and the Lebanese government, where these groups were in the old city, pressing the residents to leave their houses. A high percentage have not moved back until today (Kayal and Aatieh 2001).

The education level is very low in comparison to Lebanon in general and especially at the level of higher education, universities or even high schools. This proportion is even clearer between the different classes in the study area (cf. Figure 3.4). This is related to the economic situation in Tripoli Metropolitan Area in general and to the family size, which is sometime 6 members with a very low income (MoPWT/DGUP 2001). “The girls get married at an early age (between 14 and 17)” (UN-HABITAT

2004) and the men start to work in early age and even children of an age of 10 sometimes work because of the low income in these areas.

As the social situation in Tripoli demonstrates and the graph of the social classes with the level of education shows, the level of education is strongly related to the incomes of the different classes. Several studies and surveys have shown the percentage families with a low income is the highest in Lebanon with 7.3 % of families earning less than LP 300,000[7], meaning that about six family members live on about $200 per month, while in contrast the percentage on the national level is 5.2 % and the average of the upper classes is about 1.3 % with incomes of more than LP 5,000,000, which is about $3300 (MoPWT 2001, UN-HABITAT 2004).

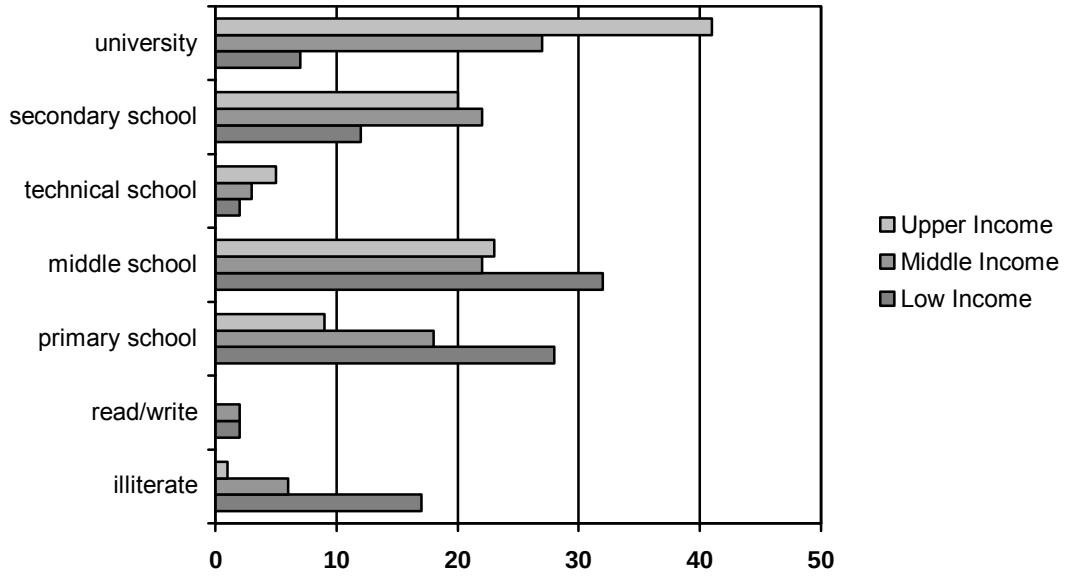

Figure 3.4: Percentages showing the relationship between education level and social class in the Tripoli Metropolitan Area
Source: Kayal and Aatieh 2001.

This showed that the social situation in Tripoli is getting more and more critical, even 16 years after the end of the civil war. This is mostly subject to the policy of the Lebanese government to focus mainly on capital reconstruction after the civil war. And with a centralised system which can block different projects at the local level, both these issues affect the economic situation of Tripoli, a fact which is discussed in the following section and which was one of the main causes of the existing social situation.

[7] LP 1500 is about US $1

3.1.4 Physical Infrastructure

In the following section the term “Physical infrastructure” is used in the sense of Choguill 1999 (see below). The infrastructure is one of the basic elements which can affect urban growth. Mainly the construction of new roads can be a reason for attracting new investment and urban development around and on both respects, with all that these roads can offer with access to other road networks. If we look at the urban growth map of Tripoli Metropolitan Area (cf. Figure 3.13) we can see that until the beginning of the twentieth century Tripoli developed mainly around the old city and the road axis between the citadel and El-Mina, which divides the city into two flat areas (cf. Figure 3.2). Later the city started to open to development in the north-west in the direction of the old harbour city of El-Mina in the later nineteen century. It started with the construction of the first road, which connected Tripoli to El-Mina and especially the laying of the first tram, which was drawn by horses and stopped in the late 1930ies (DGUP 2001, Gulick 1967, Kayal and Aatieh 2001). At same time the first main roads (cf. Figure 3.6) which connected Tripoli and Beirut with railways to the Syrian border were also constructed in the 1930ies. The railway played an important role in the economy of this study area at this time, as is discussed in the next section. These two roads Beirut-Tripoli-Homos (Syria) and from the old town of Tripoli to El-Mina were the main axes of the Tripoli urban sprawl.
The city continued growing mainly around the new road network and again the civil war hardly affected the situation, so that the city has grown without control and until today.

The diagram below shows that only about one third of Tripoli’s roads are in a good condition and the second third is acceptable. The situation of the water supply and sewage system is even worse because normally in “Urban residential physical infrastructures, in particular safe water and sanitation systems, are an important prerequisite to good housing and living conditions and to health” (Choguill 1999 : 289). Tripoli suffers from very high pollution, affecting the environment and mainly the natural resources in the study area. For example, the existing sewerage network is still the same as before the civil war, especially in the old city and It flows out into the Mediterranean Sea through the main river (Abu Ali River), through other channels and in some cases into the agriculture fields (MoPWT/DGUP 2001).

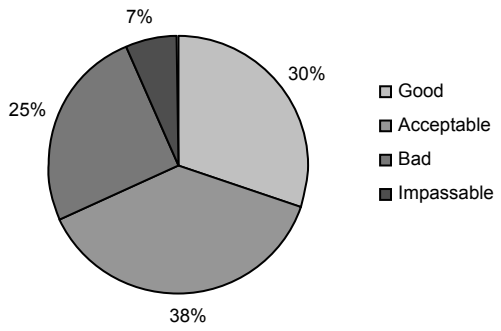

Figure 3.5: Road conditions in Tripoli Metropolitan Area in around 2000
Source: DGUP 2001

This issue is one which is, like others, interrelated with the social conditions in the study area, mainly the low income and socially poor areas which are located in the old city. No recycling for the sewerage residue and no good sanitation network serve the study area and the environmental conditions are becoming worse daily.
Electricity does not look much better but this issue is discussed in the next section with the economic situation in the study area, since these energy sectors can play an important role in the economy in general.

3.1.5 Economic Aspects

According to sources from 11th century Tripoli was surrounded by land of high fertility which served the city with its rich natural resources. By the 1970ies the city had developed from an agricultural and harbour town into a city dominated by industry and commerce. With the beginning of the civil war, in Lebanon the City of Tripoli like as in the whole economic sectors of the country was hardly affected and the situation until today has not changed, 16 years after the end of the civil war. The current economic situation is still far behind the situation in the 1940ies to1960ies. The history of the economic growth with the sectors that played important roles in Tripoli's economic growth and a comparison to the existing situation in Tripoli long lasting effect of conflicts is discussed in the Economic Situation Section, 3.1.4.2
The following section discusses the situation of Tripoli's infrastructure and the importance of this sector for urban growth and the suitable development of the study area. Both aspects were selected to give the reader an overview of the existing economic and infrastructural situation, since these sectors can play an important role in the suitable development of a city like Tripoli.
Since the period of the study is mainly focussed on the twentieth century up until the present in this section, the economic history of Tripoli over the previous centuries will not be discussed here but it is important to mention that historians refer to the fact

that Tripoli was famous over centuries for its economic activities as a trade city, mainly because of the natural harbour.

From the late nineteenth century until the end of the Ottoman era Tripoli played a very important role in the country's economy, even greater than Beirut. Tripoli was always known for its harbour, which served even the inland territory of Syria. **The economy of the city was mainly based on the trade sectors, particularly on agricultural products (cf. Figure 3.6). Only 25 % of these fields still exist today and it is planned that they will be removed with the 2000-2020 Master Plan proposal (cf. Section 3.2).** The second main agricultural product is the olive. This was not as greatly affected by the high urbanisation as the citrus fields, since it covers the plateau area of Tripoli Metropolitan Area, but sooner or later this part will also be affected as a result of the 2000-2020 Master Plan. This issue will be further discussed in detail in the following section.

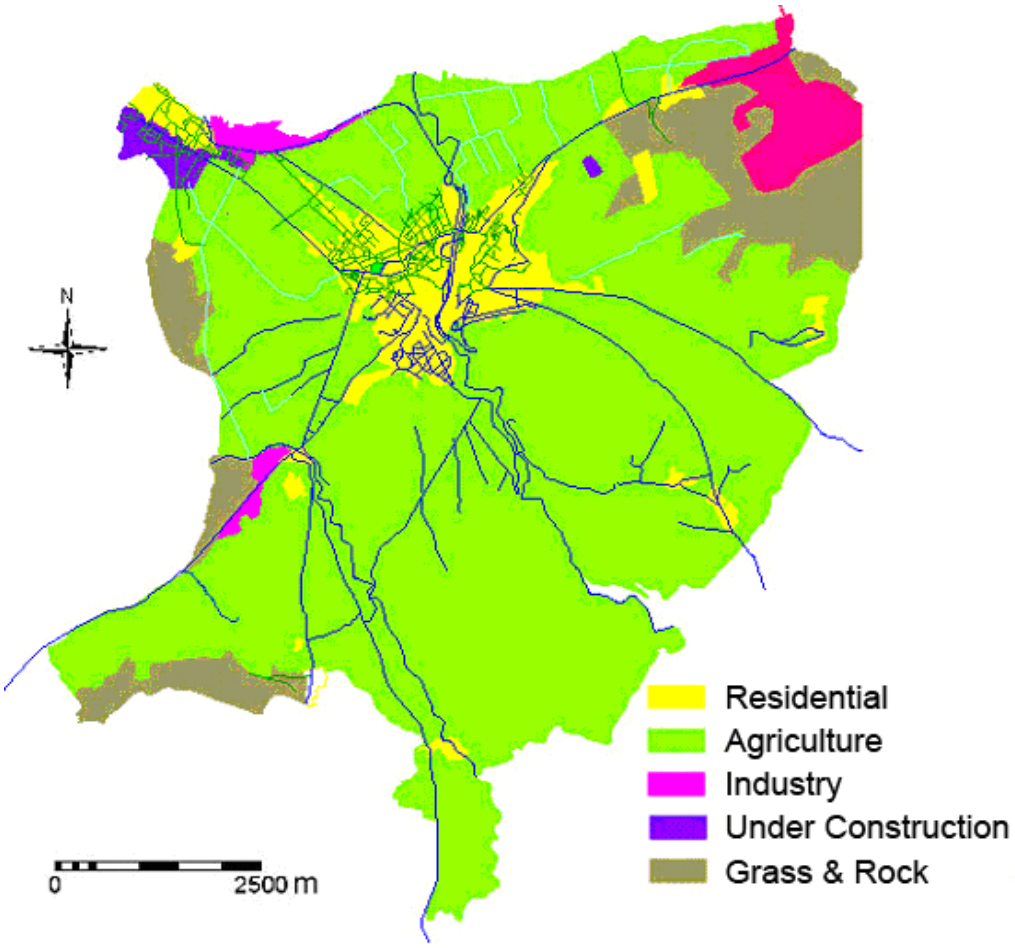

Figure 3.6: 1956 Land use map of Tripoli
Source: Prepared by the author based on the 1963 Master Plan document

The harbour is starting to lose its position as one of the most important harbours on the Mediterranean coast, for many reasons: the Syrians constructed their own harbours at Benias and Tartous cities because of conflicts between the Tripoli and

the Syrian leaders in 1950ies. The second reason was the opening of the Suez Canal in 1869, which could serve the inner Arab countries, mainly the gulf countries instead of Tripoli. With the beginning of the First World War and until 1918 Tripoli harbour was greatly affected and was not the most important harbour any more.

In 1921 the French founded Great Lebanon, including Tripoli as the capital of the North Lebanon Province and Beirut as the capital of the country. This decision was firmly rejected by the Tripolitans and several demonstrations and a revolution against this decision took place, particularly because they knew that with such decision the important role would be given for Beirut (Danawoui 1998, DGUP 2001, Gulick 1967, Kayal and Aatieh 2001). However, these were to no avail, but this movement was one of the reason for a revolution against the regime in 1958 which led to the first civil war in Lebanon which is discussed in the next paragraph.

The economy of Tripoli declined until 1930 when for the first time electric power supply reached the city, which was the first step in the industrialisation of Tripoli City. The most important phenomenon of that time was that the crafts industry grew very strongly between 1931 and 1937 “while workers in Tripoli’s old-style workshops were almost three times the number they had been in 1931” (Gulick 1967). Several other industries such as the cotton industry, “Arida”, were opened at the southwest part of the city and the founding of the Iraq Oil Refinery at the northern entrance of the city of El Bedaoui played an important role in the economy of the city at that time (Kayal and Aatieh 2001). At that time Tripoli was helped by the first drinking water supply and water tanks were constructed serving mainly the old city.
In 1940 the railway between Tripoli and Beirut was completed. However, it did work serve very long because the civil war started in 1975.
The last important economic boom in the area of Tripoli was during the late 1940ies when the campaign against the establishing of the Israeli state on Palestinian territory started. That had a positive effect on Tripoli’s economic growth because the Iraq Petroleum Company (IPC) refinery in Haifa had to close and to be moved to Tripoli. That gave Tripoli’s economy a great chance, especially in that IPC moved all the staff, who were mainly English, from Haifa to Tripoli, and indeed Palestinians, who mostly stayed afterwards in Tripoli (Kayal and Aatieh 2001).
The same period saw the establishment of the first industrial zone in Tripoli, the Bahsas Industrial Zone at the southern entrance of the city. The situation did not hold for long especially, because the first civil war which broke out in 1958 started in Tripoli, affected the economy greatly.
In comparison to Beirut, Tripoli’s economy is still suffering from the civil war and there is in urgent need for a strategic plan to improve the situation, especially in that the city is rich with very important natural and physical resources. **Several projects like the reopening of the railway connection to Syria and the IPC, etc., have been in progress for many years but there has been no implementation step until today (Federation of Municipalities of Al Fayhaa 2002).**

3.2 Tripoli's Development, Reflecting the Planning Practice

According to the planner of the Tripoli 2000-2020 Master Plan, land management started in Tripoli after independence from the French in 1943, with a first study by Eglie[8] in 1947 (Harmandayan 2002). On this point I disagree with the planner's claim that the land use management started in Tripoli only after independence, because land management had existed for thousands of years (Pettit 1997). **We cannot neglect the Ottoman occupation over centuries and their type of the land use, and land management practices which still can be seen very clearly even today, especially in the old cities.**

What was introduced for the first time into land management in Lebanon after independence was the Master Plan approach, which is still very dominant today despite its ineffectiveness.

3.2.1 Master Plans and Conflicts in Tripoli

As mentioned in Section 3.1.3, the Ottomans were already interested in expanding the development beyond the old city wall and this took place with construction of the first tram around 1881, which was pulled by horses (MoPWT/DGUP 2001). It was in the interest of the Ottoman rulers to construct new roads connecting the two cities of Tripoli and El-Mina for trade purposes. **At the beginning of the twentieth century the railway to Syria was ready, too. This step gave the reason for the Tripolitan investors to start constructing new buildings along two sides of the new main street (cf. Section 3.1.4.1).** When the French defeated the Ottomans and became the rulers of the area, they built new residential areas and especially several schools on the periphery of the old Mamluk city of Tripoli.

The development of Tripoli continued around the old city (cf. Section 3.2.2) until 1947, when the first revolutionary Master Plan of the French Planner Eglie (MoPWT/DGUP 1964) was accepted. The only existing blueprint was scanned (cf. Figure 3.7) and the distribution of the various zones is analyzed in the next sections.

3.2.2 Tripoli's 1947 Master Plan

After independence from the French in 1943 the Lebanese Government decided to prepare the first Master Plan for Tripoli in 1947 under Decree 8938 on 5 May 1947. With this decision all old plans which had been made before that time by the Ottomans for Tripoli Municipality had to be nullified and the official Master Plan for Tripoli: Future Land Use Plan in 1947 introduced as a replacement (MoPWT/DGUP 2001).

[8] French planner who prepared the first Master Plan of Tripoli and El Mina in 1947

The Tripoli 1947 Master Plan was limited to the cities of Tripoli and El-Mina (cf. Figure 3.7) by defining both their expanding limits. El-Mina was planned to expand to the south and to the beach area in the south-western part of the study area from one side and to meet Tripoli in the middle around the main road connecting the El-Mina and Tripoli city centre.

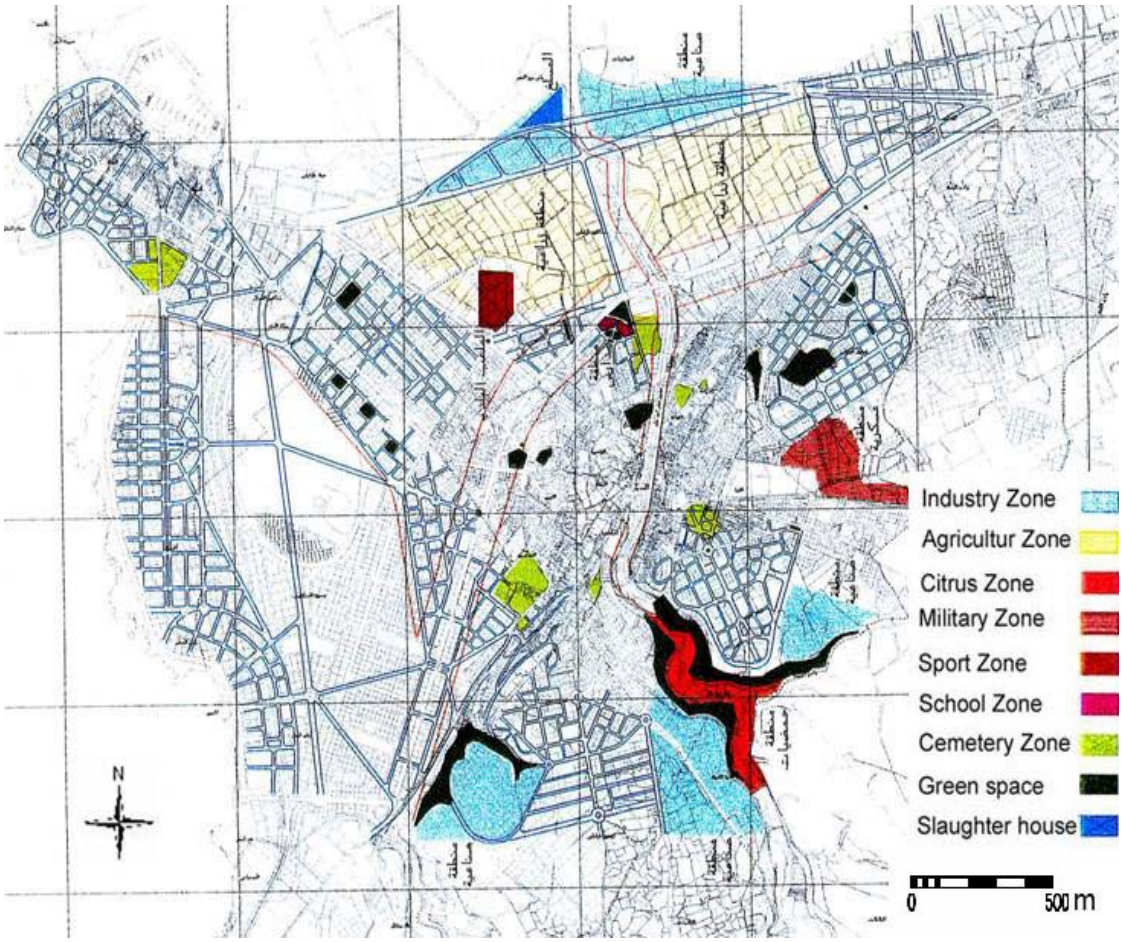

Figure 3.7: 1947 Master Plan of Tripoli
For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.
Source: MoPWT/DGUP 2001

Tripoli was planned to extend mainly around the old city to the plateau and around the Crusader castle and Abu-Ali River. This shows a clear interest of the planner in concentrating on the industrial areas and their distribution around the city. For example, on the plateau were three industrial zones and 2 others along the coast in the north from the harbour (cf. Figure 3.7). This approach was clearly concentrated on the industrial zone, especially as mentioned in Section 3.1.4.2, so that the economic boom in Tripoli around that time was related to the high industrialisation in the area.

UNESCO selected 40 historical buildings of these as heritage protected monuments and stopped their destruction by creating an administrative border around the old city (cf. Figure 3.8) and forbidding any construction in this area without permission from the Minister of Monuments and Heritage Protection (MoPWT/DGUP 1964).

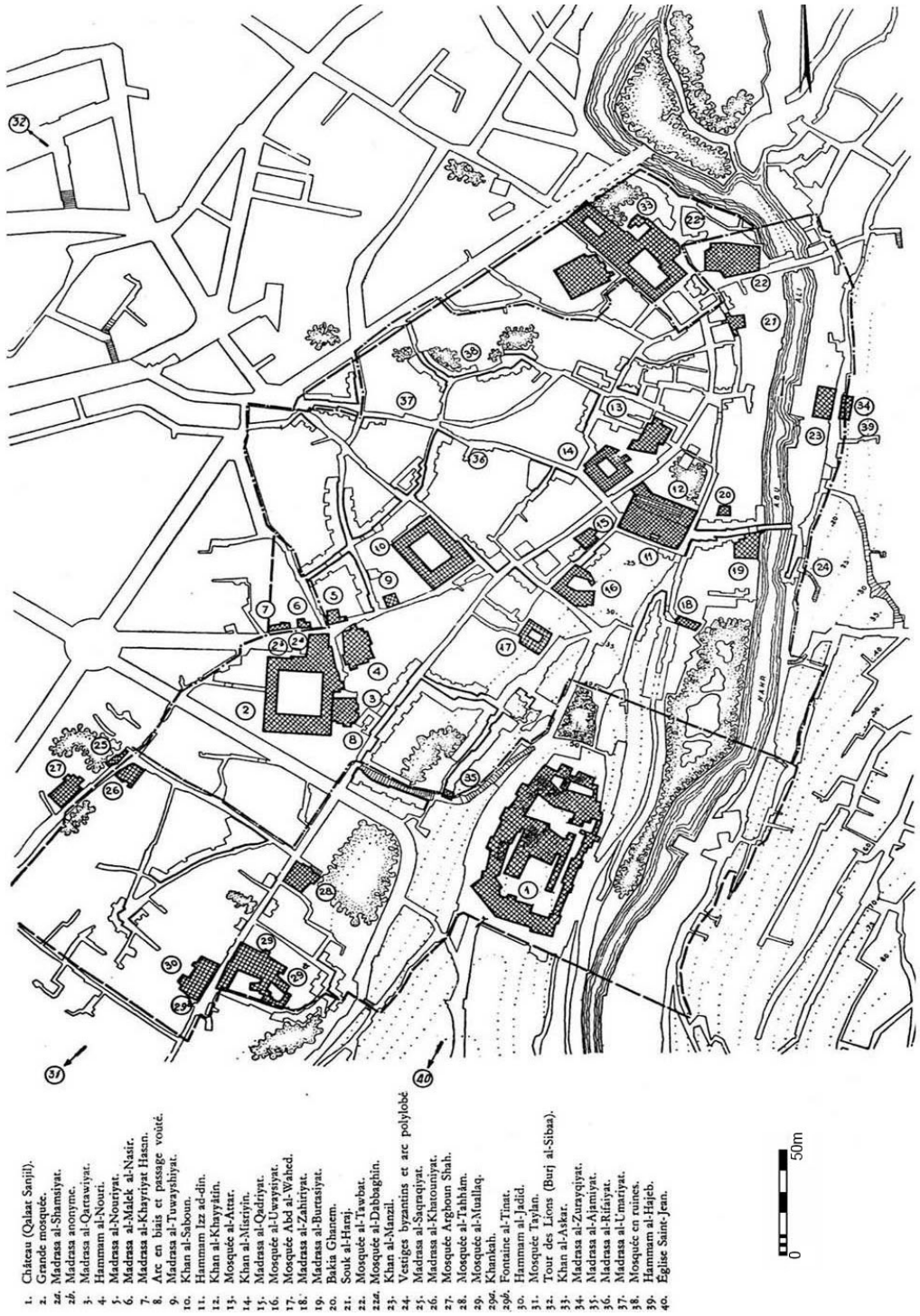

Figure 3.8: Portion of the Tripoli map of the monuments under UNESCO protection
Source: MoPWT/DGUP 1964

The 1947 Master Plan remained valid until the DGUP required a new Master Plan in 1964, which was prepared by the architects Henri Edde and George Doumani. Their detailed land use plan for Tripoli has never been realized; instead of its implementation the DGUP decided on a modification in 1971.

3.2.3 Tripoli's 1964 Master Plan

The two Lebanese architects and planners Henri Edde and Georges Doumani were asked by the MoPWT/DGUP to prepare a new Master Plan for the City of Tripoli and El-Mina and their surroundings in 1964. Phase One of the process was completed in the first six months of 1964 (MoPWT/DGUP 1964).
This study included a full document based on the procedure recommended by the DGUP (cf. Section 2.3.1). The proposed Master Plan of Edde and Doumani (cf. Figure 3.9) faced great pressure from the local authorities, who were mainly political leaders, and also from the major land owners, who could influence the political leaders in the area of Tripoli (Doumani 2004). The concept of Edde and Doumani, which was based on the 1947 Master Plan, was to reclassify the residential area and to remove the different Industrial zones from the high plain area to an area at the southern entrance to the city. This area is called El-Bahsas Industrial Area. However, since the civil war until today, it has remained unused as it was before the civil war, due to high percentage of the industrial buildings that have been destroyed.
Other major components of their plan were that the industrial area on the northern coast of the study area should be extended to the IPC harbour. Sports and hotel areas were included and an airport area with a hospital zone and a mixed activities area in the high plain area were proposed.

Again Edde and Doumani did not keep only the citrus fields on the low plain in the northern part of the study area as Eglie did, but they added the southern agricultural area which was to be almost all the lower plain area as a protected agriculture zone. **This proposal did not meet the interests of the landowners and the political leaders to consider the plain area as residential zone and who tried strongly to modify the plan.**

It was mentioned above that the first proposal was submitted in July 1964 and also the weakness of the kind of plan which is discussed in Section 4.2 cause the blocking of this proposal with basic modification proposals for more than six years until September 1971.
The basic modification is presented and discussed in the following section together with Tripoli 1971 Master Plan.

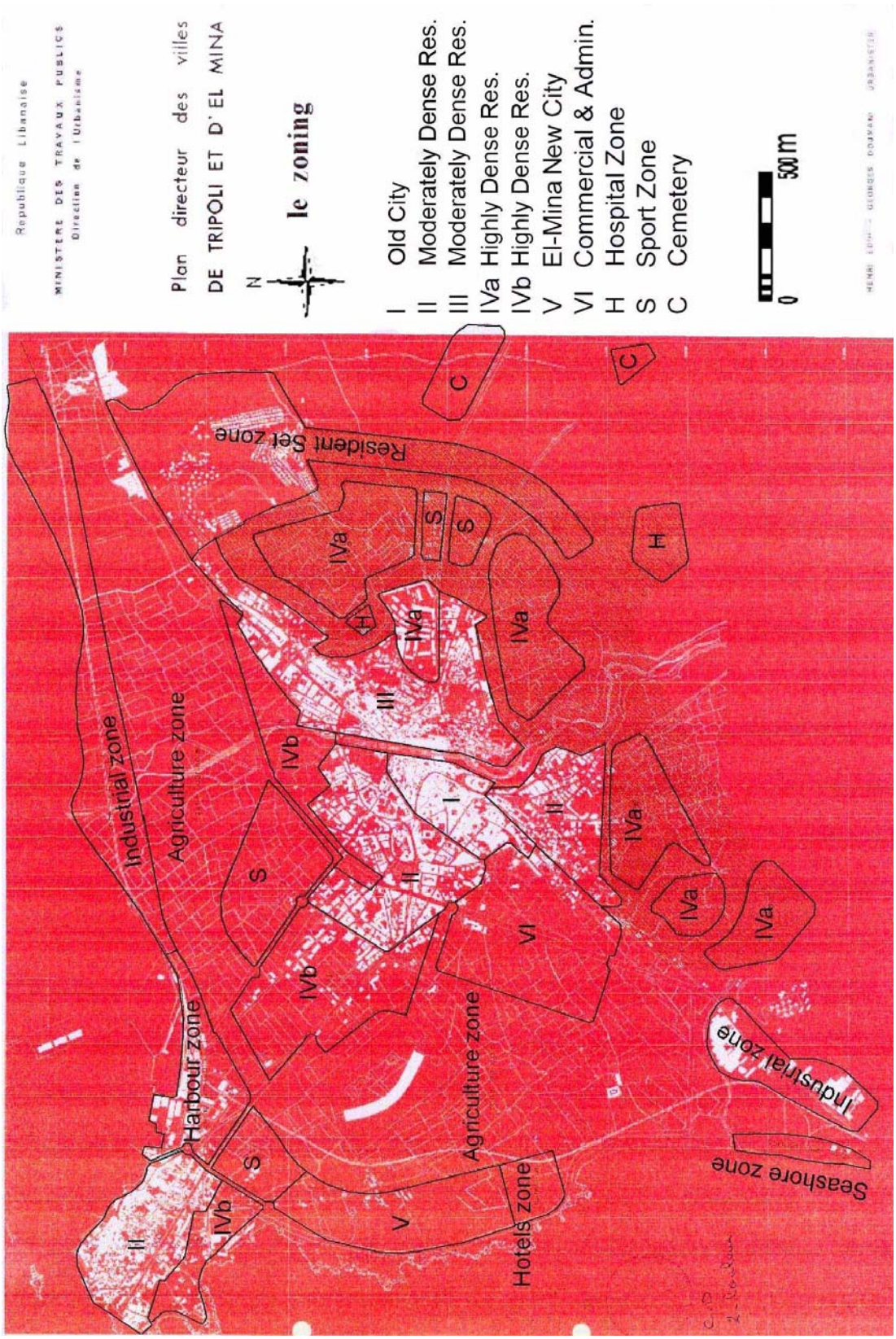

Figure 3.9: Tripoli's 1964 Master Plan
Source: DGUP 1964 (legend translated by the author)

3.2.4 Tripoli's 1971 Master Plan

On 14 September 1971 the Master Plan of Tripoli was approved under the 1915 decree, more than six years after Henri Edde's and Georges Doumanis' Master Plan proposal. The Lebanese Government decided on a Master Plan proposal from the DGUP which is very different from the 1964 Master Plan proposal. **The new proposal opened all of the plain area for urban expansion, which meant that the two agricultural zones of the 1964 proposal were removed and no agricultural zone was mentioned at all.**
The 1971 Master Plan presents six main classes (cf. Figure 3.10):

1. The old city Zone A and A1
2. The residential zone around the old city was divided into three sub-areas B1, B2 and B3
3. The residential zone, including the newly-developed area of Tripoli and the area under development, was divided into four sub-areas C1, C2, C2.1 and C3
4. Future expansion with three different sub-areas D1, D2 and D3
5. The recreational zone included two classes E1 as a coastal area and E2 as tourist area including aspects like beaches and hotel construction
6. The Industrial zone was divided into three areas the old industrial areas: the southern entrance of the city, around the harbour area and a third area from the northern entrance to the city to the Mediterranean coast

Another reason for the clear aspect of the construction and opening all the Tripoli area for future development and the removal of the two agriculture areas selected by 1964 Master Plan proposal was the reduction of open green space and public areas. The 1971 Master Plan selected only 0.6 % from the total area as public and green areas, in comparison to 1964, which gave 30 % of the total study area (MoPWT/DGUP 2001).

Four years later the civil war, which lasted 15 years, started in Lebanon. This was the reason for a lack of organization and control of the land use development in and around the City of Tripoli. No general topographical map revision was carried out after the first publication by the Directorate General for Geographical Affairs (DGGA) in 1963. Furthermore, the lack of remote sensing data and especially aerial photos is striking: no air-photos from the time between 1974 and 1994 exist in the DGGA archives. However, since the beginning of the Civil War in 1975 the degree of land use/land cover has changed in the area of Tripoli and accelerated (cf. Section 3.2.9) without a suitable land use plan.

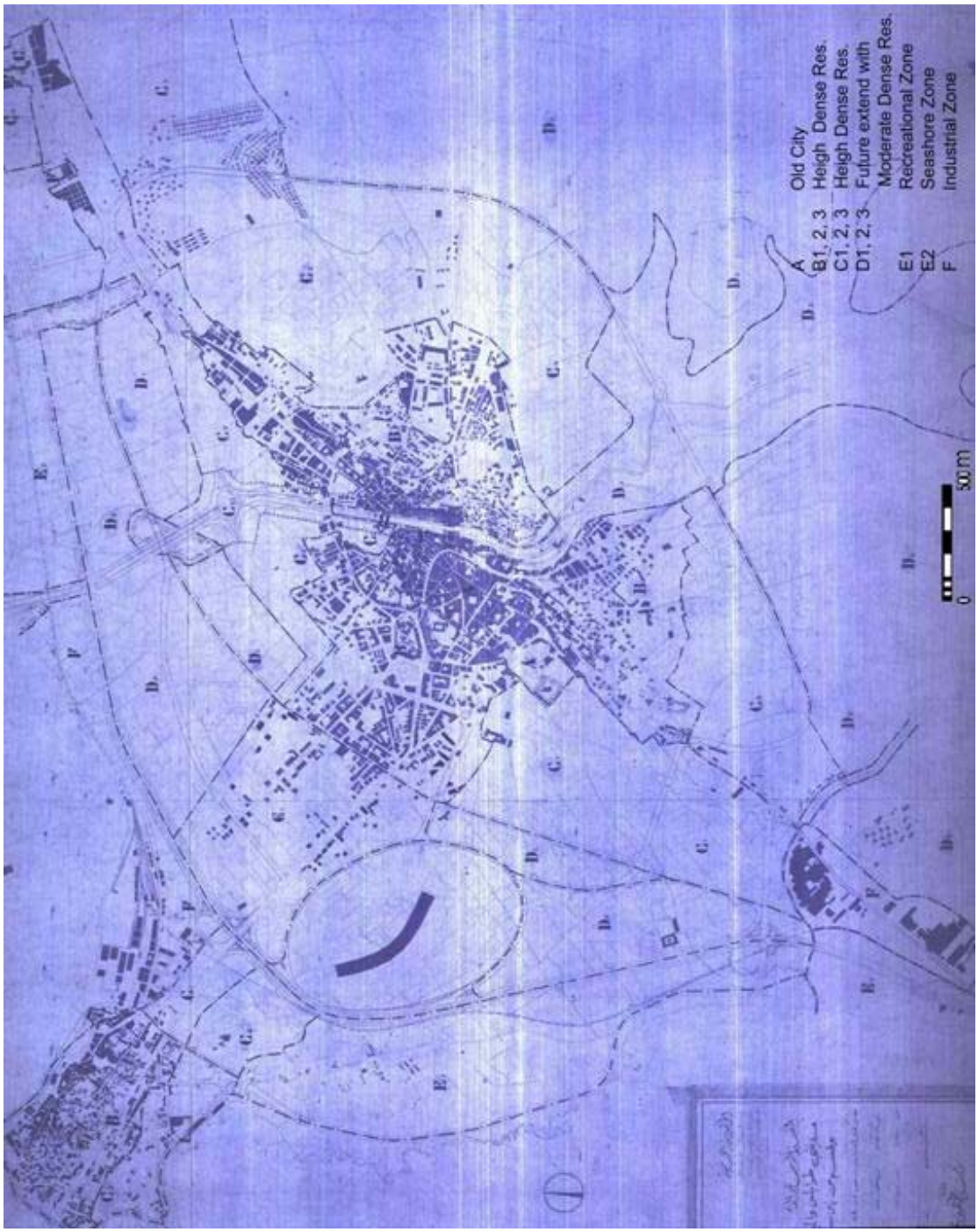

Figure 3.10: Tripoli's 1971 Master Plan
Source: DGUP 1971 (legend translated by the author)

In 2000, a new Master Plan for Greater Tripoli, covering Tripoli's old and new city, El-Mina and the two neighbouring areas, El Bedaoui and Ras-Maska, was required by the DGUP. However, although it was submitted in a final draft by the planner and accepted by DGUP in June 2004, up until the June 2007 the project has not been approved. As a result, the 1971 Master Plan is still in use with some modifications which were made over the last three and half decades.

3.2.5 Tripoli's 2000-2020 Master Plan

in June 2007 the Master Plan of 1971 is still the official Master Plan with a modification of the future extend zones D1, 2, 3 from moderately dense residential to high moderate residential in 2002 without the consultant firm being informed about this decision by the DGUP (DGUP 2002, Harmandayan 2004).
The description and review on this Master Plan process gives the reader an picture of about the main reason for selecting Tripoli as case study.

The recent Master Plan of Tripoli was demanded by the Lebanese Government with the authority of the MoPWT/DGUP with a contract for the architect Harmandayan as consultant.

On 12 July 2000 the consultant received a letter from the MoPWT/DGUP/Designing Office/Study Department which gave the official order to start the work on preparing the Master Plan of Tripoli, El-Mian, El Bedaoui and Ras-Maska, based on the Contract Number 3/140 of 11 May, 2000 between the two authorities (MoPWT 2000). For more detail on the contract between the Lebanese government and a consultant firm concerning the Master Plan preparation see Section 2.3.

The contract was signed under the condition that Phase One, which is related to the data survey, analysis and problem evaluation (cf. Figure 2.3), should be completed within eight months from date of receiving the official order to start the work on the project (MoPWT/DGUP 2000).

After the MoPWT/DGUP agreed to Phase One, the consultant was required to submit his first Master Plan proposal within another four months. In the two phases, Sundays and holidays and delays because of natural disasters were included in this calculation.
That means, that if there was no objection from the DGUP/Designing Office on the result of Phase One, the complete project should have been ready in about one year.

A unique feature of the Tripoli Metropolitan Area plan was that the first time it was possible to have a committee from outside the DGUP which could follow the planning process. A second feature is the availability of materials and sources related to this case study and, as mentioned before, also at the beginning of this chapter, it was the first time new stakeholders in the planning process were invited to follow it.
The Master Plan project was launched because it had been realised that Tripoli had no Master Plan for about thirty years and it had developed without any control, especially because of the civil war situation. That means the city was in urgent need of a new Master Plan for the land use management of the area. That was the claim of Harmandayan, the planner of the 2000-2020 Tripoli Metropolitan Area Master Plan

“The existing Tripoli Master Plan has been in use for thirty years, where normally the Master Plan should be use for an average maximum of 20 years” (Harmandayan 2002).
Tripoli Metropolitan Area did not have a Master Plan for thirty years and as the following table shows, the MoPWT/DGUP accepted the project after more than four years only from the planner (MoPWT/DGUP 2001). However, look back to Harmandayan statement above, that the required 20 year Master Plan in 2000 was still not ready and that after 5 years of delay. A new proposal is needed.

Table 3.4: Preparation steps of the Tripoli Metropolitan Area Master Plan 2000-2020

Subject	Date
The signing of the contract deal	11-04-2000
The order to start the Phase One	12-07-2000
Finishing Phase One	31-12-2001
Acceptance of Phase One and recommending the starting of Phase Two	07-08-2002
Finishing Phase Two	04-12-2002
Presenting the Proposal to the Higher Council for Urban Planning (HCUP) and sending it to the municipalities concerned to give comments within a period of one month	24-03-2003
The acceptance by the (HCUP) and sending the proposal for the second time to the municipalities concerned to give comments for a second time	09-06-2004
The MoPWT/DGUP accept Phase Two of the study from the planner	12-08-2004

Source: Harmandayan 2004

In fact the delay is not finished because, based on the Planning Process (cf. Section 2.3) the Master Plan can be ready and in use only after the agreement and signatures of the decision makers have been given (cf. Section 2.4.2 and Figure 2.5). This agreement was still not there in June 2007. If we turn back to the claim of Harmandayan that Tripoli has not had a Master Plan for thirty years. It has to be added that **today Tripoli has not had a Master Plan for thirty-seven years. This highly effects the uncontrolled development of the Tripoli Metropolitan Area, without any plan to guide its development.**

Is it the fault of the Planner, the Municipality, MoPWT/DGUP or the planning process that the Master Plan has not been approved until today? Or is Tripoli really in urgent need for new “Master Plan” or it needs the DGUP to look into new planning process or to update at least the existing planning process to more collaborative planning process by considering the issue of community planning and geo-data visualization tools role in participatory urban planning?

The responsibility certainly lies not on one of them but is shared among all of them to different degrees. But the main thing responsible is the existing planning process (cf. Section 2.3 and Figure 2.3). The answer to this question is divided into the three main objectives of the study in Chapters 4 and 6, which will mainly be referred to the review of the case of Tripoli Metropolitan Area' 2000-2020 Master Plan process as described in the present section.

3.2.6 Role of Public Participation and Urban Governance

The Master Plan preparation process in Lebanon is based on the planning process documents of a contract between the MoPWT/DGUP and consulting firm. This document was translated by the author (cf. Section 2.3) based on the last update of the document, which was made in 2004.

The local municipality normally has the opportunity to give comments on the project at the final stage before the project is sent to the Lebanese Government for final agreement. In the whole description of the preparing of Master Plan procedure no role at all was given or even mentioned for the local authorities participating or discussing the project.

In the present case study the situation was different because a new committee was founded to give different authorities, mainly the Tripoli Metropolitan Area municipalities, representation and allow them to follow the process (cf. Table 3.5).

Shortly after the launching of the Tripoli Metropolitan Area Master Plan project, pressure on the national government and especially on the MoPWT[9] from the local municipalities and political leaders of the Tripoli area began. The pressure was to cancel the land management project in the residential zone D2 in the northern and eastern part of the Tripoli area (cf. Figure 3.10). The project was recommended by the Lebanese government under decree 8921 on 29 July, 1996 and modified on 20 August, 1997 under Decree 10782. A meeting between the Committee for Public Works and the political leaders and the Municipality of Tripoli was held on 18 February, 2001 in the Lebanese parliament. The aim of the meeting was to stop the land management project in Zone D2 in the northern and eastern part of Tripoli and to wait for the new Master Plan of Tripoli, which had been launched six months previously and carry out this Master Plan as soon as possible (Al-Nahar 2001, MoPWT 2001).

Why should the land management project of Zone D2 be cancelled?

The main reason for this demand was that the partition of lands in this zone was unfair and contravened the landowners' rights and also that the land value estimates contradicted the standard evaluation criteria (MoPWT 2001). At the same time

pressure on the Prime Minister from the landowners through the political leaders arose to cancel this project especially because the government was recommending a new Master Plan for Tripoli Metropolitan Area. This pressure was effective and gained a promise from the Minister of Public Works and Transport that the recent Tripoli Metropolitan Area Master Plan which was in Phase One at that time would be ready at the latest in July 2002 which meant one year delay already after the official deadline (MoPWT 2001).

On 12 February, 2001 a letter from the Minister of Public Works and Transport was sent to the General Director of Urban Planning asking him to cancel the project of the land partition in the Zone D2 in view of the meetings of the Tripoli authorities in the Lebanese Parliament in 18 January 2001 (MoPWT 2001).
The General Director for the Urban Planning Department forwarded the letter of the Minister of Public Works and Transport to the President of the Planning and Design Department in the DGUP on 13 February, 2001 (MoPWT 2001) through official channels.
To summarize the bureaucratic procedure of the different departments and the authorities to whom the recommend letter was forwarded, the result was a reply from the DGUP based on decisions of a meeting of the HCUP on 21 March, 2001, during which it was decided that the cancelling of this project was not necessary (HCUP 2001).
The HCUP based its decision on the argument that the land management project Zone D2 was necessary before the urban development in the area of Tripoli reached this area, for which no adequate land management scheme had as yet been prepared. Second, the project was already in the final stage and the investment in this project had by then reached about L.L. 2,500,000,000 (about 1,666,666 US$); Third, from the technical perspective, that the final stage, which is the part related for the preparation, of the cadastral map was already in process (HCUP 2001, MoPWT/DGUP 2001).
The above reasons were not convincing for the political leaders and the local authorities who were trying to stop the project (and were mainly the land owners in this zone). Especially the additional argument of the HCUP that the Municipality of Tripoli had not rejected the project before had been accepted. Why did they want to stop it now, when the project was already in the final stage? (MoPWT/DGUP 2001). This is one of the examples of how the policy of the local government can change because of a political situation in the national government in small countries.
The decision to cancel the land management project in Zone D2 remained more important that any argument against proceeding with this project. The political leaders thought that the importance of stopping this project because of its negative impact on the landowners. In the end political interest was more important than the cost of the project (Al-Nahar 2001).

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[9] The Minister of Public Work and Transport at that time was from Tripoli, Minister Najib Mikati.

On 20 February, 2001 Decree Number 1/62 came from the MoPWT and for the first time in the history of Master Plan preparation in Lebanon, a committee was created on the basis that recommendation of the Public Works Committee and the Tripoli Municipal Council who proposed that it should participate in the preparation of Tripoli's 2000-2020 Master Plan (MoPWT 2001).

Table 3.5: Individuals involved in the 2000-2020 Tripoli Master Plan preparation

Name	Representing
Dr. Eng. Bachir Zawk	The President of the Engineering Syndicate in Tripoli
Eng. Jalal Abess	Tripoli Municipality Council
Eng. Abed El Rahman Al Thamine	Tripoli Municipality Council
Eng. Ahmed Kamar Al Dine	Tripoli Municipality Council
Eng. Habib AL Chami	El-Mina Municipality Council
Mr. Majed Ghumrawi (engineering Background)	El Bedaoui Municipality Council
Eng. Abed Al Karim Fatal	The Lebanese University in Tripoli
Eng. Tarek Kabara	Al Rabita Al Sakafieh (active association in Tripoli)
Eng. Amer Hadad	The Environment Protection Committee (NGO)
Eng. Naim Khariati	The Engineering Committee in El-Mina Municipality
Mr. Mikhael El Kari	President of Ras-Maska Municipality

Source: MoPWT 2001/ translated by the author

The committee members were engineers or people with an engineering background and mainly representing the different municipalities concerned in the Master Plan area (cf. Table 3.5), two representatives of active NGO's and one representative of the Lebanese University in the region of Tripoli, who were also all engineers.
This committee was to coordinate with the DGUP represented by "the General Director and the head of the Design Department and the responsible engineer from the Design Department" and the consultant firm which was supposed to prepare the Master Plan and was represented by the Planner.
The interest in the first step in democracy in the planning process in Lebanon, giving the chance to involve new stakeholders in the preparation of their area Master Plan was an important to measure the effectiveness of that step this result is discussed in Chapter 6.
However, the discussion of the participation ended with strong conflict between the planner and the committee members which led to the idea of establishing a wider community.

The President of Tripoli Municipality, who is at same time the President of the Federation Union of the Al-Fayhaa Municipalities (cf. Footnote 5) tried to solve this conflict and proposed a wider community, comprising more members from different backgrounds as social and political science, etc. (cf. Table 3.6). As this proposal needed the agreement of the MoPWT, the letter was forwarded by the DGUP to the Minister of Public Works and Transport (Tripoli Municipality 2002). The extended committee did not receive any official invitation and this meeting did not take place. Some of the committee members did not even know that the DGUP was preparing a Master Plan for Tripoli or that they were supposed to be invited to discuss this Master Plan. Why this wider committee did not take place is discussed in chapter 6.

Table 3.6: Individuals proposed by the President of the Tripoli Municipality, however not involved in the 2000-2020 Master Plan

Name and (Background and/or Activity)	Representing
Dr. Khaled Ziadeh (social scientist)	Lebanese University Tripoli
Dr. Rawya Majzoub (expert in historical monuments restoration and conservation)	Lebanese University Tripoli
Dr. Mousbah Rajab (architect and urban planner)	Lebanese University Tripoli
Dr. Nawaf Kabara (politician)	Balamand University
Dr. Wafae Shaarani (philosopher and NGO leader)	Lebanese University Tripoli
Dr. George Nahass (university vice-president)	Balamand University
Dr. Youssef Kafrouni (politician)	Lebanese University Tripoli
Dr. Fatima Badwoui (social scientist)	Balamand University Tripoli
Mrs. Faika Sibaii (NGO leader)	NGO
Dr. Nayla Karam (doctor, dentist)	Head of the dental-medical doctor syndicate in Tripoli
Dr. Ibrahim Jougadar (medical doctor)	Head of the medical syndicate in Tripoli
Mr. George Mourani (lawyer)	Head of the legal syndicate in Tripoli
Mr. Maamoun Adra (president of Tripoli Traders Association)	Tripoli Traders Association
Dr. Samira Bagdadi (social scientist)	Saint Joseph University
Eng. Rashid Jamaly (NGO leader)	NGO
Dr. Omar Tadmori (historian)	
Dr. Abed Al Majid Naanaii (politician)	
Eng. Saiid Al Halab (engineer)	Private construction company
Eng. Abdallah Babetty (engineer)	Private construction company
Dr. Muhammad El Danawoui (lawyer)	

Eng. Mounzir Shaarani (architect)	President of Tripoli Forum Hall
Mr. Abdallah Gandour (NGO leader)	President of Tripoli Chamber of Commerce and Agriculture

Source: Tripoli Municipality 2002, translated by the author.

3.2.7 Tools and Methods Used for Analysis of the Stakeholders' Arguments

The selection of the members of both groups was not based on clear criteria and this was one of the reasons why the planner faced a conflict with the first committee. However, the second committee was not invited to participate.

In Tripoli the society is based mainly on family societies which is purely centred on family relationships (Kayal, Aatieh 2001) and in Tripoli there are high numbers of active NGO's and family associations.

It was mentioned in the Economy and Social sections that Tripoli has been suffering for a long time under a critical economic and social situation. The pressure on the national government has increased in the last five years especially because the centralised policy of the Lebanese government in the capital Beirut contravened the Lebanese constitution.

Because of the critical situation of Tripoli Metropolitan Area, the local and national governments organised a conference with the title "Tripoli Development Conference" on the 9th of October 2002. This conference included most of the Tripolitan society from the political leaders and the ministers of the Tripoli Metropolitan Area to the existing Syndicates and the Community Based Organisations (CBO'S) with active NGO's and the Lebanese University, etc. (Federation of Municipalities of Al Fayhaa 2002).

The aim of the conference was to discuss the main problems of Tripoli and how to solve these problems. The stakeholders agreed on one list of projects which should be conducted for the Tripoli Metropolitan Area as quickly as possible and one of them was the 2000-2020 Master Plan (which had already been delayed for more than one year). Apart from the presentation of the different projects and the study of the Tripoli Metropolitan Area which had been conducted already, no strategy was mentioned or analysis made of the priority of this project and how it should be implemented.

The important point to be stressed was the final demand of the stakeholders stressing the importance of the decentralisation system for Tripoli and the high impact of this policy on the role of the development of Tripoli (Federation of Municipalities of Al Fayhaa 2002).

The conference demonstrated a lack of tools for the analysis of the stakeholders' demands and the evaluation of the importance and the priorities of the different projects with a clear strategy for project implementation.

The basic importance of the Tripoli Master Plan is that it is one of the most important projects, which could help to gain a clear strategy for Tripoli's development. It pressed the planner to finish his Master Plan proposal on the 4th of December 2002 after more than one year's delay (cf. Table 3.4). The project was presented for the first time at the HCUP on the 24th of March, 2003 (Harmandayan 2004). After the discussion of the Master Plan proposal it was sent to the municipalities under consideration for them to give their comments within one month.

On the 16th and the 23rd of April, 2003 the Engineering Committee of Tripoli Municipality met and discussed the proposal and on the 22nd of April 2003 the Engineering Committee of El-Mina met for the same purpose. Important is that the role of the committee which was founded under Decree 1/62 of the MoPWT was not mentioned. The discussion of the proposal was made by each municipality separately even though the three municipalities of Tripoli, El-Mina, and El-Bidaoui form a federation.
Without discussing the details of the comments, the result was that a letter from El-Mina Municipality was sent to the DGUP in the 26th of April, 2003 referring to the proposal with detailed description on all points (El-Mina municipality 2003).
From the Tripoli Municipality side and under Decree Number 135, the project was totally rejected and several points were described and commented on (Tripoli Municipality 2003).
The two municipalities were not the only ones which had comments on the proposal. The Engineering Syndicate published report, based on a committee requested to be established by the engineering Syndicate President to study the proposal (Engineering Syndicate 2003). The interesting thing is that the comments of all the different committees were almost the same.
The DGUP had to answer with a letter through the Planner. The Planner's answer observed very critically that the Engineering Committee had not studied the proposal well. The planner gave in some of his answers to the comments reference and reasons why the decision was made in this way (Harmandayan 2003).
The interest of the populates in the Master Plan proposal for their area was great and particularly some active NGO's invited the planner to present the project and some of the members who were proposed by the second committee (cf. Table 3.6) were also invited. And at the same time the planner faced several criticisms through local magazines, especially from some of the first committee members who had followed the preparation of the Phase One.

Some modifications were made on the first proposal and a new version was submitted to the DGUP. For the second time, after more than one year, on the 9th of June 2004 the project was presented to the HCUP (cf. Table 3.4) and again sent to the municipalities considered for them to give their comments within one month (Harmandayan 2004).

The Tripoli Municipality, with the new council member and president, who was elected on the 6th of June, 2004 under Decree Number 309, again rejected the new proposal. The comments of the new local government were same as that of the old, with new points and with the argument that the planner had not considered the comments of the committee which followed the preparation of the Master Plan from the beginning (Tripoli Municipality 2004, Kabara 2003).

The planner for the second time answered the municipality comments in a letter which was mainly a copy of the first reply (Harmandayan 2004).
On the 12th of August, 2004 the DGUP accepted the project from the planner officially (cf. Table 3.4) and the negotiation to solve the conflicts is now between the municipality and the DGUP.
As described above, none of the planners of the DGUP looked for tools or methods how to solve this conflict, which shows a clear weakness in the planning process in Lebanon especially in revealing and resolving such conflicts.

The above discussion and review of the example of the Tripoli Master Plan process shows the urgent need to look for a collaborative planning approach and new tools that could improve the handling of such conflicts and even for a wider community, which can include all the members of society involved.
The next chapter discusses the Scope of study of this study and presents a Planning Support System, based on visualization tools using the highest resolution satellite images created by the QuickBird platform.
The historical analysis of urban development shows that important factors in land use planning where the remote sensing data can contribute greatly.

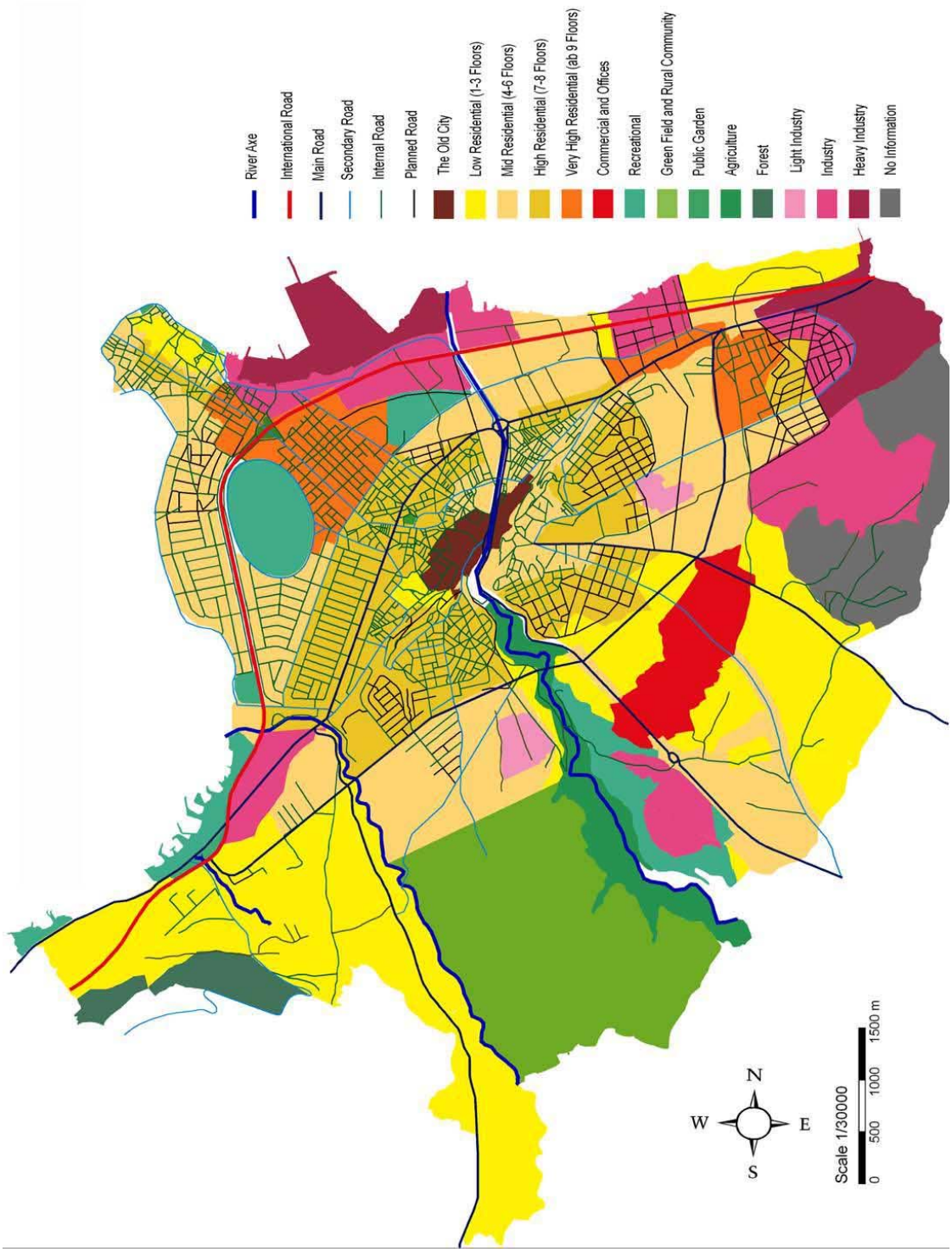


Figure 3.11: 2000-2020 Master Plan of Tripoli Metropolitan Area with building heights of the residential areas

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD and Maps.

Source: DGUP 2001 (classified by the author in ArcGIS)

3.2.8 Historical Analysis of Urban Development

This chapter has discussed the characteristics of Tripoli Metropolitan Area area with a review of the different land use plans for the area over the last 5 decades. Since the aim of the chapter was to evaluate the role of the visualization tools in urban planning participation it was important to visualise the high urban growth and change in the case study.

The analysis of the historical urban development in the Tripoli Metropolitan Area area is based on the same classifications used for the present land use map in the Multi-Flip Display visualization tools (cf. Chapter 5).

The findings of this historical analysis show in the next section the high growth and the impact of this urbanisation on the agricultural field in 50 years and this is done by using historical remote sensing data. Detailed discussion of this land use change detection is given in the following section.

3.2.9 Land-Use Change-Detection Based on Remote Sensing

The land use change detection analysis of the Tripoli Metropolitan Area was conducted through visual interpretation by screen digitizing based on mosaics of three temporal aerial photo series from 1956, 1973, 1994 and QuickBird satellite images from 2003 (cf. Figure 3.13). The four layers were geo-referenced in ArcGIS and the different classes were selected on the basis of urban classes, including: Heavy Industry, Industry, Residential, Recreational, Informal Settlement, Public Garden, Under Construction and Agriculture.

The aim of the presenting the land use change in this classes above is to show the decrease of the agricultural class and the impact of removing this class with the Tripoli 2000-2020 proposal. Are the local authorities aware of the high impact of urbanisation and how to manage best the future plan with a sustainable development plan?

The 2000-2020 Tripoli Master did not have a clear population projection for 2020 as the planner relate this projection to the socio-economic situation in the areas by giving 3 scenarios for Tripoli 2020 population which are: 370.000, 409.000 and 452.000 inhabitant.

The importance of presenting the results of land use detection shows the negative impact of the poor decisions which were made during the conflict of 1964 and 1971 Master Plans, when the later proposal offered all the plain area for future development, which was not needed since more than 30 % vacant land exist in the zone under construction today (Harmandayan 2004).

The planner in his data collection analysis shows that 30 % of the residential areas are vacant, too. Is the solution, in fact after 30 years of no Master Plan for Tripoli, to

prepare a new Master Plan which was planned in 2000 and is still not approved in summer 2007?

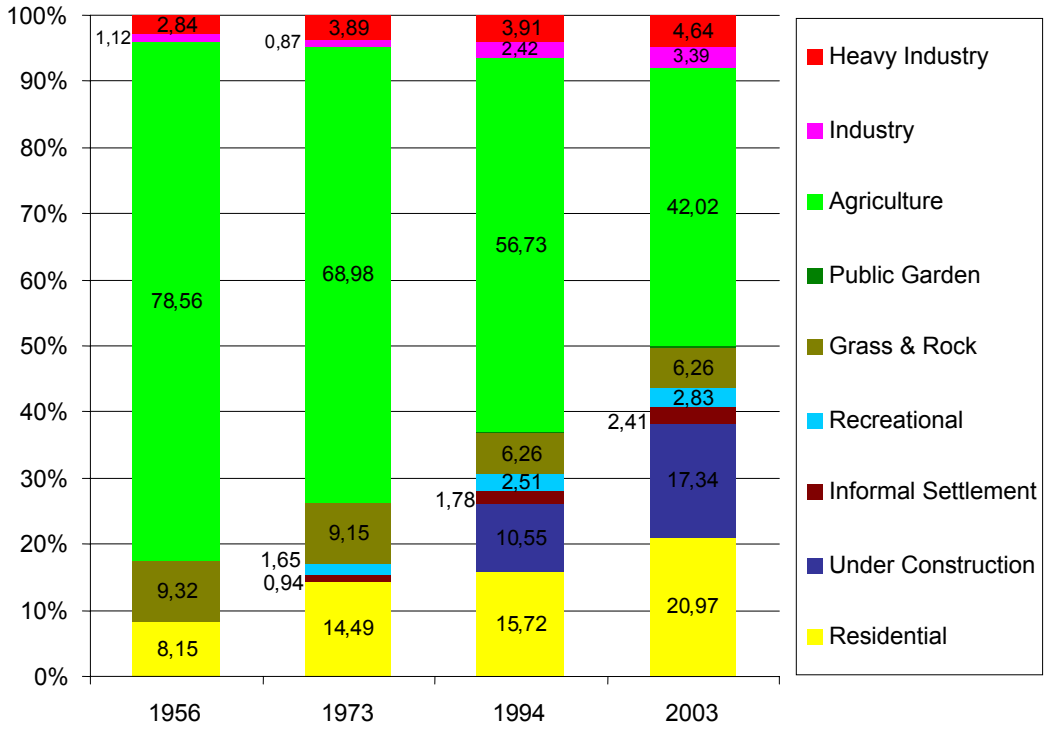


Figure 3.12: Proportion of land uses 1956-2003 in percents

Table 3.7: Proportion of land uses 1956-2003 in hectares

Landuse (Ha) / Year	1956	1973	1994	2003
Agriculture	3776	3317	2726	2016
Grass & Rock	448	440	300	301
Residential	391	695	755	1007
Heavy Industry	136	185	188	227
Industry	53	42	116	163
Public Garden	1	2	7	7
Recreational	0	79	121	136
Informal Settlement	0	45	85	116
Under Construction	0	0	507	832
Total	4805	4805	4805	4805

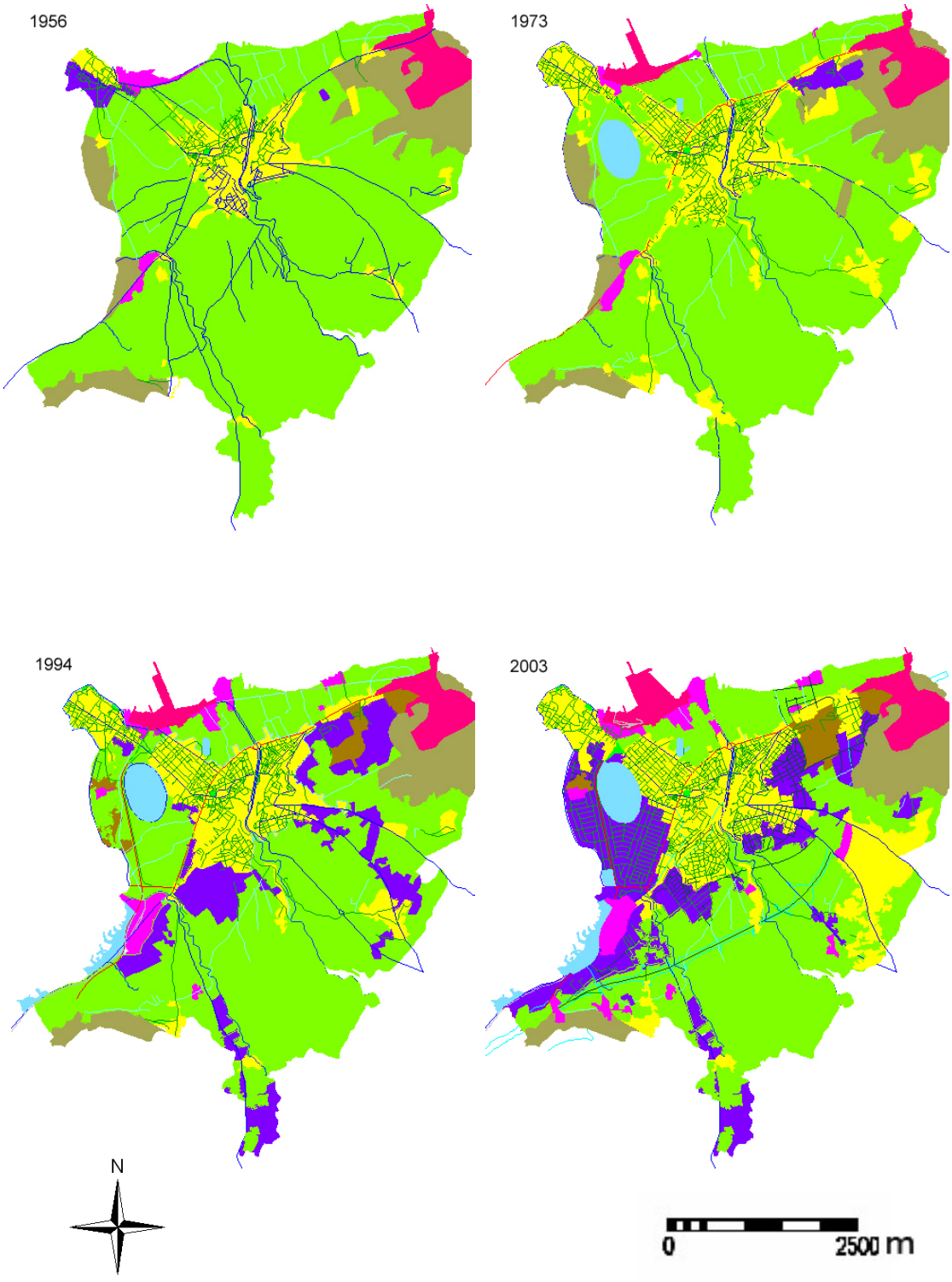


Figure 3.13: Urban growth of Tripoli Metropolitan Area

How can participation be realised, and geo-data visualization play a prominent role in participatory urban planning? The next chapter is answering these questions.

4 Settings of and Drivers for the Study

4.1 Introduction

The previous chapter discussed the main characteristics of Tripoli Metropolitan Area and provided a detailed review on the urban planning process practice. The conflict between the historical Master Plans was discussed and the main focus was on the 2000-2020 Master Plan. The focus in the discussion of the 2000-2020 Master Plan was mainly related to the conflict between the stakeholders and basically between Tripoli Municipality on the one hand and the planner representing the DGUP on the other, which in June 2007 was still not solved.

This conflict between key stakeholders was one of the main reason for selecting Tripoli as a case study (cf. Chapter 3).

This chapter has been elaborated based on the three objectives of the thesis related to the planning process, urban governance and the role of geo-data visualization in participatory urban planning. The three points are closely interrelated as the conceptual model shows (cf. Figure 1.2). Each of them is discussed in the following 3 main sections.

Sections 4.2 and 4.3 focus on a literature review concerning different types of land use planning and their impact on urban governance as transparent and democratic system for the rights of all the social groups to be involved in the urban planning practice.

Section 4.4 discusses the trend in geo-information technology development and the effects of this development on participatory planning. It includes a review of examples where geo-data visualization tools were used for participatory planning. The Multi-Flip Display as a new visualization tool is introduced in the last section of this chapter and a detailed description of the production of this tool is given in Chapter 5.

4.2 Trends in Urban Planning Management

Section 4.2 analyses urban planning practice in Lebanon and the development trends in this domain in comparison to the global change in the theory and practice of urban planning and management.

Based on the case study of Tripoli Metropolitan Area 2000-2020 Master Plan the shortcomings of this type of planning process are compared to the advantage of strategic and action planning process, now commonly used in other countries.

The evaluation of urban Master planning in the following sub-section discusses the potential of using the strategic planning and action planning as alternatives for the existing planning process.

4.2.1 Evaluation of the Urban Master Planning Practice

The definition of urban Master planning changes from country to country and sometimes from author to author. Whatever definition is used in the end, the criticism of this type of plan, which it is also referred to as a Master Plan, Analytical Plan, Statutory Plan and Orthodox Analytical planning, is strongly evolved in the last years (Davidson 1996).

The Master Plan approach is still dominant in Lebanon, especially because of the highly centralised political system. The interrelation between the governing process and Urban Master Planning in the conceptual module (cf. Figure 1.2) shows the effect of this political system on the urban planning process.

The analysis of Tripoli's 2000-2020 Master Plan process shows the weaknesses of this type of planning process. The base criticism of this approach to urban planning demanded a reform by the middle of the 1960ies "that would stress the policy basis of plans and seek to avoid the excessive elaboration of physical and land use detail that dominated the existing blueprint approach" (Williams 1999: 41). The criticism of these types of plan is related to the key characteristic weakness: the excessive amount of time needed, the bureaucracy, technocratic problems, inflexibility etc… (Baross 1991, Davidson 1996, Williams 1999, Pomilio 2000, Steinberg 2003, Sliuzas 2004).

Such criticisms are clearly applicable to the planning process in Lebanon. **With regard to the consumption of time were we can see that Tripoli 2000-2020 Master Plan took more than 4 years to prepare and after more than seven years is still not approved (cf. Section 3.2.5).** The technocratic approach limits involvement in the planning process to experts only, whereas the new post-modern planning procedures require a collaborative planning process and participation of the various societal persons and groups involved. **The centralised system, which makes the process more bureaucratic with its comprehensiveness and inflexibility, is a main issue facing the implementation and the success of these types of plans.**

The evaluation of the Master planning process (cf. Figure 4.1) shows the weakness of this process when compared to post-modern planning, which is a socio-economic and political process and no longer based only on physical plans and management of land and spatial activities (Macleod 1996, Taylor 1998, ESCWA 1999, Kumar 2002).

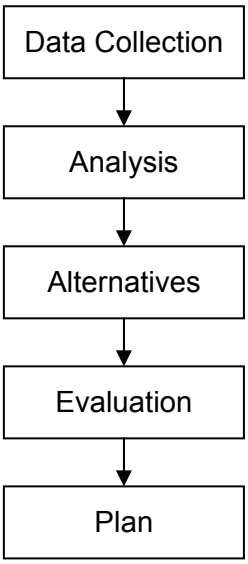


Figure 4.1: Analytical planning process
Source: Baross 1991

Since 1989 in Lebanon the Master planning process model has not been up-dated (DGUP 1989). The last up-date was the integration of the Higher Council for Urban Planning (HCUP) under Decree No. 2/89 (DGUP 1989). This changed the planning process from the Analytical Planning process which was used in Lebanon previously into the existing Master planning process (cf. Figure 2.3). The HCUP member's responsibility is to give their opinion on any proposed Master Plan and send the project to the municipality council concerned to give their comments and later send it to the council of ministers, the members of the HCUP. This is discussed in Section 2.4.

Neither in the 1989 up-date nor in any subsequent discussion was the role of the society and the market (Private Sector) fully considered. The existing planning process is still highly centralized and far behind the trend in the post-modern urban planning process at the international level, which is a more collaborative and transparent process. This statement shows to follow the trends in the planning process by looking at how to develop the existing planning process into a more collaborative process.

In Tripoli and in Lebanon generally a new model of urban planning is needed after the failure of the existing system as the review of the different Master Plans in Chapter 3 and specifically the 2000-2020 Tripoli Metropolitan Area Master Plan show. This would support a discussion of the issues of participation at all levels. An elaborated urban planning process model, as result of this study based on the main objectives of the conceptual model (cf. Figure 1.2) with the empirical case study of Tripoli Metropolitan Area area is discussed.

Strategic planning and action planning have a greater potential than the Master planning process, for supporting the governance trend especially in view of the collaboration key characteristic in this process, which is discussed in the following sub-section.

4.2.2 Action and Strategic Planning as Alternative to Master Planning

Strategic planning and/or action planning are planning processes which have appeared in the last 4 decades. The great interest in these types of planning first appeared in the United States and Western Europe (Allison and Kaye 1997, Healey 1997, Williams 1999, Pomilio 2000, Graham and Healey 2005) but it has spread globally as well.
The performance of both planning processes is discussed with their close interrelation in comparison to statutory planning. Statutory planning is based on the description of Davidson (1996) who refer to the Master Plan and structure plan a basically types of statutory planning with different degrees of rigidity and flexibility.

4.2.3 Action Planning

The concept of action planning is based on the definition of Baross (1991), who is a staunch critic of the Master planning process. Baross saw in action planning, with its methodology and tools, a significant process especially for dealing with the problems that arise in the Third World cities because of their high urbanisation with lack of oriented planning process (Baross 1991).
Baross, criticism of the Master planning process is related to “the output of analytical planning, embodied in the Master Plan, (which) lacks the scope for dynamic adjustments, flexibility, constituency acceptance and results in either long delays in implementation or in unimplementable projects” (Baross 1991: 3).

In his description of the key characteristics of the action planning process (cf. Figure 4.2) Davidson (1996) refers to action planning as performance-oriented planning.
Both Davidson and Baross argue that action planning is more implementation-oriented and can tackle problems in limited time frames and that it “is designed so as to give the greatest possibility of success based on full involvement of the key actors…” (Davidson 1996: 455).
However action planning, too, has its limitations. A major limitation of action planning is that it looks at the micro level and at specific issues, while some concerns require a wider view, which is the strategic planning or, as Pal Baross refers to, as “Strategic Action Planning” (Baross 1991).

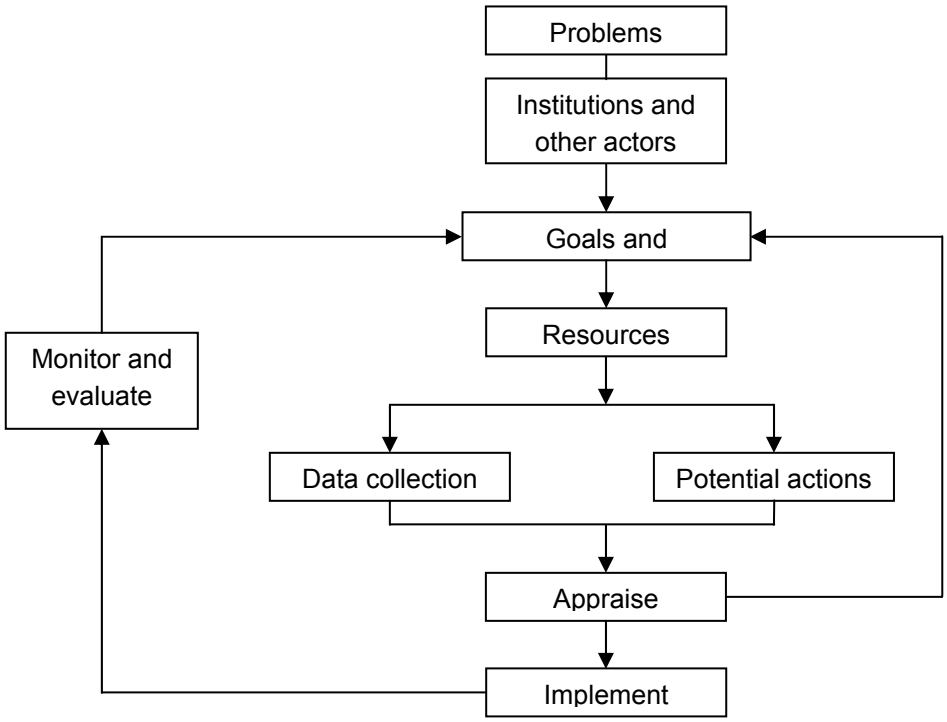


Figure 4.2: Action planning process
Source: Baross 1991 and Davidson 1996

4.2.4 Strategic Planning

Strategic planning has a higher potential for following the development trends in the governing process, because the planning process is more participatory. This potential is more closely related to the key characteristics of strategic planning process with regard to participation, democracy, collaboration between those in society involved. The decentralisation process encourages many authorities to use it as a powerful tool in urban planning (Williams 1999, Steinberg 2003).

Strategic planning originally was not part of urban planning but it "is a concept borrowed from business management and adapted to urban planning" (Davidson 1996: 455); the aim of this section is not to discuss the origin of strategic planning but rather to discuss the different phases of the process itself.

Allison and Kaye (1997) see strategic planning as a systematic process which should go through seven phases (cf. Figure 4.3) which serve to build commitment between the stakeholders in the priorities.

Figure 4.3: Strategic planning process
Source: Allison and Kaye 1997

Figure 4.3 summarizes the strategic planning process which has been adopted from Allison and Kaye research dealing with the advantage of this planning process for nonprofit organizations. The above mentioned process was not selected because it is the standard for a strategic planning process but more because it contains the essential ingredients and shows the flexibility in the related steps. The basic and important steps which strategic planning offers are the involvement of the stakeholders concerned from the beginning, with a key point of sharing ideas, reflecting on past (strategies) deliberation, argumentation and the building of a consensus on priorities and actions with the commitment of resources.
The Phases 2, 3 and 4 shows the flexibility of this type of plan, where the planner can always go back to previous steps if necessary. As soon as the stakeholders agree on the priorities the first draft plan should be prepared in Phase 5 and a review is made by the stakeholders to adopt the final version. Step 6 is the implementation phase, which should create at same time an annual operating plan (s) to guide the implementation of the strategic plan. Phase 7 is the monitoring and evaluating phase to give the process continuity and show that the potential of the plan for environment change can be handled.

Action and Strategic planning approach show the potential and the possibility of taking into account the socio-economic and environmental context and "create flexibility in decision making, oriented at action and based on a new culture of urban management" (Steinberg 2003: 2).

4.2.5 Relationship between Action, Strategic Planning and Statutory Planning

After the discussion of the alternative types of planning process it is necessary to examine the relationship between these different types.
In this section the term "statutory planning" is used instead of "Master Plan", on the basis of Davidson's description which refers to both, Master planning and structure planning as statutory planning with a different degree of rigidity and flexibility (Davidson 1996).
Action planning has the advantage as a collaborative planning process (cf. Figure 4.2) and can focus on the problem with a time limit.

Davidson does not see the strategic plan as action plan with a broader agenda, as described by Baross. In Davidson's view, action plan can be a basis for strategic plan (Davidson 1996). The idea of Davidson is that it is unnecessary to expend effort on the action plan to look at a wider context: "The ideal situation would be that a strategic plan forms a framework for a series of action plans" (Davidson 1996: 456).
Figure 4.4, which is based on the illustration of Davidson, shows how he refers to the statutory plan with, a pointing frame, oriented in another direction. Here he wants to show that the weakness in the statutory plan which is prepared long in advance and

is unable to respond to new developmental perspectives and opportunities (Davidson 1996).

The basic difference between the content of the statutory plan and of the non-statutory plan, as discussed above in the context of flexibility and collaboration process, showed difficulties in supporting development trends from the governing concept to governance. However, there is no value in such planning if it does not have a legal status and for that reason in the case of Tripoli the first steps in participation should be followed by an updating of the planning process to more structured strategic planning, which could involve participation and this need a clear step from the DGUP/MoPWT that this type of plan have a legal status.

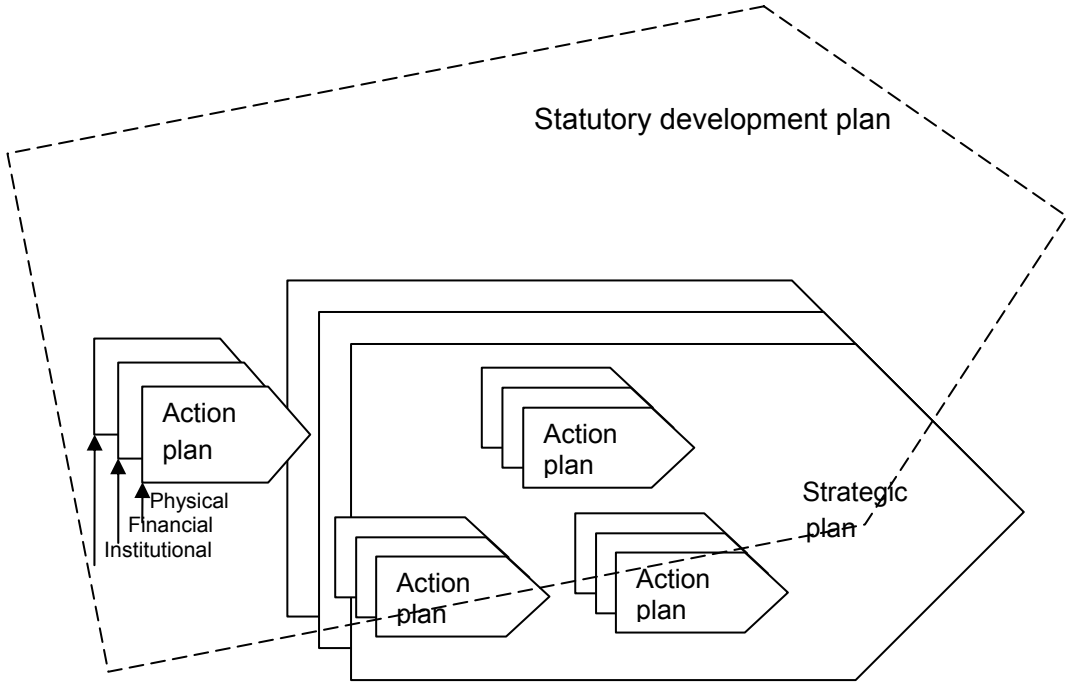


Figure 4.4: Statutory, action and strategic planning relationship
Source: Davidson 1996

4.2.6 Structured Strategic Planning Process

On the basis of the action and strategic planning process discussed above and their relationship to statutory planning (Master or Structure Plan), it is important to look in more detail at a structured strategic planning process.
The structured strategic planning process (cf. Figure 4.5) is based on the lessons learned from the action and strategic planning process, with the aim of producing the characteristics of performance-oriented planning, which are flexible and participatory in nature.

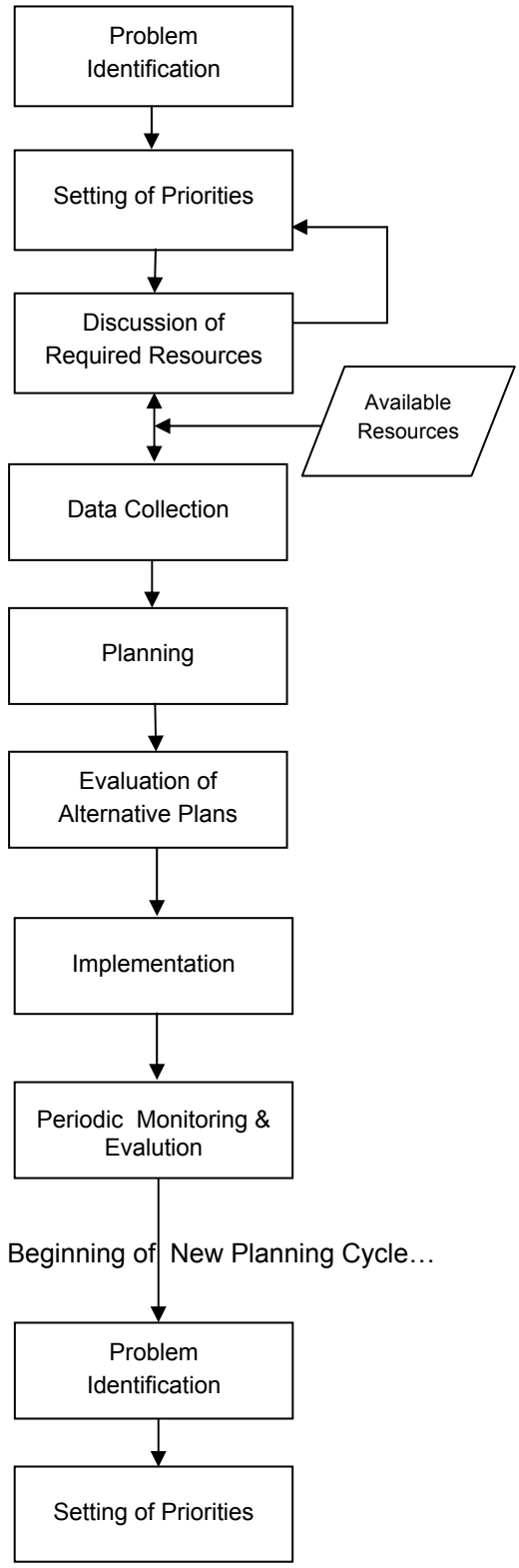


Figure 4.5: Structured strategic planning process

Note: Explanation of different shapes of flow chart modules cf. Figure 1.3

The advantage of the structured strategic planning process is that after the problem is identified the setting of priorities follows, which helps to articulate the procedure from the beginning. These steps lead to a discussion of the resources required, which can get back to the setting priorities process for checking in case the required resources are not available, to an agreement on new priorities. The next process is data collection, which in turn is supported also by the resources available. Step 5 is a planning activity, where different alternative plans and proposals should be presented. This step is followed by the evaluation of the alternative plans with selection of the right alternative for implementation. After the implementation process a regular monitoring and evaluation take place, which should lead to frequent adaptation of the implementation and, in the case of major changes, perhaps of the plan itself. As the model shows, the objective is articulated from the beginning and the conducting oriented towards the flexibility of a continuing process, in comparison to the Master Plan process, which ends with the plan itself. The planning process should be seen as a continuous process with a similar procedure in the next planning cycle.
The structured strategic planning process, which is divided into 8 steps, shows that in every step there is a possibility for stakeholders' involvement in contrast to the Master Plan process (cf. Figure 4.1), which starts directly with the data collection process. The stakeholders' role and the necessity for their participation in the urban planning process is discussed in Section 4.3 under the Urban Planning as Governance objectives.

The discussion about the meaning of governance has grown in the past few years and this is discussed in detail in Section 4.3, in general as well as in the urban planning context specifically. Whatever the view on governance, most of the literature refers to the following characteristics: supporting decentralisation, democracy, transparency, looking at socio-political issues and participation etc. (Kooiman 2003, UN-HABITAT 2004). As participation and collaboration are among the important issues in governance and the new urban planning approach can serve this development this would require a new role for the urban planner.

4.2.7 Urban Planner's Role

In the previous section the development of the trends in urban planning was discussed. This development has important effects on the role of the planner, which shifts from preparing drafts or drawing zoning plans to be a communicator and facilitator between the different groups involved. With this change, "the role of the 'grand' classical urban planner fades away and that of a communicator and facilitator is projected instead" (Steinberg 2003: 24).

Hague (2000) in his paper, "What is Planning and What do Planner do?" criticized the planning practice which belonged exclusively to professional planners and sees

rather that it is a tasking which all the stakeholders should be involved as “politicians, public, pressures groups, developers and many others” (Hague: 1).
This section is not to discuss the definition because, as Udy (1999) says in the beginning of his paper, “The Planner”, he sees that view of the planner about urban planning can be totally different for every third planner (Udy 1994). The definition of the planner can vary at different times and the role of the planner increasingly has been changed in the last decade. **The planner is no longer the one who can decide what the future of the societal environment should look like. At times when the planning process is becoming more and more collaborative all the actors should be equally integrated.**
The changes in the role of the planner and the planning profession place greater responsibility on the planners’ shoulders in one respect and moves the responsibility of the planner from drawing plans to being more a process moderator or, rather than that as Pallagst (2005: 204) sees it nowadays.
In the collaborative planning process the planner can play several roles and should have a different character to that of the traditional planner. The new planner should listen and act as mediators and facilitators sometimes (CUPEM 1998, Innes 1998, Alexander 2001, Pløger 2001, Tang 2001).
Macleod (1996) sees that planners should “care about the future of our communities and want to contribute solutions to our pressing social, economic and environmental problems” (Macleod 1996: 1).
As the planner’s role has basically changed, it is recommended that he/she looks for new tools and instruments to support his/her new role in participatory planning which is necessary to manage the arguments of the stakeholders. This will be discussed in the following sections.

4.3 Urban Planning as Governance

The development trends in the domain of public administration, from governing to more governance by encouraging society and the private sector in the planning process. This put high pressure on the state’s role as more a facilitator for urban services rather than provider (Sliuzas 2004). The term “governance” is relatively new. It is related to different aspect of the role of the state, which has changed in the last 30 years.
After a short definition of the term “governance”, this section discusses the role and the pillars of so-called “good governance” and its effect on the urban planning process.
There is no clear reference to the exact date of the reform of the traditional governmental system, which predominated until the 1980ies and which had “the authority and capacity to govern: to formulate and implement policy, and to realise development goals” (Rakodi 2002: 1). Indeed, societies modify their process of government at different speeds and times. However since the early 1990ies there

has been an increasingly strong global movement to radically transform governing into governance.

The support of the governance concept and the influence on the trends in development of the government systems into governance by strengthening the role of major groups relay at the centre of the Agenda 21[10] (UNSD 1992).
The United Nations, support for the governance concept was increased by different institutions. Especially in developing countries, where the government structure is unable to handle this reform because of their existing political constitutions.
The aim of this section is to focus more on the effect of governance, especially from the urban planning side, with a participatory process as the main characteristic.
Pieterse see urban governance as an "…effective collaborative planning, decision-making process (and mechanisms) and implementation to co-ordinate distinctive efforts of the local government, civil society organisations and the private sector towards the progressive attainment of sustainable urban development and local democracy"(Pieterse 2000: 4).
Whatever the ongoing international debate about the definition of urban governance and its key characteristics, the definition above covers the basis of the governance concept. Participation is one of the important aspects of the governance process with the integration of different groups in society in any action or activities related to socio-economic, political and environment aspects.
The issue of participation and the different stakeholders' role in the governance process is discussed in the following sections, but it is important to look at the feasibility of the governance concepts in the Arab regions, since the case study of the thesis is part of this region.

The World Bank has almost the same point of view as the United Nations in that the strength of good governance translates into Participation, Transparency, Account-ability, and Responsiveness. The World Bank has been critical of the high degree of corruption in the developing countries, which has caused a basic change in their policy of supporting direct participation of the local authorities in development projects instead of transferring grants to these authorities through the central government.
A basic reference for the success of the World Bank's new policy of including the local authorities in the planning process is "The World Bank Participation Source Book". It describes case studies from different regions and different projects related to stakeholder participation (World Bank 1996).

[10] The Agenda 21 proceedings of the United Nations Conference on Environment & Development, which took place in Rio de Janerio, Brazil from the 3 to 14 of June 1992. The aim of the conference was to build a global partnership based "on the premises of General Assembly Resolution 44/228 of 22 December 1989, which was adopted when the nations of the world called for the United Nations Conference on Environment and Development…" (UNSD 1992)

The World Bank vision of improving governance in the Middle East and North Africa Region (MENA) is basically related to considering the two universal values of good Governance: Inclusiveness and Accountability (cf. Figure 4.6).
Inclusiveness is an important value for good governance, based on the World Bank definition which sees "that governance is good when the process includes all people living within the state—that everyone who has a stake in it and is affected by it has equal opportunities to participate in and benefit from it" (World Bank 2003: 27).
Accountability and as Figure 4.6 shows is based on Transparency and Contestability, which means that accountability "rests on knowledge and information (*transparency* in governance mechanisms), as well as on incentives that encourage those who act in the name of the people—government officials—to do so faithfully, efficiently, and honestly (*contestability* in the governance process)" (World Bank 2003: 27).

Figure 4.6: The underpinning values of good governance
Source: The World Bank 2003

The weakness of the economic, social, and human-based according to the MENA Development Report "is being handicapped by weaknesses in the quality of public governance, in which the region lags behind the rest of the world" (The World Bank 2003: 2).
The poor governance in the region, as already mentioned, is greatly affected by corruption and exclusiveness, while there is no participation and equal treatment but a lack of accountability, transparency and contestability. The situation is not always the same in all the regions and some of the good governance pillars existed in some countries more than in others. This point, however, is not discussed in this thesis. For more information the author refers to the MENA Development Report (World Bank 2003).

The issue of strengthening the role of the local government as an important actor in the governance process and the main coordinator in the public sphere within the central government, private sector and the civilian organisations involves higher priorities in the 25-year ESCWA[11] agenda program (ESCWA 1999).
The need for good governance in the Arab region is not only in the interest of the United Nations. The World Bank also sees urban governance as one of urgent needs in the developing countries especially because of the great corruption in these regions.

A contribution of the United Nations Development Program is the "Programme on Governance in the Arab Region" (POGAR) as a web portal for information about governance in the Arab region. For example, in Lebanon the main issue facing the feasibility of the governance process, based on POGAR is the highly centralised political and administrative system (UNDP-POGAR 2006).
The weakness of urban governance in Lebanon it is no far from the situation in the MENA region but Lebanon could be have a better chance to move towards governance with its democratic basis. For example, "Lebanon ranks among the highest of the countries in the region in terms of political participation, civil liberties, and free press" (The World Bank 2005: 8).
Another positive element supporting good governance is the social structure in Lebanon, which shows a high interest in social activities, where Lebanon has relatively high densities of civil society organisation among the Arab countries (cf. Table 4.1).

Henry in his research on Transparency and Accountability in the Arab region refers to the Lebanese social structure as one of the strongest in comparison to any other part of the Middle East (Henry 2004).
The positive influence on governance that Lebanon can offer additionally to this, which has been discussed above, is that Lebanon has many of the constitutional institutions which have a positive influence to achieve governance (The World Bank 2005: 8).

This can only be a good start but it still requires enormous effort to fill the gap of weak governance in the MENA region in general and in Lebanon in particular with comparison to the other regions in the world (cf. Figure 4.7) In Lebanon's case this gap is due to the high level of corruption and to the lack of transparency in the planning process or decision-making with the complicated bureaucratic system (The World Bank 2005).

[11] The Economic and Social Commission for Western Asia is an institution of the United Nations established in 1974 and located in Beirut, Lebanon.

Table 4.1: Density of civil-society organizations in the Arab region

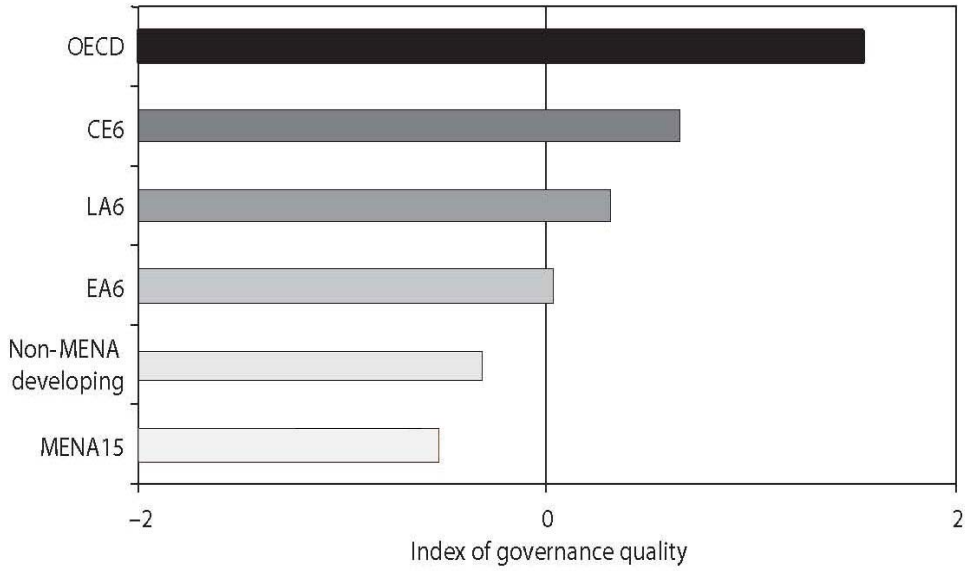
Countries	Number of organizations in 2001-2	Population in 2001 (in millions)	Organizations per 100,000 inhabitant
Algeria	58,000	31	187
Morocco	30,000	29,2	103
Lebanon	3,600	3,6	100
Tunisia	7,500	9,7	53,6
Bahrain	3,600	0,7	45,8
Egypt	16,000	65,3	24,5
Jordan	900	5,2	15,5
Yemen	2,700	19	14
Kuwait	103	2,3	4,4
United Emirates	113	3,3	3,4
Saudi Arabia	230	21	1,1
Sudan	246	37	0,6

Source: Nasr 2005

In 1999 an important step from the government's side to reduce corruption in the country was the founding of "The Presidential Complaints Office", which "was set up directly by President Lahoud to receive and process speedily complaints by citizens" (Safa 2000: 10). The public had high hopes in this complaint office; especially in the beginning, when the office in the first three months received 3250 complaints and could handle 2200 of these (Safa 2000). The involvement of higher authorities and control of the complaints office through the public sector were two of the basic faults that this important step against the high corruption failed and the complaints office at the end was used as a stage for private conflicts between two political groups.

With a score of 2.7 out of 10 (Transparency International 2004) Lebanon still ranks very low within the international corruption index, particularly in comparison to the MENA Region.

The exclusion of the different stakeholders: the public sector, civil society and the limited power and role of local government, as a result of the centralised system, is affecting the chance to fill the gap in building good governance in the MENA in general and in Lebanon specifically. There is an urgent need from the state to accept and agree to the important role of the local government and other involvement of stakeholders in the planning and decision-making process by supporting the main two universal values of inclusiveness and accountability along the lines presented by the World Bank and others.



Notes: OECD includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. Central European countries (CE6) include Bulgaria, the Czech Republic, Hungary, Poland, Romania, and the Slovak Republic. Latin American countries (LA6) include Argentina, Brazil, Chile, Mexico, República Bolivariana de Venezuela, and Uruguay. East Asian countries (EA6) include Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. MENA15 includes Algeria, the Arab Republic of Egypt, Bahrain, the Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, the Republic of Yemen, Saudi Arabia, the Syrian Arab Republic, Tunisia, and the United Arab Emirates.
Source: Authors' calculations, which are based on the index of governance quality, covering 173 countries worldwide.

Figure 4.7: Governance quality in the MENA area in comparison to other countries of the world
Source: The World Bank 2003

4.3.1 Stakeholders in Urban Governance

The previous section discussed the characteristics of good governance and the approach of the MENA region in general and Lebanon specifically to the pillars of good urban governance.

Transparency, the combating of corruption and inclusiveness were the most important pillars to be implanted in Lebanon. The three pillars are interrelated to each other and have an impact on good governance, since "Transparency in decision-making processes and in institutions has the potential to become a central strategy for engaging stakeholders, combating corruption and improving the quality of urban governance overall" (UN-HABITAT and Transparency International 2004: 8).

The above statements show that stakeholder involvement is a basic issue in good governance. In other words participation is a democratic aspect where every actor has the chance to hear and to be heard. Good governance gives stakeholders a voice, ears and a vote to influence the decision.

But who are stakeholders and why is it very important that they are involved?

The stakeholder is simply any one who holds a stake. It means "any individual, community, group or organisation with an interest in the outcome of a programme, either as a result of being affected by it positively or negatively, or by being able to

influence the activity in a positive or negative way" (Department for International Development 2002: 2.1). Ramirez (1998) states that it evolved from the initial term, which was first recorded in 1708 as "a person who holds the stake or stakes in a bet", to the definition given above, i.e. with interest and concern in something.
Stakeholders are important because the success of development projects is based on the contribution of "active participation of all stakeholders, including municipalities, developers, the general public and those involved in inter-governmental and cross-jurisdictional co-operation" (Mueller, Bentivegna and Costa 2005: 3).
This interrelation between good governance and stakeholder participation as discussed above show the positive impact of the good governance on stakeholder participation and vice-versa. The "good governance implies inclusion and representation of all groups in the urban society…" (The World Bank 2000: 15)
The positive impact of good governance on stakeholder participation in the planning process and decision-making and the necessity of this integration of the democratic side it is not without complexity, especially in that many stakeholders have conflicting view. The complexity of participation has led to the development of different models, tools and methods which could solve a conflict between participants. Some of these models will be mentioned in the following sections.

4.3.2 Participatory Structured Strategic Planning Process

The previous sections discussed the definition and the importance of the urban governance in urban planning with the need to integrate society by including all the different actors from the democratic side and the importance of this contribution of society to the problem analysis.
How, when and who should be involved in the participatory planning process?
On the basis of the structured strategic planning process (cf. Figure 4.5) discussion in Section 4.2.6 the 8 phases of the process can offer opportunities for participation.
The participatory structured strategic planning process (cf. Figure 4.8) shows that the stakeholders concerned should be involved throughout all steps of the process.

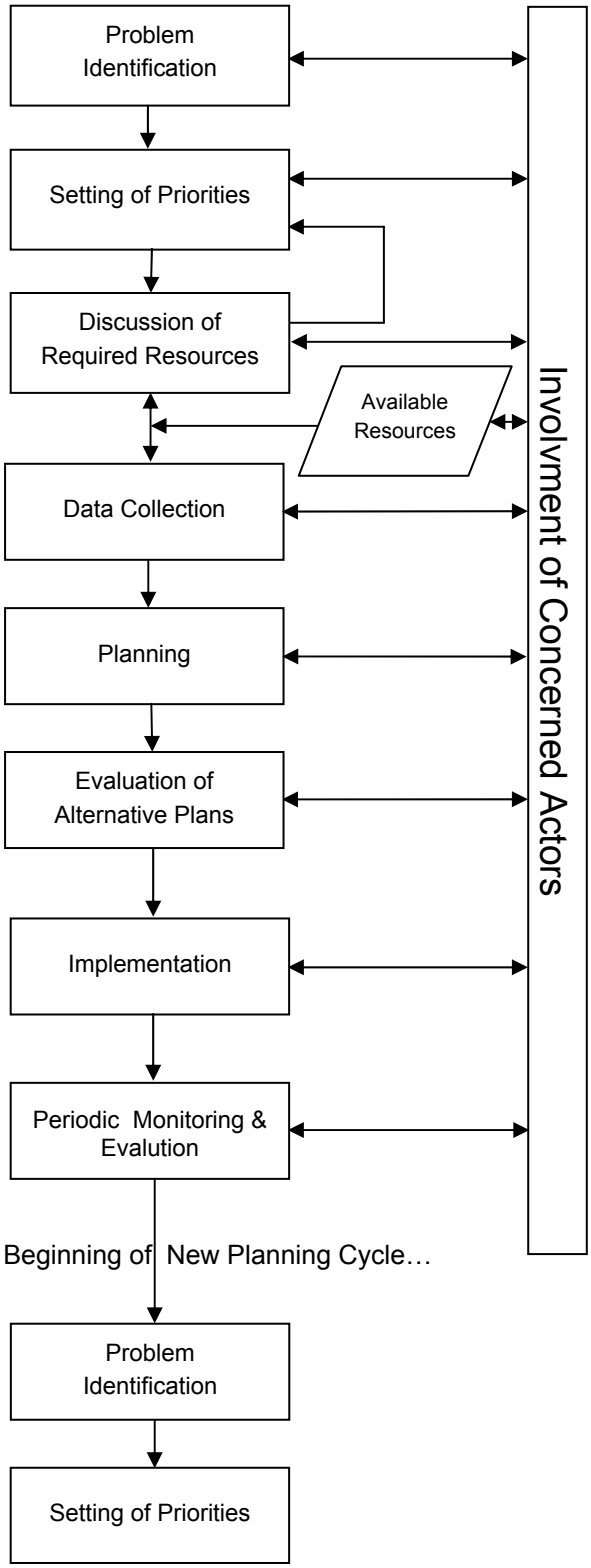


Figure 4.8: Flow chart of participatory strategic planning process
Note: Explanation of different shapes of flow chart modules cf. Figure 1.3

This full involvement supports the pillars of governance, transparency and accountability and inclusiveness, where every participant can have the opportunity to contribute and to follow the evolution of the process.

Who should be involved is related to the size and the type of the project. The actors concerned involved can even play different roles at each stage of the process, using their experience and knowledge, from problem identification up to monitoring and evaluation. This does not mean that any part of society can be excluded; this process should be accessible for any interested person or group of society.

Participation is needed, but this does not mean that the task will be managed without difficulties evolving from the different interests among the stake-holders.

4.3.3 Tools and Techniques for Participatory Planning

The keys for good governance have been discussed above with the definition of stakeholders and the need for their participation in the planning and decision-making process, on the basis of the "inclusiveness" pillar of good governance. Inclusiveness can be translated into a need for tools that support participatory planning. UN-Habitat sees participatory planning as an indicator of democratisation "from holding a simple public hearing…to engaging whole populations in 'visioning' exercises that identify the full range of issues facing a city, helping articulate what it is that people want for their city future, and assigning priorities possible actions, investments and institutional changes" (UNCHS 2001: 17).
The importance of inclusiveness in governance in the UN agenda led to the founding of the "Global Campaign on Urban Governance"[12], which links the campaign under the concept of inclusiveness to the UN-HABITAT Global Campaign for Secure Tenure (UN-HABITAT 2002).
In both of these Global Campaign visions and the strategy that goes with the them, inclusiveness "is to realise the 'inclusive city,' a place where everyone, regardless of wealth, gender, age, race or religion, is enabled to participate productively and positively in the opportunities cities have to offer"(UN-HABITAT 2002: 3).

The interest in participatory planning nowadays is increasing and "internationally a number of local and metropolitan governments have begun to explore ways of taking more seriously the challenge of bottom-up participatory planning in setting policy and budgetary priorities" (Wiseman 2003: 16). One of the main criticisms of participatory planning is that it takes time and resources, especially when the goals are not well-articulated. Such issues arise in the case study of the Tripoli Metropolitan Area

[12] For information on the Global Campaign on Urban Governance activities and the phases of the campaign cf. http://www.unhabitat.org/governance

Master Plan. The reform in the planning concept should lead to a search for new tools which could support and facilitate different aspects of participatory planning.
The aim of this research is to evaluate the contribution of geo-data visualization techniques based on the Multi-Flip Lenticular Foil Display (LFD) technology (cf. Section 4.4.4, Chapter 5 & 6), which was tested for the first time as tool for participatory urban planning.
The Department for International Development's source book "Tools for Development" includes an important number of models and techniques for participatory planning from case studies in different countries. The source book offers important references and especially with empirical case studies without referring to tools used in specific cases. However, the tools should always be selected on the basis of resources available, existing problems and the actual situation.
Groenendijk (2003) refers to different development models with a discussion of the advantages and the disadvantages of each. For instance, one of the well-known methods referred to is SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis (cf. Table 4.2). This form of analysis was used for the first time in the city of Tripoli by UN-HABITAT under the "Urban Sector Profile Study Lebanon Report" (UN-HABITAT 2004).
The result of the UN-HABITAT study was the output of the SWOT analysis (cf. Table 4.2) in the case study of Tripoli it shows that the points discussed in the present research and the finding concerning the issues discussed by the participants during the field study to evaluate the role of the LFD technology role in participatory urban planning (cf. Chapter 6) were almost the same.

The present study hypothesis is based primarily on evaluating the Multi-Flip LFD in comparison to the conventional transparency maps as a new Geo-data visualization tool in participatory urban planning and to test the impact of this technology in the participation of stakeholders from different backgrounds. The result of the technique evaluation is discussed later in Chapter 6 and for a detailed description of data used and the generating process see Chapter 5.

Another important source book providing an overview of methods and tools for community planning is "The Community Planning Handbook" (Wates 2000) which is one of the basic books supporting the rapid evolution of community planning skills. The importance of this source book is that it presents methods and tools, many of which put emphasis on the visualization tools in participatory planning, the main concern of this study.

Table 4.2: SWOT analysis by UN-HABITAT for the city of Tripoli

Strength:	**Weakness:**
a. Management - avail and train environmental human resources in the administration - assure integrated sect oral coordination and well defined roles - avail a quality control division, including assessing EIA b. Finance - diversify sources of income - strengthen services division and commercial extension - exploit special traditional and touristic occasions for profit-making festivals c. Information : - enhance the capacities and role of the environment observatory - encourage a wider dependence on internet for spreading information - strengthen teams for routine monitoring and assessment - avail awareness programs and spreading of information	a. Capacities and implementation - lack of capacities in implementing projects: administrative/technical/and skills - lack of implementing regulatory decrees b. Planning and legislation - lack of proper environmental vision for quality of living - lack of relevant regulatory decrees and punishment c. Coordination and commitment - lack of coordination between groups : public and private - absence of feel of "belonging" and care by the citizen
Opportunities: a. Capacities - Avail and train personnel in promising fields (Archaeology, natural resources, coastal environments, rivers, protected areas…) - capacitate and train teams in improving touristically attractive sites b. Investment - attract the Lebanese emigrants to invest in the country through specially designed festivals - invest in traditional occasional events strengthen existing environmental centers and NGOs relating to spread of environmental knowledge	**Threats:** a. Natural - Abou Ali river flood and torrential or flash floods - Coastal erosion and salt-water intrusion b. Human - pollution of surface/subsurface water and resultant diseases - loss of green/productive land and agricultural soil - non-commitment of the citizen in environmental conservation

Source: UN-HABITAT 2004

4.4 Geo-Data Visualization in Participatory Urban Planning

The previous two objectives discussed the developmental trend in the planning field and in governance. This section focuses on the developmental trend in geo-information technology and the impact of such development on the Urban Planning and Governance domains.

As the present section focuses on the important effect of geo-information technology (GIT) in general on the planning process reform and geo-data visualiza-tion tools in particular, it seems important to review the historical development of GIT.

Foresman (1998) in his chapter “GIS Early Years and the Threads of Evolution” presents a detailed discussion on the milestones of GIS development with “the major milestones, groups, or trends that helped influence GIS”.

The development of what is nowadays known as modern GIS played an important role especially in that it followed almost completely the reform of the planning form and governance system within almost the same time period.

Foresman states that the term “geographic information systems” became widespread for the first time after “the development of the first industry–scale computer-based GIS, known as the Canadian Geographic Information System or CGIS” in the 1960ies (Foresman 1998: 6).

The CGIS is, however, not the very beginning of GIS. Foresman sees computer technology as the backbone for GIS evolution based on old, traditional map overlays which goes several centuries back as one of the important techniques leading to what is nowadays known as GIS.

Figure 4.9 gives an overview of the GIS eras and the eras of influence on GIS where we see that the research and development, implementation and client application ages follow almost the same development as the planning and government trends periods discussed in the previous sections.

The following section discusses the contribution of the application of GIT on the discussed urban planning process, which forms Planning Support System (PSS).

The last two sub-sections focus on role of geo-data visualization in participatory planning and the Lenticular Flip Display (LFD) as a new visualization technique for participatory urban planning.

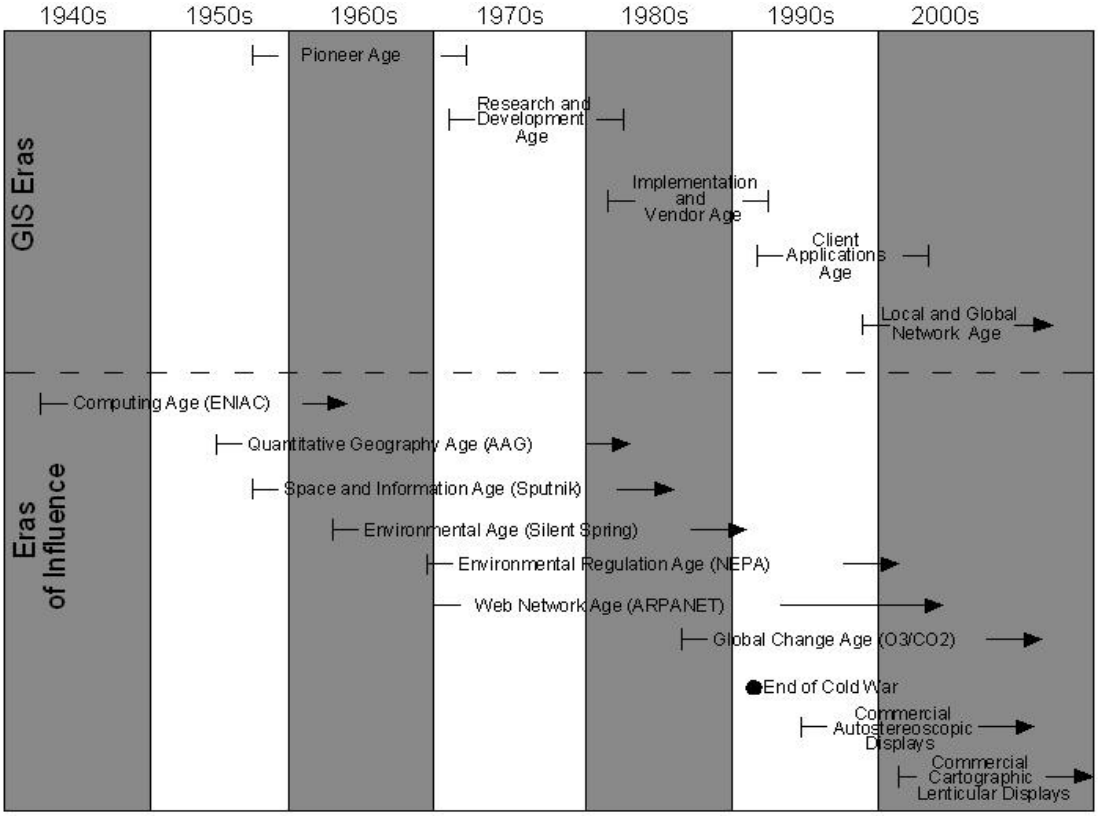


Figure 4.9: Chronology of GIS evolution in relation to major agents of change
Source: Foresman 1998

4.4.1 Effect of Geo-Information Technology on the Urban Planning Process

The application of "classic" cartographic techniques in urban management is thousands of years old. Elliot (1987) in his study about the evolution of city mapping; "The City in Maps: Urban Mapping to 1900", shows the clear interest of the oldest urban civilisations in the cartographic representations of their settlements.

An example of this is the fragment of the city plan of the city of Tuba (cf. Figure 4.10 a) which dates from the 4th century B.C. The plan shows the river, in the centre is Tuba and below of the city name is part of the city walls and the Shamash Gate "Great Gate of the Sun God" (Elliot 1987).

Another example is from the "679 fragments of marble tablets, bearing part of a large plan of Rome (cf. Figure 4.10 b), known as the 'Forma urbis Romae', as produced in 203-II A.D. (Elliot 1987).

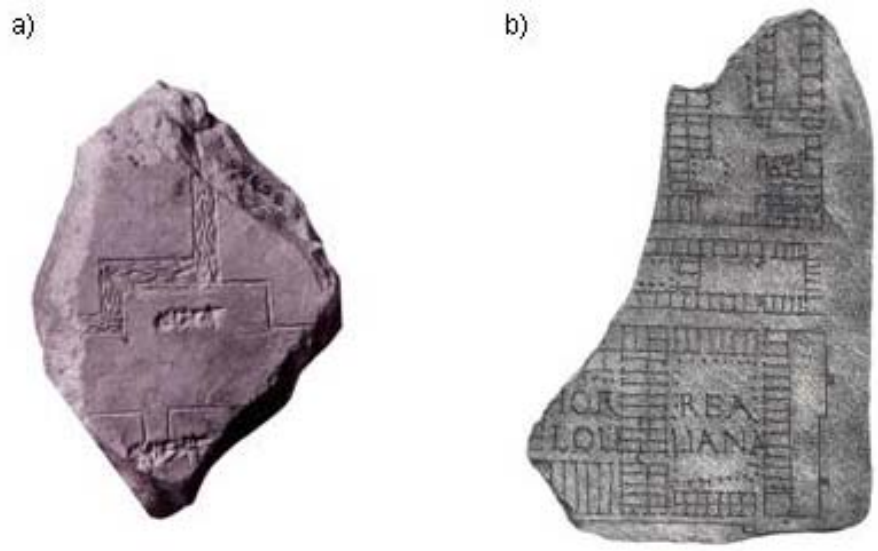


Figure 4.10: a) Fragment of a city map of "Tuba", Turky, engraved in a clay table (4th century B.C.), b) Fragment of city map of Rome, also engraved in a clay table (203-II A.D.)
Source: The British Museum adapted from Elliot 1987

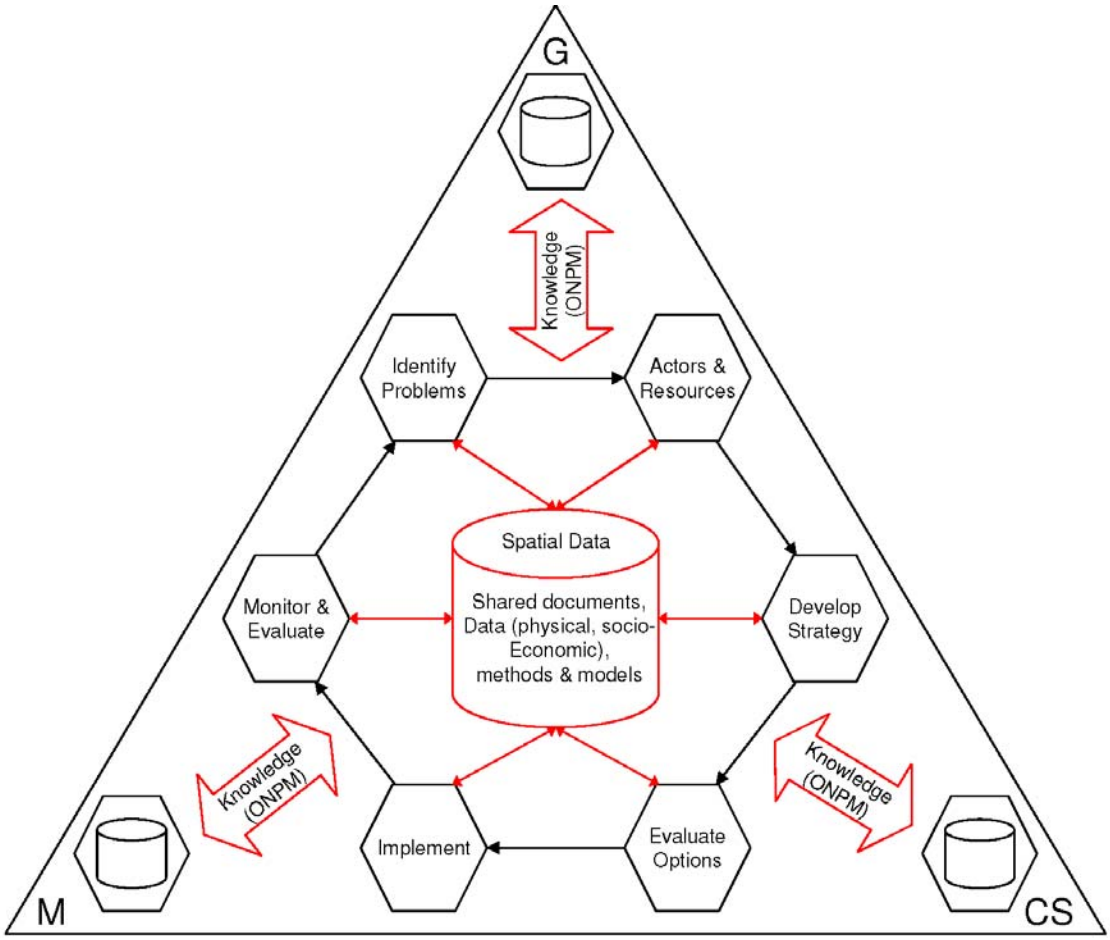
The development of the classical cartographic depiction, especially in the urban areas, continued over centuries and especially with the development around the 15th century of the bird's-eye-view and the perspective maps as a kind of 3D map at that time. **The need for hardcopy maps certainly increased because of the general education and the need for usable maps caused by this. They still reperesent a very attractive working tool, especially today, since larger-size print-outs are cheaply producable.** They offer the great advantage of "portability, good graphic quality and high image resolution, and high information density" (Elzakker 2004: 20). One of the recent developments in printing process is 3D printing technology by means of printing a real 3D solid terrain model (STM) from GIS data in few hours (www.contex.de 2006) and the LFD technology (www.tu-dresden.de/kartographie, www.mbmSystems.de) which was used in the present study. They allow a true-3D perception, while offering the advantage of a better portability due to their thinness (cf. Chapter 5)
In the 1950ies the restriction of the data content in the hardcopy maps, which is limited to the size of the sheet, was one of the critical issues involving the hardcopy maps (Tomlinson 1998). Another example where the hardcopy maps had limitations was the Canadian government project in the 1960ies, which required geographical data at national and regional level with scales between 1:250,000 and 1:20,000. The number of maps to cover the Canadian territory was extremely high; the project was one of the important reasons for putting more effort into the development of GIS (Foresman and Millette 1997, Tomlinson 1998).

The development in the fields of Internet, GIS and remote sensing technology offered great advantages in the field of urban planning, from contribution to information and knowledge exchange as a base for participation and decision- making.
One of the recent applications in the so called web mapping is “Google Earth”, where any person with internet access can have the opportunity to work interactively with “wide availability of data, and the possibility to link (his/her) own data to the maps and satellite imagery” (Kraak 2006: 128).
This use of internet technology to offer “people access to geographic information in a variety of forms, including maps, images, data sets, analysis operation and reports” comes from 10 years of development and is known as Distributed Geographic Information (DGI) (Plewe 1997). DGI can play an important role in the planning process, especially in the developed countries, whereas the less-developed and developing counties need more traditional methods for participatory planning. An example in traditional participatory planning application is discussed in the next sub-section.

Geertman (2002: 23) sees in GIS development “and communication technology (as an) instrument that supports planning processes, particularly those in which intensive public participation is a key element: such as planning support systems (PSS)”. PSS is a fairly recent term as Geertman shows in his account going back to the 1950ies-1960ies. It comprises “the three components of traditional decision-support systems-information, models and visualization” (Geertman 2002).
Different tools have been developed in the planning field which could support the decision support systems (DSS). Examples are the Spatial Multi-Criteria Evaluation system SMCE[13] or “What If”, a GIS-based PSS instrument.
The second component of PSS is the model “which includes tools for spatial interaction, analysis, expert systems, and artificial neural networks” (Geertman 2002: 23).

The recent conceptual model of a collaborative PSS developed by Sliuzas (2004) was intended to support collaborative planning and participation between the actors involved, especially from the knowledge exchange side (cf. Figure 4.11), considering important issues which had not been covered by previous models.

[13] A tool recently developed by the International Institute for Geo-Sciences and Earth Observation (ITC) and was integrated into the Geo-information software ILWIS developed by the same institute.



CS: Civil Society, G: Government, M: Market

O: Object Knowledge, N: Normative Knowledge, P: Process Knowledge, M: Method Knowlege

Figure 4.11: A collaborative PSS. Red lines are indicating the role geo-data visualization. Cf. Figure 4.12

Source: Based on Sliuzas 2004

The triangle in Sliuzas' model represents the governance triangle where the three main stakeholder groups CS, G and M are in each apex of the triangle.

The collaborative planning process (cf. Figure 4.11) appears in the center and at "the core is a set of documents, data, methods and models that are shared and developed by stakeholders throughout the planning stages" (Sliuzas 2004: 52).

The cylinder shown inside the hexagons at each apex represents the planning process and data, methods of each actor operating separately. Each actor has the potential to contribute to the planning process, which is visualized through the knowledge exchange arrow into the general cylinder in the centre of the planning process.

The knowledge exchange arrows of the 4 different types of knowledge (O-N-P-M)[14] stand at the same time for coordination and knowledge exchange in the multi-level planning framework (cf. Figure 4.12). This knowledge exchange between the diverse actors in each project is necessary especially with the positive effect on communication in the planning process as an "important element of a successful collaborative planning process" (Sliuzas 2004: 54). The other important aspect in such a process is transparency, where all the actors have access to the same information resources.

The three important issues considered by Sliuzas in the model above are the way of dealing with the diverse actors, who are the Civil Society (C), i.e. NGO's, CBO's, active associations, individuals…, the Government or the Public Sector (G) and the Market or Private sector (M).

The triangle was used as basis for the second issue which deals with the temporal dimension and the multiple level of planning. The multi-level planning framework he proposed is based on the mixed scanning approach of Etzioni. The model shows that broader development strategy as "Strategic Planning", focusing on a limited number of key concerns represented by 3 arrows (cf. Figure 4.12). At the bottom is the action planning level, which has a different frequency, focus and duration. "In contrast to the pure rational model, the whole process includes normative activities as well as positive activities…which planners and other participants may be involved in as part of a collective learning process…" (Sliuzas 2004: 19).

The multi-level collaborative PSS model of Sliuzas (cf. Figure 4.12) shows the inter-level coordination and knowledge exchange of (O-N-P-M) within the time interval. For instance, each triangle represents a model of a support system for collaborative planning on a given scale and/or period (cf. Figure 4.11); this has been discussed above in more detail. The strategic planning form on the upper level with the strategic issues which should be revised at the different times periods with inter-level coordination always with the different action plans.

The knowledge exchange arrows are relevant for controlling the different action plans and the input of information from the different action plans, which can contribute to the revised stage of the strategic plan.

The action plans are represented in different sizes, which is related to the complexity of the project, starting at different times what are the location and the "variable duration, represented by the time line attached to each action project" (Sliuzas 2004: 55).

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[14] O: representing the object knowledge related to the planning field and "it maybe subject to many deficiencies in terms of thematic content, aerial extent, temporal and spatial resolution…"
N: Normative knowledge of the values and " guiding principles upon which intentions goals are developed"
P: Process knowledge related to the planning process
M: Method knowledge which can be methods and technique important in the data handling, information processing and plan generation (Sliuzas 2004)

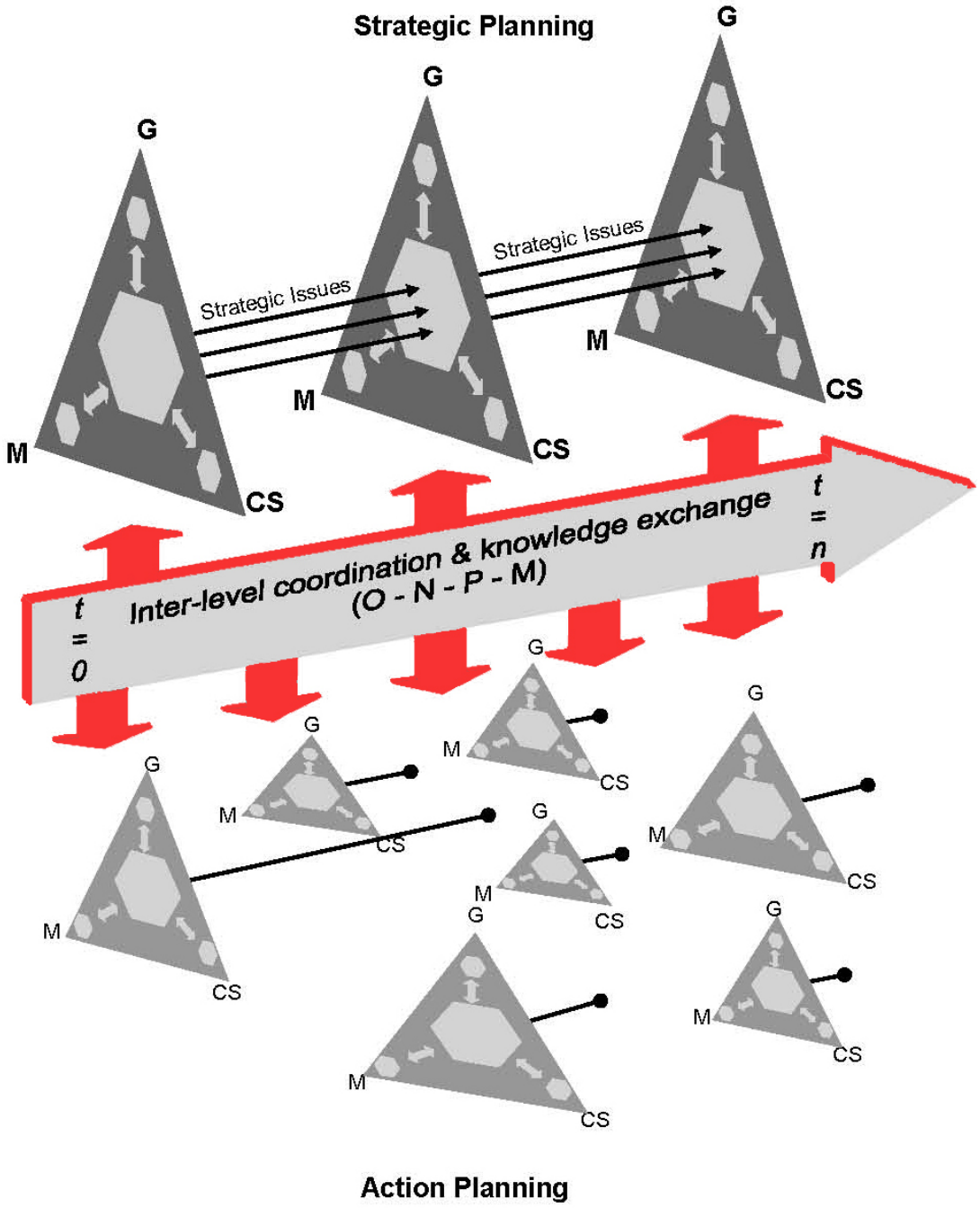


Figure 4.12: The multi-level collaborative PSS. For explanations of abbreviations see figure 4.11 and footnote 14. Red arrows are indicating the role geo-data visualization. Cf. Figure 4.11
Source: Based on Sliuzas 2004

The need for communication in the planning process, which can be a system "that facilitates knowledge-sharing and collaborative problem solving" (Campbell J.G. 2005: 3), **with the positive impact of the exchange of knowledge about the participatory planning, does not mean that this communication is always**

effective. Communication can also negatively affect the success of planning, especially at the city level where a bigger number of actors should be involved and "the establishing of effective communication between actors could be a considerable problem" (Sliuzas 2004: 54). However, providing access to information to a wider audience could lead to more resistance in the public, and moreover the reliability of data may be challenged.

Geo-data visualization can play an important role in the communication, especially because it is the language which every person knows, whatever his/her background is. **Most stakeholders are inclined to communicate more actively when topics are graphically presented.**

4.4.2 The Role of Visualization in Community Planning

4.4.2.1 Theory-Oriented Aspects

In the previous section the collaborative PSS model of Sliuzas was discussed with its multi-level planning and collaborative planning process, which is based on communication between the different actors. The implied knowledge exchange, which includes data, methods and models etc. and the benefit for the different actors coming from this knowledge exchange is an important issue in Sliuzas' PSS model. The new form of the urban planning process with more inclusive and transparent processes (cf. Section 4.2) has given a new role to the planner as a facilitator of community planning (cf. Section 4.2.7). In order to show how geo-data visualization can play a role as a component of PSS in enhancing participation in urban planning, a review of the role of visualization is made and an empirical case study dealing with geo-data visualization is presented.

It is important to understand from the theoretical point of view how humans perceive their surroundings with their senses by fusing the information from their 6 senses, it is important to look to the paper of Buchroithner (1997) in "Multimediale Kartographie, Data Integration und Information Fusion". Buchroithner discussed the 3 world model (cf. Figure 4.13) of Popper and Eccles where World One is the real world indicating the physical entities, World 3 is the spatial presentation of the environment and in the centre of World 2 is the information fusion of the individuals representing the human, senses and how the world is perceived. The 3 World models based on Buchroithners argument are intended to benefit as much as possible by looking into different methods and media based on remote sensing, image interpretation and cartographic visualization and the importance of considering the psychological and philosophical approaches as an important aspect. In Figure 4.13 the information fusion of the individuals in the centre surrounded by the different human senses which represent the role of each and how each sense can contribute in sharing this information, for example the visual sense is very well integrated as

cartographic communication presentation. Buchroithner's idea is to benefit more from the human senses by looking into tools where new media can play role in information fusion instead of the conventional 2D black and white paper maps, and in this context he wanted to improve cartographic representation to facilitate the understanding of the environment by every person in the society. The use of LFD technology as a new cartographic technique implies participatory urban planning in contrast to the conventional black and white map in the empirical case study of Tripoli, where is covered in the theoretical aspect of the discussion by Buchroithner. However, the visual sense is still one of the most used senses in the cartographic domain, covering both the visual thinking and the visual communication and this we see in DiBiase (1990), 4-stage process of geo-data visualization.

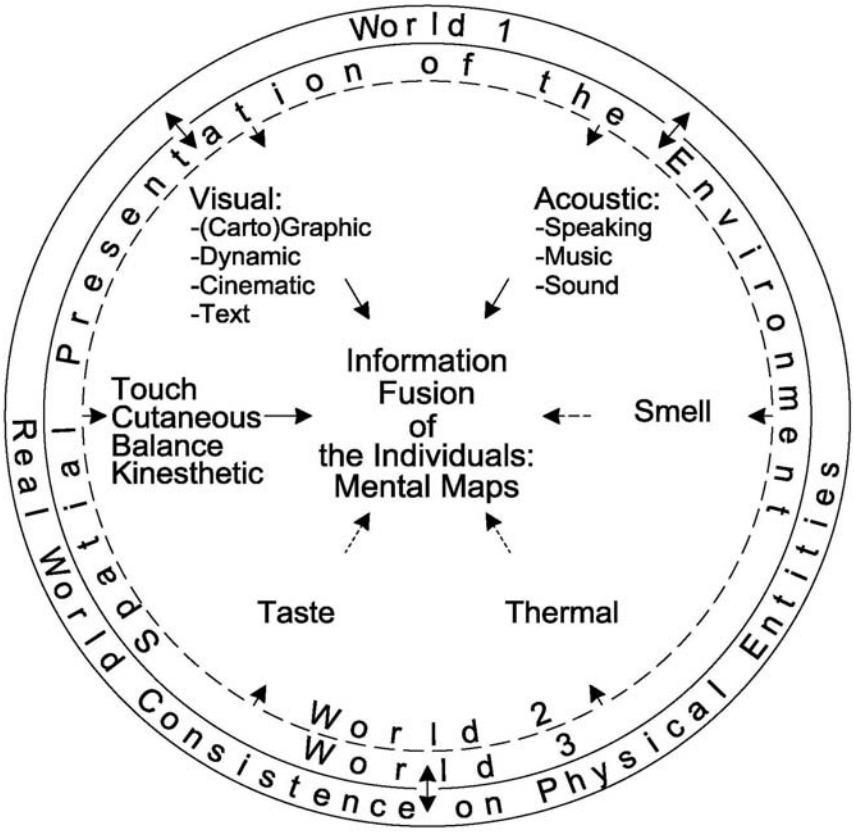


Figure 4.13: Three-world model of Popper/Eccles (1977) based on a modified graphic representation by Buchroithner (1997)

Follwoing the phrasing of DiBiase 1990: p. 14, the generation sequence of geo-data visualization (in concrete: the lenticular foil display), which is visualised in a summarized form in Figure 4.14, can be described as a sequence in 4 stages: exploration of data to reveal pertinent shortcomings and problems, confirmation of apparent relationships in the data in the current and proposed (future) situations, for

experts and laymen. The process typically begins in the rather “private” realm of one or a few specialists who are intimately acquainted with the subject.

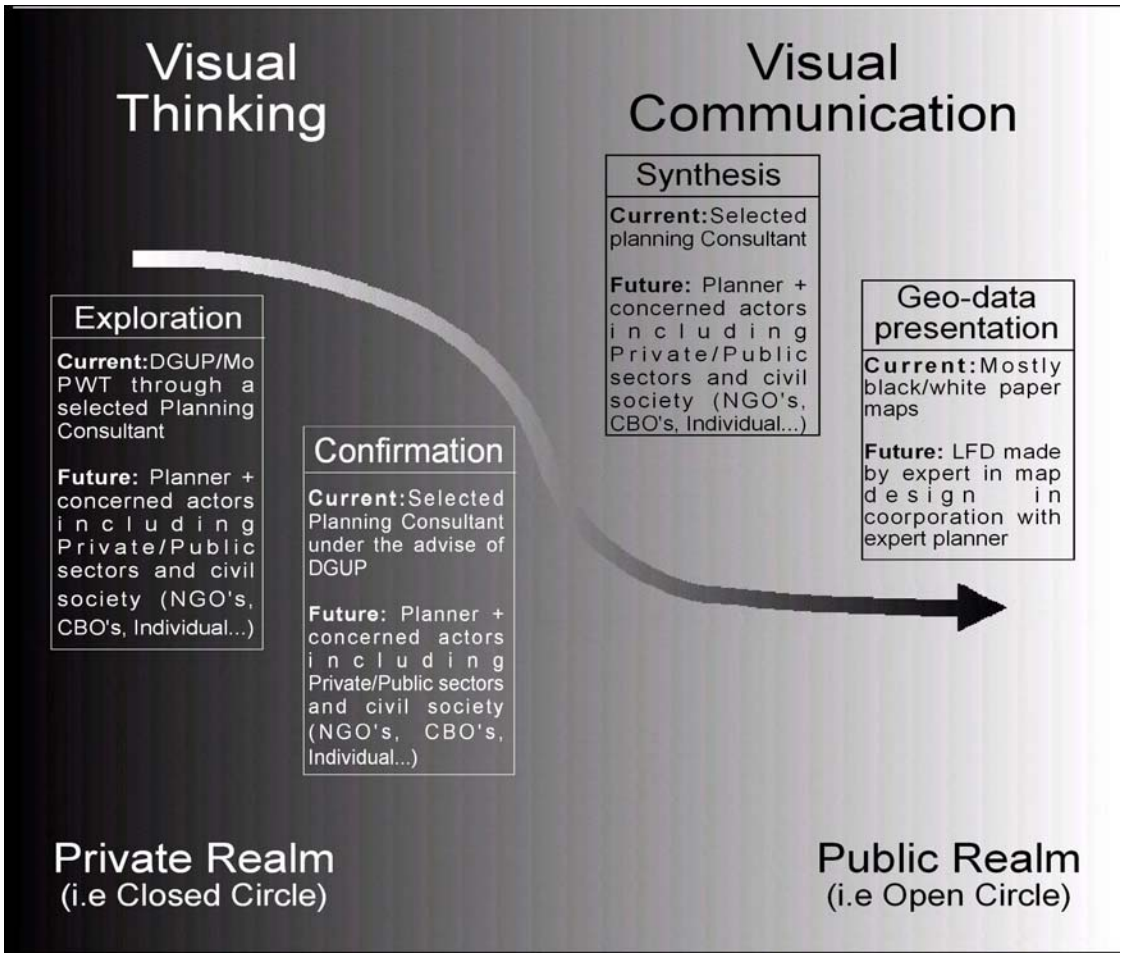


Figure 4.14: Role of geo-data visualization as a tool in participatory planning
(Based on DiBiase 1990)

As the project comes to the attention of a wider circle of peers, the initial planner's emphasis gradually shifts from answering his or her own questions to communicating ideas. Finally, the future geo-data visualization is disseminated in the “public realm” of all stakeholders concerned. The intention of the visualization evolves parallel to the progression from the “private” to the “public” realms. Visual thinking implies the generation of ideas through the creation, inspection, and interpretation of visual representations of the previously non-visible and visual communication involves the effective distribution of ideas in visual form. **Existing geo-visualization methods are already able to produce impressive information graphics.** The greatest potential contribution of new computer-based visualization tools may be in the “private “realm, i.e. in the experts’ domain, where the emphasis is rather on using remotely sensed images and other cartographic depictions to show reality.
Geo-visualization has important functions in communication in the Map Use Cube of MacEachren (2003) (cf. Figure 4.15). The three cube spatial axes involve the use of

the map by public and private groups from one side to the interaction level axis with the map because of the limited ability of the user to interact with the map and the third axis is the task of information sharing and construction of knowledge.
The theory of the map use cube can be demonstrated by the empirical case study used in this thesis in which the participants were able to communicate and share knowledge by using the LFD. The positive effect of LFD technology on the urban planning process in the case of Tripoli can be seen in the evolution of this process as shown representing the existing planning process in dark grey and the proposed planning process as light grey. As we see in the existing planning process, the planning task is limited to knowledge construction with a low level of spatial data interaction and is only to be understood by specialists. **This proposed planning process is intended to make use of new geo-data visualization, covering the planning task proper but also playing a major role in information sharing.** This implies the full integration of the public. The spatial data interaction remained not fully covered with the justification that not all the participants could be able to have interaction at a high level.

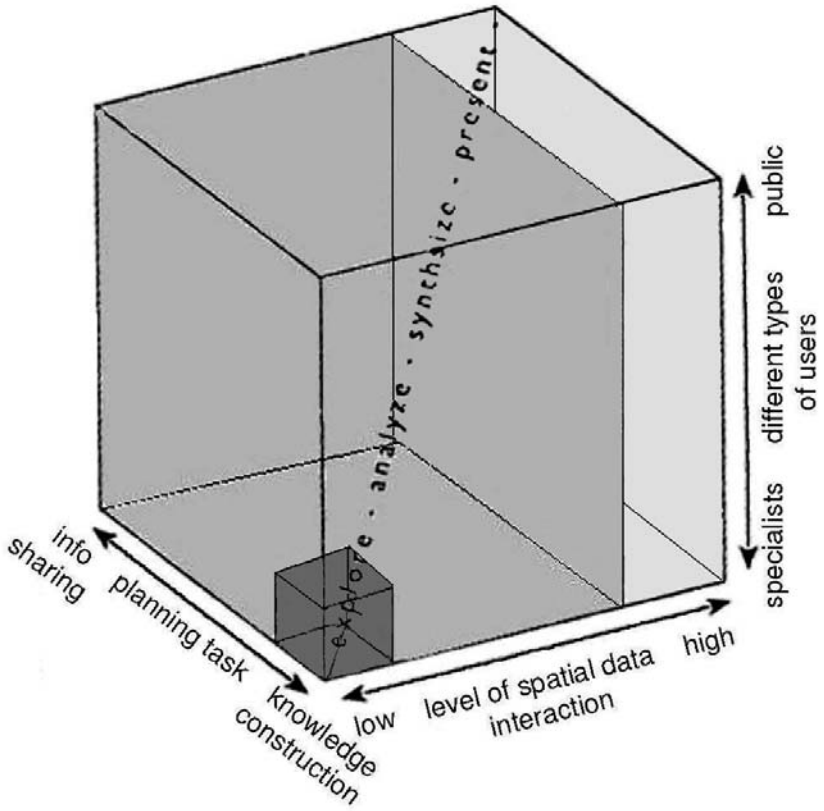


Figure 4.15: Function of geo-data visualization: current process using a black-and-white map (dark grey cube) and the proposed process using an LFD (light grey cuboid) based on MacEachren's Map Use Cube. For further explanation see text

In the issue of map conception as cartographic activity it is important to look into new ideas and methods to improve visual communication. According to Freitag during his discussion on the map conception, it is important "to consider the support that other

media of information can provide as integral (or additional) part of Cartographic communication“ (Freitag 2005: 25).

Visualization is a common language which the technical and non-technically-skilled participants can work with, discuss and become fully involved in the planning process (King et al. 1989, Appleton and Lovett 2005). Smith et al. (1998) state that communication and visualization “is at the heart of the planning system” and they see this in the visualization methods of communication between different groups and the understanding of complex information related to urban planning.
Geo-data visualization plays an important role where scientific knowledge and Indigenous Spatial Knowledge (ISK) can work well together in resource management. It is as in the case of benefit from good geo-data visualization technique integration in GIS, which can make important contributions to Participatory GIS (P-GIS), which “is expected to be participatory and make use of local people’s information …” (McCall 2002: 1).
Most attractive for the stakeholder in the visualization technique in a planning process, is that it can represent the “reality” of the object discussed. As examples solid 3D models are usually an attractive element for the participants same as the remote sensing data which the Centre for Earth Observation Programme with their project so-called “Vom Satellitenbild zur Planungskarte” shows the importance of the remote sensing data as planning and participatory tools as different level of planning (CEO 1999).
The “Virtual Reality Modelling Language (VRML) provides the basis for the majority of existing (soft) urban models on the web” (Smith, et al. 1998: 4). 3D model integration with VRML can be useful for community planning but “such approaches require appropriate hardware and software in order to view the visual information, which may limit public accessibility” (Appleton and Lovett 2005: 323). On the other hand this issue is critical in participatory planning since the discussion is related to the fact that all the public have the right to get access to the information and to use this information.
For developing countries access to the Internet and the level of knowledge of computer use should be considered. In the case of Tripoli, where the high percentage of illiterate people has to be considered (cf. Figure 3.4), All these facts speak more for a hardcopy as the more attractive way of communication when the participants feel more comfortable to deal with it and to discuss it.

4.4.2.2 Applications of Geo-Visualization in Planning

Van Elzakker, (2004) studied the use of maps in the exploration of geographic data. He focused on exploratory cartography as part of the geo-visualization concept based on the map use cube (cf. Figure 4.15) and examined the role and use of maps and maps displays. One of Van Elzakker’s research conclusions, which speaks for the hardcopy preference of the 10 participants tested that 5 of the first 7 participants

“clearly preferred to use paper maps (which) led to the decision not to allow the last three test persons to use paper maps” (Elzakker 2004: 123). It is important to add that in Van Elzakker’s research the participants almost all had a geographical and cartographic training, background and experience and were able to use computers, in contrast to the case of Tripoli. This shows more the role of hardcopy as a more attractive way of communication, where the participants feel more comfortable dealing with it and handling it.

Another PhD study by Domnick in the Bale Mountains, Ethiopia, shows the important role of cartographic visualization techniques for solving communication problems. One of the important findings in this research form the practical side was the involvement of the local authorities to construct a solid terrain model of their area as a means of communication for technical cooperation and future planning (Domnick 2005). This is only one of the many examples which show that communication by means of geo-data visualization can play an important role in getting the local population involved, by avoiding language barriers.

Solid 3D models can be a very effective visualization tool in rural areas, especially if local people are encouraged to prepare themselves with the assistance of technical staff as a basis for discussing their land use and resource management (Hue 1999).

In Kirschenbauer’s PhD study the advantage of the true-3D computer displays in comparison to flat maps was investigated (Kirschenbauer 2004). The study findings resulted in an evaluation of a true-3D display using the Dresden 3D display (D4D), which has been developed at Dresden University of Technology since 1995 (Nielsen 2006) and the use of a flat map. Kirschenbauer in her study examined the cognitive style “field dependency/independency” as an important parameter, since these two characteristics play a significant role in map reading (Kirschenbauer 2004).

Another example of participation enhancement is the project of the Social Forestry Development Project (SFDP) in Song Da, Vietnam. The project was based on spatial information technology using remote sensing data and a GIS software package. A black and white aerial photo of the region was geometrically corrected and printed in the scale of 1:5000 as orthoimage-map with a north arrow for orientation; later a transparency was placed on top of the orthoimage-map and fixed with clips for discussion and drawing. A permanent and a white-board marker in different colours were used to draw on the transparency. The visualization of the resources facilitated the discussion “without communication barriers and motivated participants to reflect and discuss about land issues” (Mueller and Wode 2003: 1).
The great advantage of this orthoimage-map was that the participants were able to discuss on the transparency over the orthoimage-map and draw “their” own land use map based on their knowledge of the study area. Later this data was digitized and inputted into GIS and a final map with layout was designed and discussed with the

participants for feedback (Mueller and Wode 2003). The integration of the GIS and remote sensing in the above example show a great potential of the preparation of a land use map based on local knowledge.

Werner (1986) discussed the role of cartographic media and maps in participatory planning and to what degree it is used in Germany by looking into different cases at different municipalities in Germany. Part of Werner's work was to analyse the effect of the used cartographic presentation in the 1980ies which was mainly limited to the conventional papers maps. Werner discusses the role and the practical contribution of cartographic communication in the planning process with a review of the visual communication methods used among the different selected municipalities in Germany which shows the importance of this visual communication methods in participatory urban planning.

The above examples demonstrate that visualization tools are important for communication between different actors in planning because they can cross the border of technocratic barriers.

The different actors should have the right to be equally involved in the planning process by making use of different visualization tools which could be most suitable in the respective situation, considering the ability of the participants. This is especially true at the urban planning level, where a poor decision can effect the future environment.

4.4.3 The Role of Geo-Data Visualization in Collaborative PSS

How can geo-data visualization contribute to the structured and collaborative strategic planning process discussed in Section 4.3.2 (cf. Figure 4.8)?

Figure 4.16 shows the elaborated planning process model based on displaying the role of geo-data visualization as a tool for effective collaborative PSS. Geo-data visualization is part of the spatial data base "barrel", which contains different types of geo-data and different methods, tools and models which all the three main actors in the society (CS, G, M) can have access to for knowledge exchange.

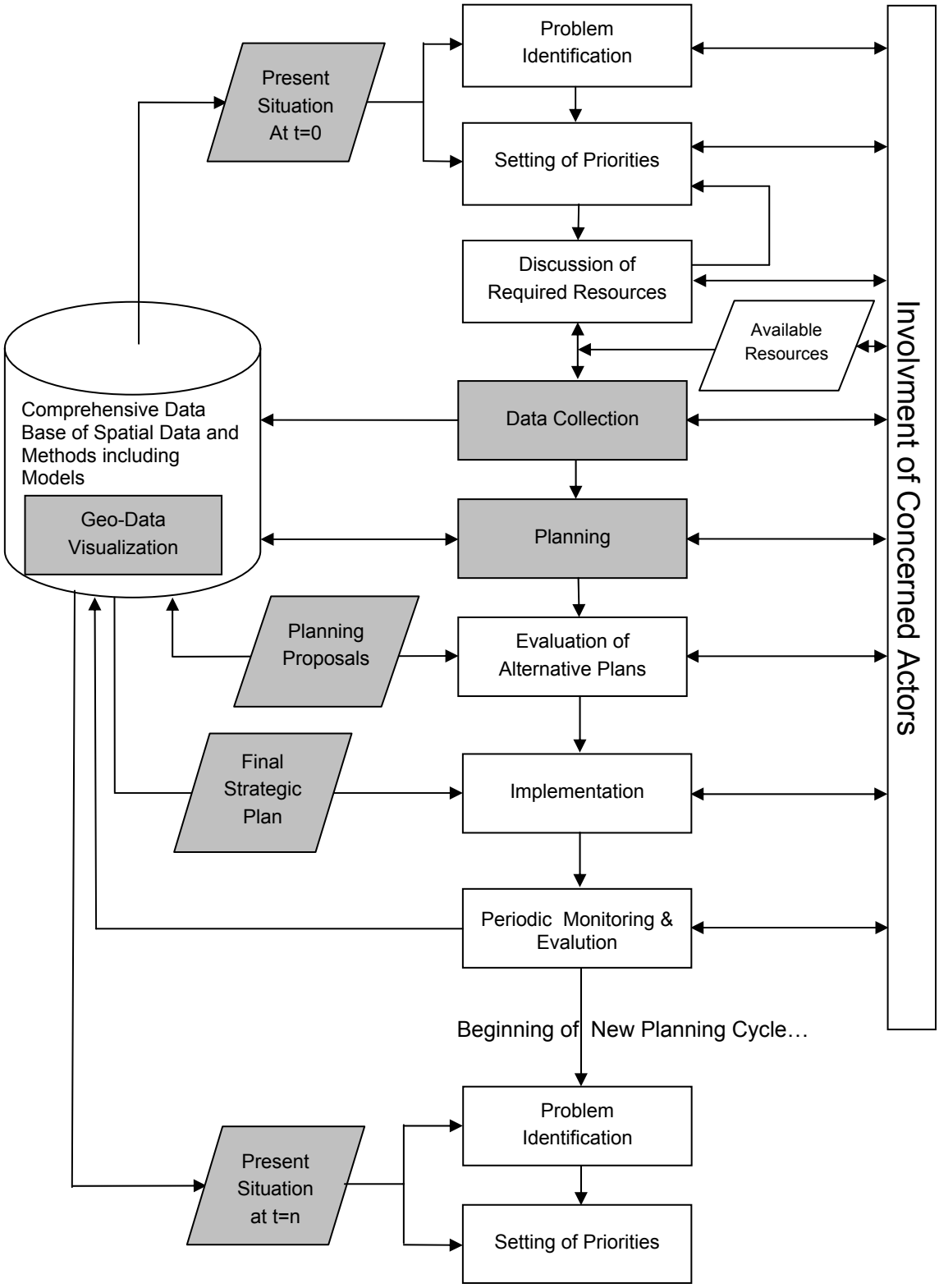


Figure 4.16: The role of geo-data visualization within collaborative PSS
Note: Explanation of different shapes of flow chart modules cf. Figure 1.3

The present situation at the time t = 0 should be visualised (based on the available data) for the actors concerned to discuss the problems and to agree on the priorities. The process can be supported by geo-imagery, as in the case of Tripoli, where available QuickBird imagery was presented to the participants in the form of a multi-flip display effect.
The stakeholders' agreement on the priorities is followed by the discussion of the required resources process with feedback and then to the setting priorities process. After the decision on the resources required the data collection process appears with an important contribution from available resources data gained from the actors concerned. When the required data has been checked with the available resources and collected it should be sent to the data base. Then the appropriate geo-data visualization process can be selected to present the geo-data to the stakeholders. In the planning process the ready proposal is sent to the spatial data base to select a suitable tool for presenting the proposal to the actors concerned. The actors concerned should give their comments in the evaluation process. Then the feedback should again make use of the spatial data and the methods and models system to prepare the final strategic plan, which should then be ready for the implementation process.
The implementation process should be followed by a periodic monitoring-and evaluation process until either a fundamental problem appears or a pre-defined plan review is required. The next cycle of plan updating starts at "time = n". Again, geo-data visualization plays an important role. Any newly gathered spatial data is very helpful and it can be easily integrated, since all the distributed data is accessible from the data base cylinder, when all actors concerned have to contribute to and can benefit from. The role of geo-data visualization tools in participatory planning where the actors can play an active role has been well demonstrated.
In Tripoli the aim was to evaluate the proposed Master Plan for 2000-2020 on the basis of multi-flip LFD and the orthoimage-map technique as an alternative geo-data visualisation technique in combination with a QuicKBird satellite image and two map layers: the current land use and the proposed 2020 Master Plan with building elevation classification.

As alternative geo-data visualisation tools the orthoimage-map was printed on normal paper and the same two map layers (present land use and Tripoli 2000- 2020 Master Plan) were printed on a transparent foil with transparent colours, where the observer could see the orthoimage-map as virtual reality background through the transparent map (cf. Section 5.2).The evaluation of both approaches is discussed in Chapter 6.

4.4.4 Lenticular Foil-Based Multi-Flip Display (LFD) for Participatory Urban Planning

This section gives an overview of the Multi-Flip Display based on the lenticular foil technique and the integration of GIS and remote sensing data. A detailed description of Multi-Flip Display generation is given in Chapter 5.

Remote sensing has always played an important role in urban planning since the 1970ies -1980ies when the application of spaceborne data in the planning field began. Albertz (1991) sees the development of geo-information systems with the integration of image processing and geo-information systems as the origin of new perspectives in the beginning of the 1990ies. At that time he stated already “that remote sensing data (satellite data) information is very important for future activities in environmental and land use planning in support of GIS and EIS” (Hartl and Klaedtke 1988: 186).

Another advantage is the development of GIS, which meant that the “planners embraced GIS technology and methodologies from their early (years of) development” for the urban planning process (Foresman and Millette 1997: 136).

The Ultra-high resolution which Quick Bird data offer nowadays “combined with high positioning accuracy, make it well suited for mapping urban areas” (Volpe and Rossi 2005: 13). The advantage of having an ultra-high resolution image as a geo-referenced background with thematic map layers is very high for GIS, particularly for the geo-data visualization.

The development of VRML contributed greatly to the softcopy, where the users have more functions to modify and interactively control the displayed data.

The lack of computer skills and the preference for hardcopies were good reasons to look for alternative visualization techniques which can be GIS- and remote sensing-based and which are useful in participatory urban planning.

Effective Geo-data visualization contributes to the development trends in the three domains of urban planning, governance participatory urban planning in several ways.

The contribution of the urban governance system which supports an inclusive and legitimate process needs more a collaborative planning process which can lead to greater commitment and accountability. In the context of greater commitment with the right of all the society actors to participate in the planning process and to benefit from the local knowledge of the local society, there is a need to look into different types of geo-data visualization as important tools and especially to link these tools into spatial data analysis systems.

The role of geo-data visualization in participatory urban planning from theoretical and practical oriented viewpoints was discussed. An elaborated model is presented and discussed as an updated version of the planning process used in Lebanon as a more collaborative process by focusing on the geo-data visualization role.

The role of geo-data visualization in participatory urban planning was tested in the case study of the Tripoli Metropolitan Area area by using the LFD technique (cf. Figure 5.1) with the Multi-flip effect and it was compared with the orthoimage-map with 2 transparent maps foil and evaluated. The generation of the Multi-Flip effect LFD hardcopy is discussed in the next Chapter and the evaluation of the technology discussed in Chapter 6.

5 Lenticular Foil Displays (LFDs): a New Tool for Participatory Planning

5.1 Introduction to Lenticular Foil Displays (LFDs)

Lenticular Foil Display (LFD) "technology is an image display method for the generation of multi-image effects like 3D visualization or animations with the capability **to spontaneously obtain these effects without additional aids for the viewer (glasses or other means for image separation, "glasses-free stereo-vision") …** (Buchroithner et al. 2005a: 1106).

The LFD method, as Buchroithner et al. 2005b described it, "uses a transparent synthetic foil for the image separation. On the upper side there are semi-cylindrical parallel micro-lenses running in vertical direction. The bottom side is plain and represents simultaneously the image plane (cf. Figure 5.1). The lenses focus incoming optical rays at the image plane, which means that focal and image plane are identical" (Buchroithner et al. 2005b: 49). The history of LFDs is closely related to auto-stereoscopic viewing and has its origin in equipment developed by the French painter G.A. Bois-Clair in 1962 (Roberts 2003).

The term lenticular "is originally an adjectival form of lens. It is merely a matter of custom that we use this word only for cylindrical lens sheet, but not for fly's-eye lens sheet" (Okoshi 1976). "Consequently, the exclusive use of this term is nowadays generally accepted as the correct name for this technique" (Habermann 2005: 77)

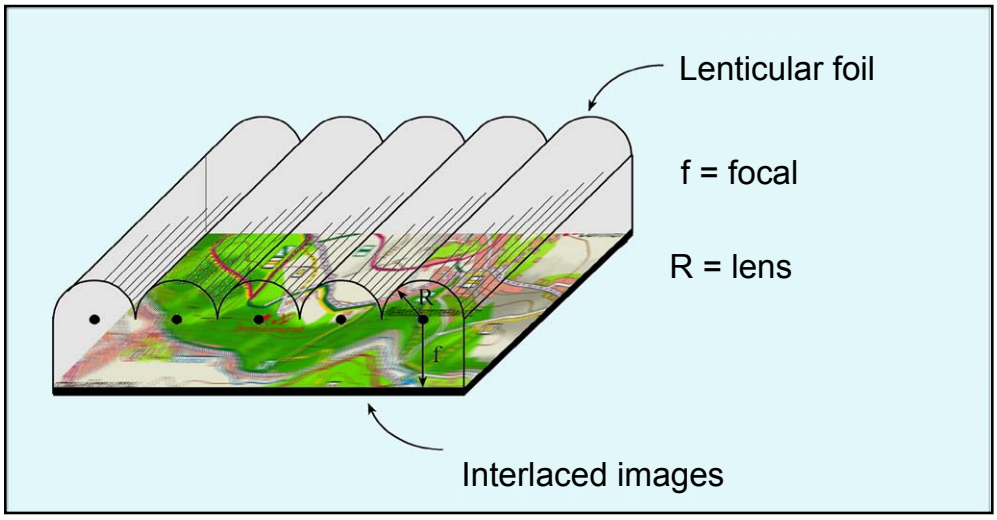


Figure 5.1: Principle of LFD technology

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Source: Buchroithner et al. 2005a

5.1.1 Effects of Lenticular Foil Displays

LFD technology offers various effects which allow us to generate “flip-image effects, short animations or true-3D displays in the form of hardcopies” (Gruendemann 2006 p.1). Table 5.1 summarizes the LFD effects in two categories: 2D and 3D effects and combined effects. “Displays with 2D effect typically have micro-lenses running in horizontal direction. Thereby a supply of the same image information to both of the viewer’s eyes is achieved. Horizontal tilting of the lenticular display then changes the image content.” (Buchroithner et al. 2005a: 1106).

Table 5.1: Effects of lenticular foil displays

2D Effects	3D Effects	Combined Effects
Flip Morphing Zoom Animation	True-3D	All combination of 2D- and 3D effects

Source: Buchroithner et al. 2005a

The present study is based on the 2D-effect and specifically on the flip effect for creating the multi-flip display hardcopy by interlacing three different geo-data layers which have been selected for the purpose of the research. The most valuable purpose for using this effect is to demonstrate “cause-and-effect” or “before-and-after” comparisons (Lenstar 2006).
Since the study focuses on the role of 2D multi-flip effects as a means of geo-data visualization for participatory urban planning, the other effects (cf. Table 5.1) are only briefly described below and are followed by a detailed description of the flip effects.

1. Animation effects: animation effects give the observer short motion sequences with a series of images.
2. Morphing effects: give transformations of one image into another by creating a continuous change of the image contents from one to the other. The start and the end image can be totally different.
3. Zoom effects: play important role, enlarging by continuous changing of a certain area with the same image content.
4. True-3D effect: is achieved by observing one object from different perspectives. This means the right eye see another scene than the left eye of the observer to give a real 3D impression.

A combination of 2D and 3D effects is also possible. For further literature about the lenticular technology and LFD application (Gruendemann 2004a, b, Buchroithner et al. 2005a, Buchroithner et al. 2005b, Habermann 2005, Gruendemann 2006).
Flip effects give the observer the opportunity to observe information. In at least 2 images with different contents (the use of more than 2 images is called a “multi-flip

effect", which is the case in the present study), observing the content of only one image is dependent on the horizontal tilting axis of the display or can be done by changing one's viewing angle (cf. Figure 5.3). The benefit of tilting is that the observer only sees the content of one image at a time, with the appropriate angle of the tilt axis giving the observer the minimum degree of cross-talk (cf. Figure 5.4). However, the use of more than 2 images can lead to cross- talk of 2 separate image contents. To reduce the cross-talk impact, the lenses should only focus on one image strip (cf. Figure 5.2), which means using of high-quality lenses and a very precise printing process.

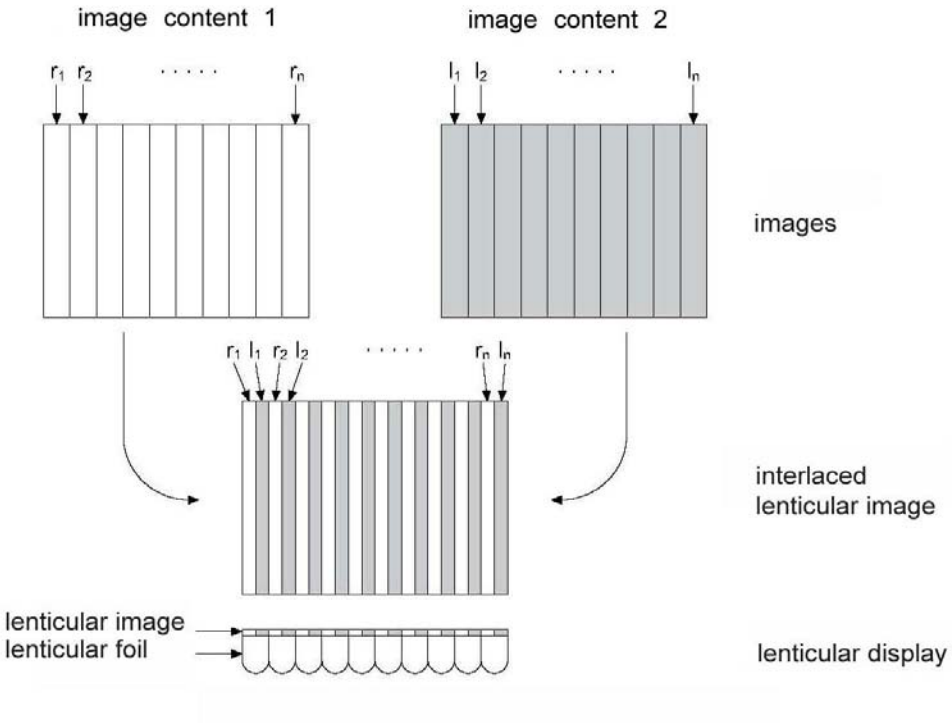


Figure 5.2: Interlacing of two different images for a 2D flip effect based on LFD
Source: Gruendemann 2004, translated by the author

An advantage of the 2D multi-flip effect in the present case study is that it gives the map reader the opportunity to extract information from different "layers" in a short temporal succession by tilting the LFD (cf. Figure 5.3). According to Buchroithner (2006: Internal lecture Notes ITC/TUD and oral communication 2006) in the present context the term "layer" involves some ambiguity: on one hand, during the data processing stage, and on the other, in a multi-flip LFD the layers occur individually, i.e. without cross-talk or biasing ("ghosting"). This implies that in a GIS the individual layers can be combined ("added"), whereas in a multi-flip LFD, this combination or "adding" is not only impossible but also undesirable. It is only an "either-or viewing" (Buchroithner 2006). Therefore, when writing about the LFD, the term "layer" is put in inverted commas.

Using GIS software the individual data sets are actual layers of a GIS data stack This means that the viewer has a “three-in-one” hardcopy (Buchroithner et al. 2005) with which it is possible to extract information form every “map layer” by tilting the hardcopy display. The weaknesses and strengths of the multi-flip display are discussed in Chapter 6.

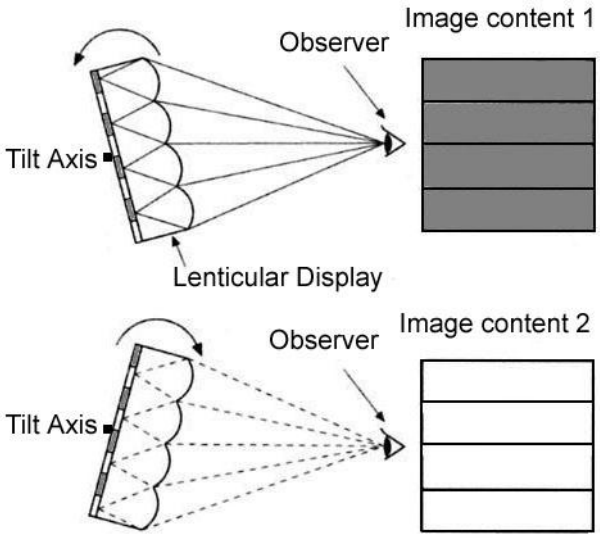


Figure 5.3: Principle of LFD flip effects
Source: Buchroithner et al. 2005c, translated by the author

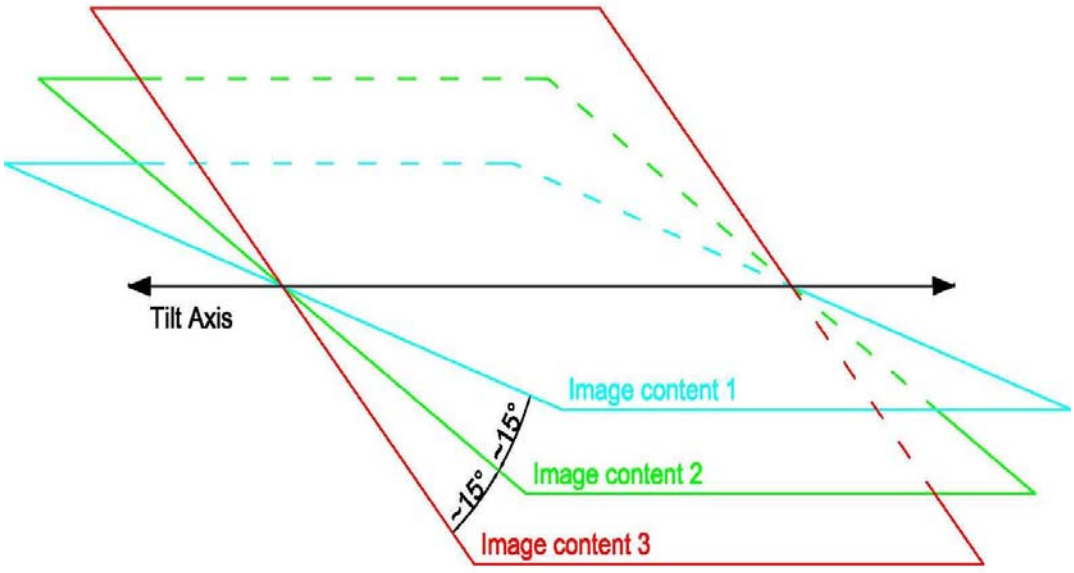


Figure 5.4: Sketch showing the functioning of a multi-flip LFD with horizontal tilting (cf. Appendix C.1: A, D + E)

In the case of the present study two, different maps with ultra-high resolution satellite imagery from QuickBird[15] are used in order to increase the active participation of all stakeholders involved in the urban planning process. The criteria of the map and the image layer selection to be used in the LFD hardcopy are discussed in the section 5.2.1.

5.2 Creating the Tripoli Multi-Flip LFD

The aim of creating the lenticular foil flip display was to develop a new visualization tool in the geosciences and using the great advantage of integrating different scenes in one hardcopy (Buchroithner et. al. 2005a)

The aim of the creation of a LFD with flip effect was to provide a tool to make it possible to evaluate the role that lenticular foil Multi-Flip techniques can play as a new visualization tool to improve the quality of the participatory planning process. The clear advantage, which is discussed in Section 6.5, is that this tool offers the opportunity to integrate different “maps layers” into one hardcopy.

The integration of a satellite image into the empirical study of the metropolitan area of Tripoli was done with the aim of offering sort of photorealistic layer, especially for the non-experts in map reading, since they are able to read images rather than normal maps.

The three layers selected for the case study were a most recent QuickBird satellite image, the recent land use map and the current Master Plan with a classification of building heights (cf. Section 1.2.1 for data selection and processing).

The efficiency of the visualization was then tested in a field study through interviews with three groups of stakeholders (cf. Chapter 6).

The generation of the multi-flip LFD has carried out in two steps: data selection and data processing.

5.2.1 Data Selection and Processing

The aim of creating the multi-flip LFD, using this technology for the first time in participatory urban planning, was to encourage the stakeholders’ involvement. This gave the data selection criteria an important role. This also applies to data processing. Both are summarized in Figure 5.4 and will be described in detail in the following sections. The role of this technology in participatory urban planning was evaluated by the participants themselves, and the results are discussed in Chapter 6.

[15] QuickBird is spacecraft carrying the Ball Global Imaging System (BGIS) 2000 camera which provides the highest resolution satellite imagery currently available in the market. BGIS offer 0.61-meter panchromatic and 2.5-meter multi-spectral resolutions. The QuickBird was launched in the 18th of October 2001from Vandenberg Air Force Base in California and circles the Earth at a 450-km 98-degree sun-synchronous orbit.

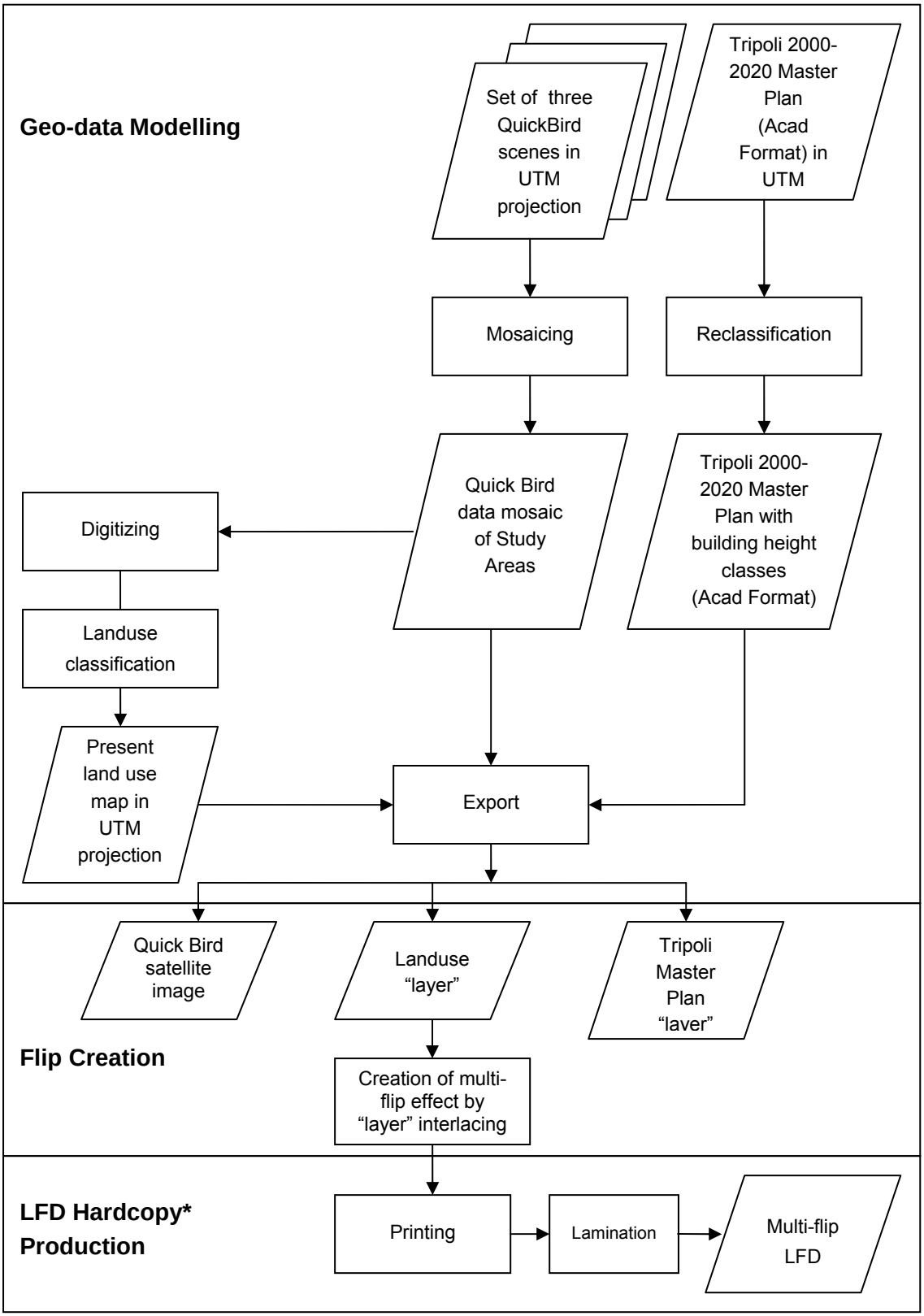


Figure 5.5: Flow-chart of multi-flip LFD production

Note: Explanation of different shapes of flow chart modules cf. Figure 1.3

* This part was carried out by mbmSystems GmbH, Dresden, Germany.

5.2.1.1 Data Selection

Selection of appropriate data is an important issue in the creation of a lenticular foil display. Current Multi-Flip Display LFD production was based on the following criteria:

1. The selection of an image from above covering the whole study area to assist the map readers to perceive their environment, since they are more able to extract information from an image than from a normal map. Three different scenes from QuickBird satellite images with a resolution of 0.61 m were selected from different period of the year 2003 (cf. Table 5.2 and Figure 5.2). The aim was to create a mosaic out of the three scenes, covering the whole study area as a background image for the Multi-Flip LFD. This means that the map reader has always the possibility of embedding his/her area of interest in the whole scene.

Table 5.2: QuickBird scenes used to create the mosaic of Tripoli

Name	Product Order Id	Map Projection Geoid Zone	Off-Nadir Angle	Earliest Acquisition Time
Tripoli	"000000076497_01_P001"	UTM WGS84 Zone 36N	14.0	2003-01-26 T08:18:04.769198Z
X2048_Tripoli	"000000046398_01_P001"	UTM WGS84 Zone 36N	13.464	2003-07-02 T08:10:16.536075Z
X2048_Tripoli (M1BS)64554	"000000064554_01_P001"	UTM WGS84 Zone 36N	7.423	2003-04-08 T08:17:17.230653Z

Source: MAPS geosystems[16] s.ar.l.-Lebanon 2005

2. The other two layers of the LFD were the two maps: the present land use map and the Master Plan with the building height classification map. Why were these two maps selected? The following two points explain the selection criteria for each map:

A. The present land use map is based on the mosaic of QuickBird satellite images, using ground control acquired during fieldwork and information from map sources

[16] MAPS geosystemes is the reseller of DigitalGlobe products for the Middle East. The latter is the main provider of QuickBird satellite data (cf. www.DigitalGlobe.com)

such as the 2000-2020 Master Plan map. The classes were selected in accordance with the legend of the present land use map (cf. Figure 5.1) in order to cover all the standard land use classes of the study area. The idea behind the selection of the present land use map was to give the map user an idea about which land use classes are to be found in his/her particular areas of interest.

B. The Master Plan with the building height map is based on the 2000-2020 Tripoli Metropolitan Area Master Plan. The 2000-2020 Master Plan was available in AutoCAD format. The reclassification process involved assigning a colour to the each class in order to simplify the map reading (cf. Section 5.2.1.2). The advantage of this map is that it involves the building height regulations and at the same time the number of floors in the residential zones, since the standard height of a floor in Lebanon is 3 m. In the this case the map reader does not need to look at the complex detail land use plan (cf. Table 2.1) to contribute in the discussion of the zone distribution, since the colours of the different classes are presented in simple manner with the attached legend (see Appendix: The MP building height class).

5.2.1.2 Data Processing

This section discusses the data processing with reference to the three “layers” of the Multi-Flip LFD hardcopy.
The data processing has been done in three steps as shown on the data processing flow-chart (cf. Figure 5.4). These three steps are geo-data modelling, Flip creation and LFD hardcopy production.

a. In the following paragraphs the geo-data modelling for the three layers is described. The three “layers” are: recent 2003 QuickBird satellite images, Tripoli 2000-2020 Master Plan and the current land use map.

    1. The “layer” “Satellite Image of Tripoli 2003” as a sort of embedding background with a mosaic of three scenes ordered and supported by MAPS geosystems (cf. Table 5.2 and Figure 5.5). Almost all the three scenes had an excellent environmental quality of 90 % and two had 0 % cloud cover and the last a 12 % cloud cover. The first scene, “Tripoli”, which had almost the same Off Nadir View Angle (cf. Table 5.2 and Figure 5.2) as the main scene “X2048_Tripoli” and cloud cover of 0 %. The mosaic was made with ERDAS IMAGINE 8.7. An area of 94.5 km² (10.5 km x 9 km) was cut out of the total mosaic to serve as a background “image” for the flip effect of the other two layers of the LFD.

2. The “layer” “Present Land Use” has been prepared by digitizing a visual interpretation of the “Satellite Image of Tripoli” layer, based on a field check. In addition, other sources such as the updated topographic map and the land cover map from of the 2000-2020 Master Plan, were checked. The class selection (cf. Figure 5.4) has already been mentioned in Section 5.2.1.2. The digitization was made with AutoCAD, since the Master Plan map is in AutoCAD format. The reclassification of the residential classes had also to be done with AutoCAD. To every class a particular colour was given (cf. Figure 5.5 and the accompanying CD).

3. The “Master Plan with Building Height Classification” was based on the Tripoli Metropolitan Area 2000-2020 Master Plan with reclassification of the residential classes used in the detailed plan (cf. Section 5.2.1). The file was received in AutoCAD format as prepared by the consultant firm; the data were re-projected into UTM WGS84 Zone 36, so that the three layers would have the same geo-reference. The reclassification was done with AutoCAD by changing the Master Plan’s residential classes into new classes based on the building height class selection criteria.

b. The second step after the layer modelling was the flip creation. This step was made by exporting the three “layers” into FreeHand. This was done for two reasons: The first one is that FreeHand is able to read the AutoCAD vector format .dxf (drawing interchange format) as well as the raster data of the satellite image. The second reason is the simple graphical attributation of the vector data. Afterwards, before the printing on the lenticular foil, a multi-flip effect was generated to test the appearance of the envisaged hardcopy (cf. enclosed CD)

5.2.2 Hardcopy Production

“For display in the form of a lenticular hardcopy, the individual partial images have to be transformed into a print file and subsequently be printed. This processed print file contains the interlaced partial images, i.e. the lenticular image. The printout can be made by direct printing on the verso of the lenticular foil using ultra-violet offset printing technology. This technique offers a high fitting accuracy of the individual interlaced image strips with the micro-lenses and is mainly suitable for high print-runs. Calibration of the printing press and the production of the printing plates are, however, very time-consuming” (Buchroithner et al. 2005a: 1108).

The actual production of the Tripoli LFD using the joint advantages of animations and flip effects, thus leading to a “three-in-one” hardcopy, has been performed by mbmSystems GmbH company in Dresden, Germany (www.mbmSystems.de). The

Multi-Flip LFD with a size of 36 cm x 42 cm was printed and finally hand-laminated in few copies only using a foil of 60 lenses/inch. The depicted terrain covers an area of 100 km², reproduced at a scale of 1:25000. Due to the hardcopy size of the product only a postcard produced in a similar way is attached in a pocket at the end of this thesis to give the reader an impression of the LFD technology in addition to the softcopy of the multi-flip effect in the enclosed CD. Full-size colour plots of the three "flip layers" used are also enclosed.

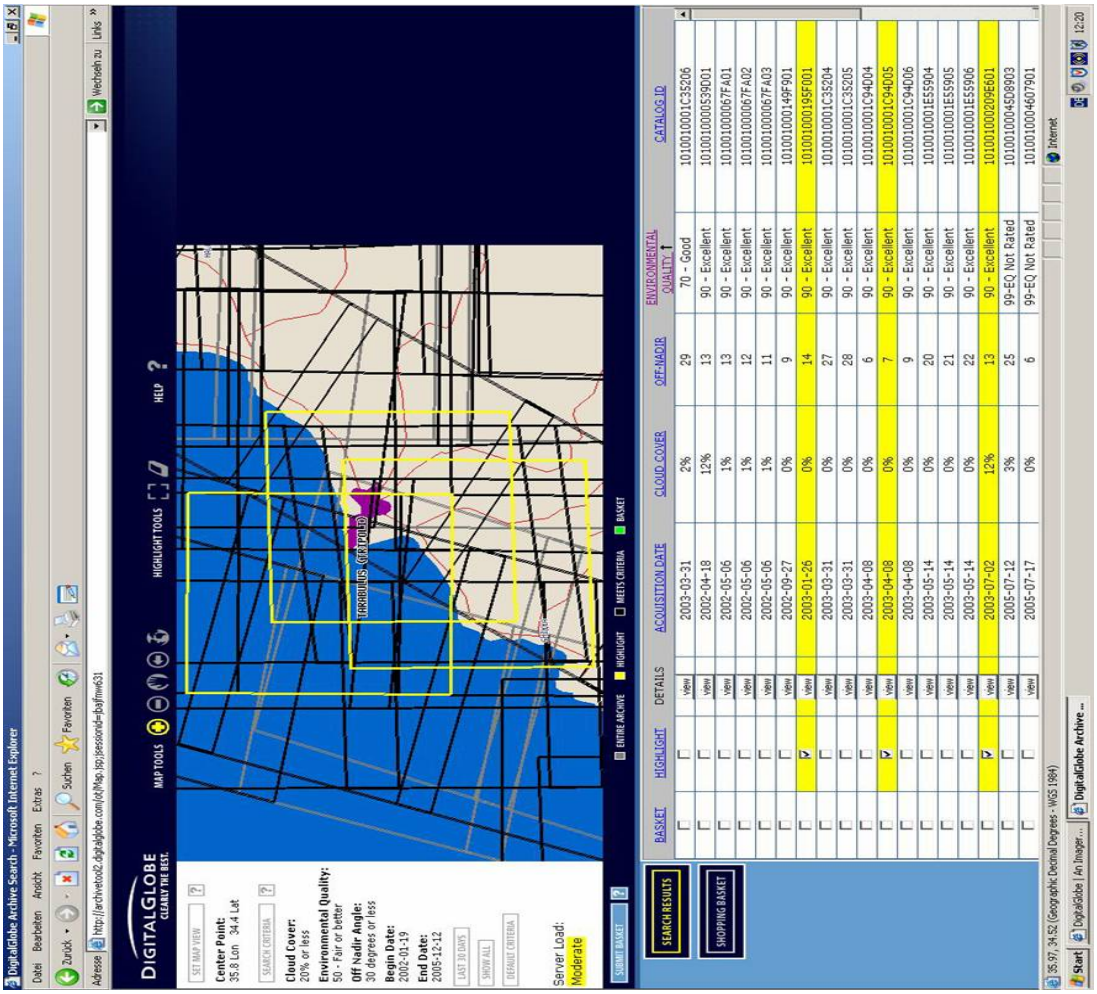


Figure 5.6: The three QuickBird scenes used (yellow bars). Data source information offered by Digital Globe (Longmont, U.S.A.)

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Source: www.DigitalGlobe.com

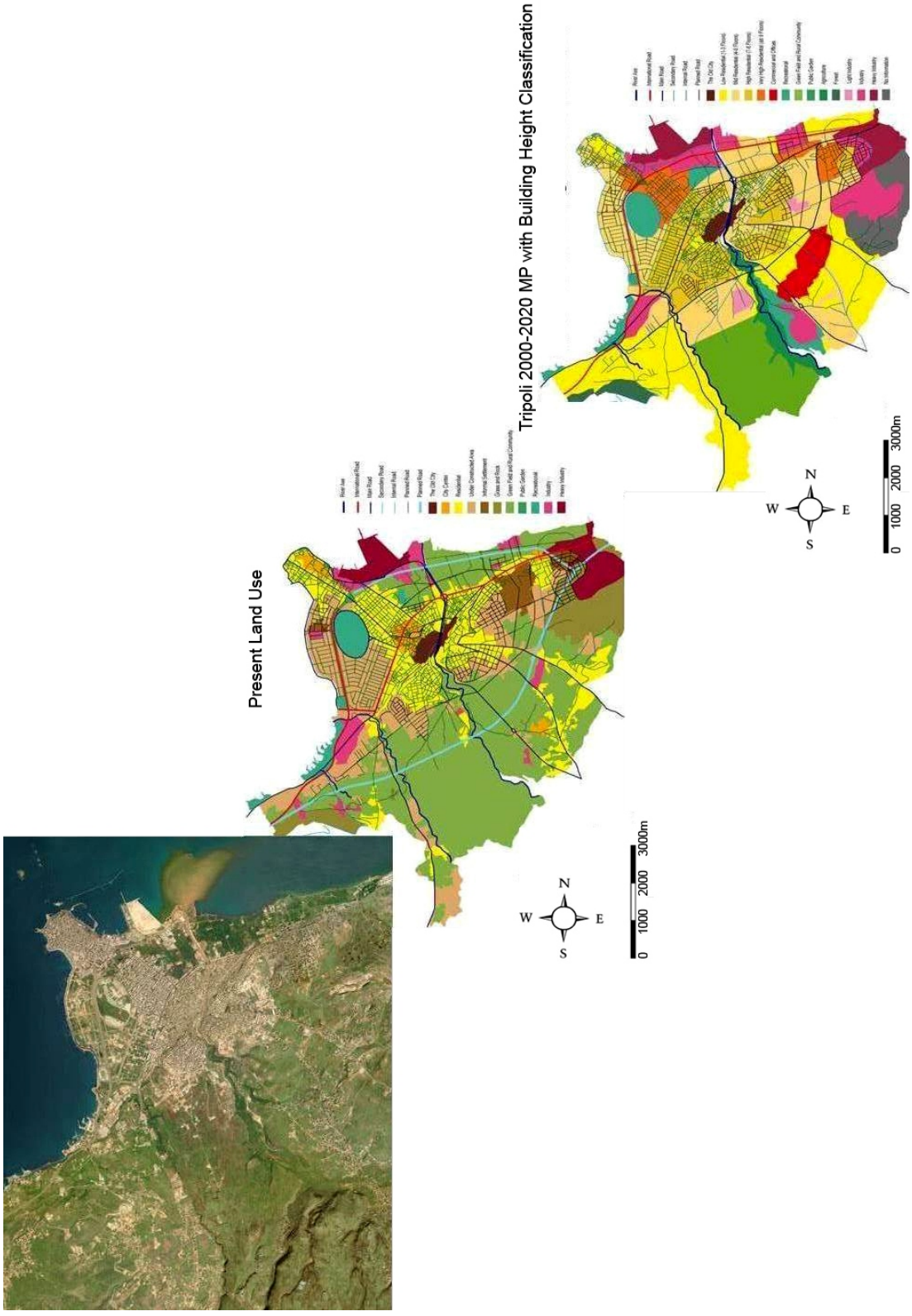


Figure 5.7: The three layers used in the multi-flip LFD. Upper left image: QuickBird scene of 2003

For the individual layers the reader is kindly referred to the enclosed CD and Maps.

6 Discussion of Results

6.1 Introduction

After a description of the generation the Multi-Flip Display in Chapter 5 and the discussion of the proposed model in Chapter 4, it is important to analyse statistically and discuss the results of the 78 interviews held in the Tripoli case study.

The questionnaires were designed to cover the three main objectives of the study (cf. Appendix B). The interview questions were divided into three groups (cf. Table 6.1).
Group A is for the stakeholders who were involved in the discussion of the 2000-2020 Master Plan (cf. Section 3.2.5), this group comprised 17 participants.
Because of a conflict in Group A in particular between the planner and a few members of group A, a new group representing more stakeholders from the civil society (cf. Table 3.6) was suggested by the President of the Tripoli Municipality (Group B). But this group (Group B) did not meet for several reasons which are discussed below.
Group C was selected by the author after a discussion with the Tripoli Municipality and it included 39 members from active NGOs, local associations, different external and local urban planners and interested stakeholders. The aim was to give so far not represented parts of the society a chance for participation. It is very interesting to look at the percentage of females within the 3 groups (cf. Figure 6.1) of interviewees' for example in Group A no females at all but if look to Group B and Group C the percentages were slightly higher.

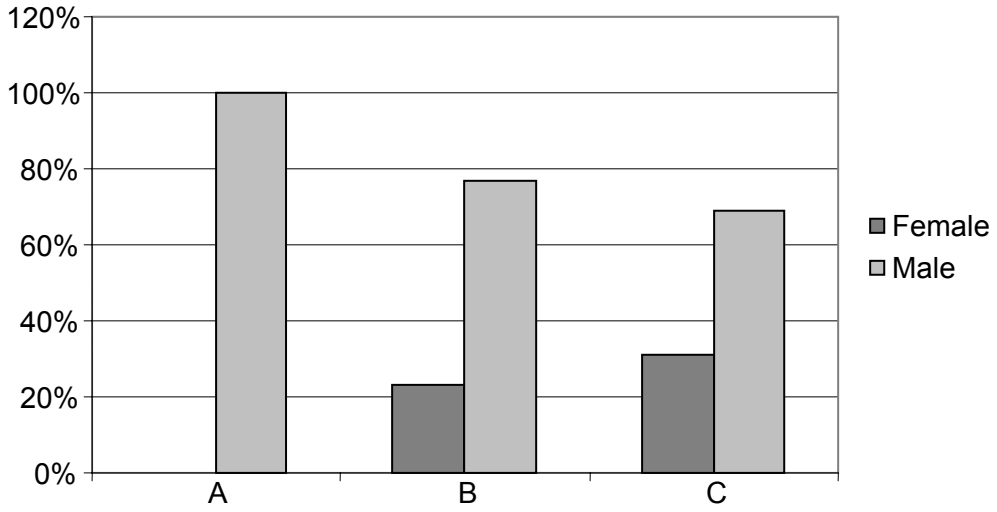


Figure 6.1: Female and Male percentegae among the three diffrents groups

6.2 Participation Effectiveness

The 3 groups were asked a set of basic questions and some additional questions for Group A regarding the effectiveness of participation in the planning process, since Group A was the only group who had the chance to participated (cf. Appendix B), the result was rather ineffective (cf. Figure 6.2).

What was ineffective in this step and why?

During the preparation of the 2000-2020 Master Plan the planner faced difficulties in convincing the committee of his ideas. His problem was that the members of the committee were mainly civil engineers[17], whose main interest was only in gaining more space for new constructions (Harmandayan 2004).

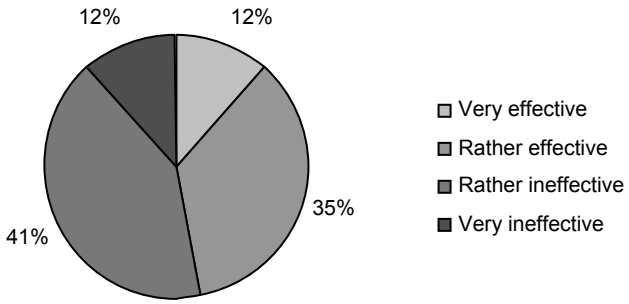


Figure 6.2: Effectiveness of the committe (Group A) participation in the Tripoli Master Plan

In Phase One of the planning process the discussion was successful in certain areas but the main conflict arose during the discussion of the first proposal draft, in which the planner was very stubborn with his ideas (Kabara 2005).

The other argument, that no community planning method for analysis of the arguments of the stakeholders was used and that in the meeting apart from the conventional paper maps no other geo-data visualization tools were presented, did not affect the participants greatly since all of them were used to this type of planning and expert in Master Plan map reading. However, the issue of tools and methods used in the analysis of the stakeholders' arguments is discussed in detail under Section 3.2.7.

The idea of the Tripoli Municipality president, to have a broader committee including mainly academics representing different organizations as not implemented as such a decision needed the approval of The Minister of Public Works and Transport. This issue was analyzed on the basis of the different group opinions as to what the reason

[17] The study of civil engineering in Lebanon is mainly related to the study of construction engineering.

was that they were not invited to participate in the preparation of Tripoli Master Plan, not only members of Group B who had been proposed by the Tripoli Municipality president but also Group C, who had the right to participate.
The different reasons which were given to the interviewees as to why the wider committee had not been formed and they were not invited to discuss the 2000-2020 Master Plan were: political decisions, financing problems, timing or other. The greatest percentage was 38 % for political reasons, followed by 28 % for "I don't know" under the alternative choice answers of "other" (cf. Appendix B).
The financing problem and the timing problem were together about 9 % and the last 25 % was divided in the "other reasons" alternating between: lack of ability, lack of experience, lack of responsibility, lack of a regulated support for such a task and the centralized system in Lebanon.
Are the existing planning processes in Lebanon unable to support such participation at all or what did the participant understand by the "exiting planning process" in Lebanon. This issue was analyzed by evaluating the planning process in Lebanon.

6.3 Evaluation of the Planning Process in Lebanon

The existing planning process in Lebanon was discussed in Chapter 2 and, as Figure 2.3 shows, participation was limited to the consultant firm which prepared the Master Plan and had to defend its proposal in the end, in front of the key stakeholders (cf. Table 2.2). To discuss the weakness of the current Master planning process in Lebanon it is important to determine the participants' understanding of the actual planning process in Lebanon.

6.3.1 Stakeholders' Understanding of the Different Types of Urban Planning Process

In this section the interview questions related to the participants' understanding of the three types of planning: Master planning, Strategic Planning and Action Planning are discussed. The aim of this part in the interview was to find out if the participants knew about different types of planning, what they understood by each type, how they evaluated their experience and what they thought about the usefulness of the different types of urban planning. The respondents were asked first if they had heard about the type of plan and if their answer was "yes" they were asked to explain what they understood about each type from their experience of this type of plan and how useful they saw this type of planning process.

Since the Master Plan is the planning process which is used in Lebanon, the result was clearly that all of the 78 participants had heard about the Master Plan and their answer to what they understand by "Master Plan" was also a common one. This common understanding of the Master Plan was that it is a land use plan for managing the distribution of the different urban land use classes in different zones.

90 % of the answers were that the Master Plan is related to construction permission in every zone. Their understanding fits well with the current purpose of such plans.
The common answer about the definition of “Master Plan” shows the technocratic side of this type of plan, especially when the participants were asked about their experiences with Master Plans.
The overall experience in the Master planning process between the respondents shows 33 % of the participants had experience of Master Plans and 26 % considered themselves very experienced (cf. Figure 6.3).
The result shown in Figure 6.3 is the result for all respondents. In the Introduction section a description was given of the three different groups which were interviewed. It was important after the result, which is summarised in Figure 6.3, to look into the different groups’ experience in the Master planning process. Figure 6.4 shows that one member of the community who was involved with the Tripoli Master Plan (group A) considered him self less experienced and one considered him self not experienced.

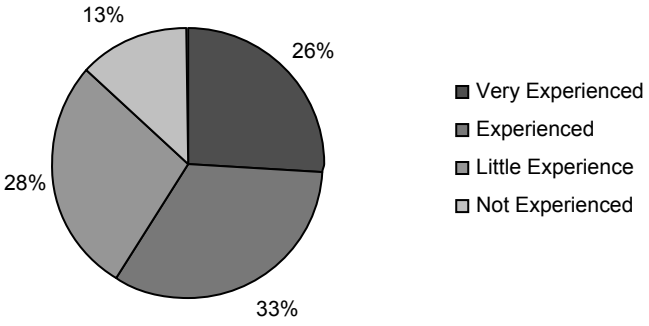


Figure 6.3: Level of experience of the respondents in urban Master Planning

The experience, of Group B represents the wider community (cf. Table 3.6). This committee was not invited to participate and the reasons why were discussed above. It is interesting to see that 8 members consider themselves less experienced and one person, not experienced at all.

This result shows that experience in Master planning was not a criterion for being a member of Group B. This could make their participation more complicated given that almost the half of the Group B members considered themselves less experienced. Or the idea was to include more participants from outside the engineering and architecture field; in this case the decision to involve less experienced participants should mean looking for community planning tools or PSS for knowledge exchange to enable effective participation.

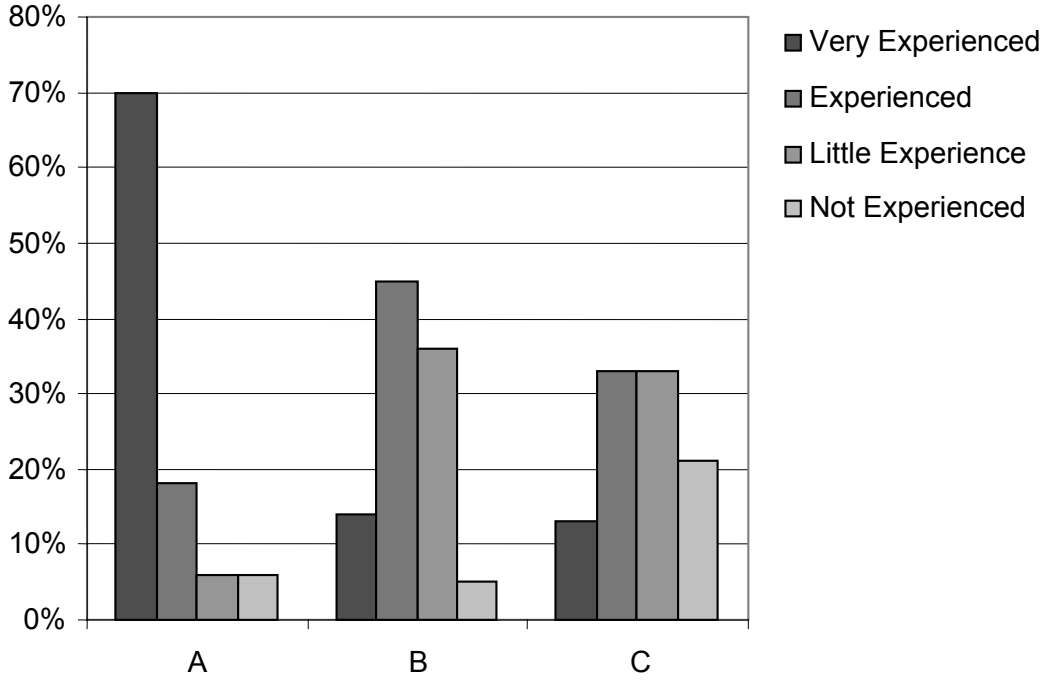


Figure 6.4: Level of experience within the respondent group regarding experience in Master Planning

The other important observation is that many members of Group C, who were totally excluded, were experienced in these types of planning.
The results show that almost the half of the participants are less experienced in the Master planning process because as they consider this type of planning as technocratic process.
This shows the urgent need to update the existing planning processes and to look into more collaborative planning processes or integrate a community planning methods and spatial visualization tools that could facilitate the involvement of every concerned actor possible.

6.3.2 Strategic Planning and Action Planning and its Potential for Use in Lebanon

The results show that all the respondents know in essence what a Master Plan is and almost the half are experienced in this type of planning. Here is the knowledge of an alternate form of planning was, however substantially less widespread. For example, in the strategic or action planning result it is shown that almost 55 % had heard about strategic planning and only 52 % had heard about the action planning process.
This does not mean that all the participants had had experience with the strategic or action planning processes. Figure 6.5 shows that about 4 % of the participants consider themselves very experienced in strategic planning and 28 % consider themselves experienced. The result of the experience level measuring in the action

planning process was that 13 % consider themselves very experienced and 24 % experienced (cf. Figure 6.6).

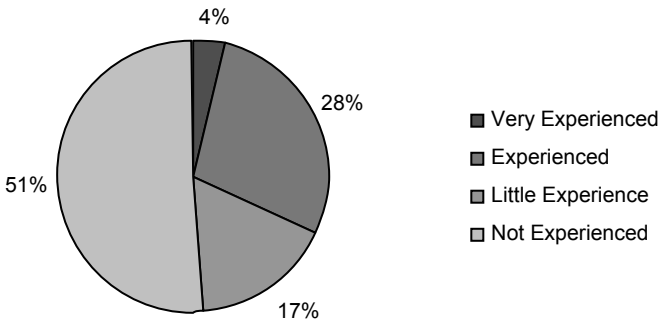


Figure 6.5: Knowledge about the strategic planning process among the participants

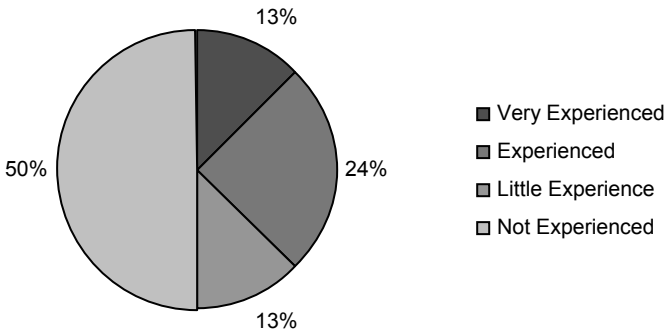


Figure 6.6: Knowledge about the action planning process among the participants

This fact that more than a quarter of the participants considered themselves to have experience with strategic and action planning is, first of all, an important result for this research.

If we look into the qualitative analysis of the understanding of the respondents on strategic or action planning we see that a common response is that strategic planning is a performance oriented type of planning with articulated strategy for achieving the goal.

The general understanding about the action planning process is that it is a short term plan that is easily applicable.

This result first of all includes some of the characteristics of these two types of plan even the most importance characteristic of these types of plan as a collaborative type of plan was mentioned by no participant.
The usefulness of the different types of plan result was that all the participants who knew only about the Master Plan see it as very useful and the respondents who knew the three types of plan see that all are very useful, since the three types of plan are interrelated in their approaches. This was the tenor of the participant knowledge of the different types of planning and their view on these types of plan from the urban perspective.
A significant number of people have had experience with strategic and action planning, which could be an important step in looking into the success of these types of plan, However, it is important to look into the answers to the questions which were related to the experience with Master Plan map-reading because if the participants are not experienced with the Master planning process it is not necessary to be experience with the reading the Master Plan maps. As Figure 6.7 shows, Group A members were all experienced with the Master Plan map-reading, unlike Group B, which had almost 14 % very experienced and 45 % experienced members, that is 41% in-experienced, which could make a contribution from this group impossible using the same types of geo-data visualisation. In Group C, which was not mentioned at all by the DGUP, 23 % of the members were very experienced and 23 % experienced with Master Plan map-reading But still more than half of them had less experience and in this case if this group will be involved like it should be this needed to look into other types of geo-data visualisation rather than the conventional paper in black and white maps in most cases.

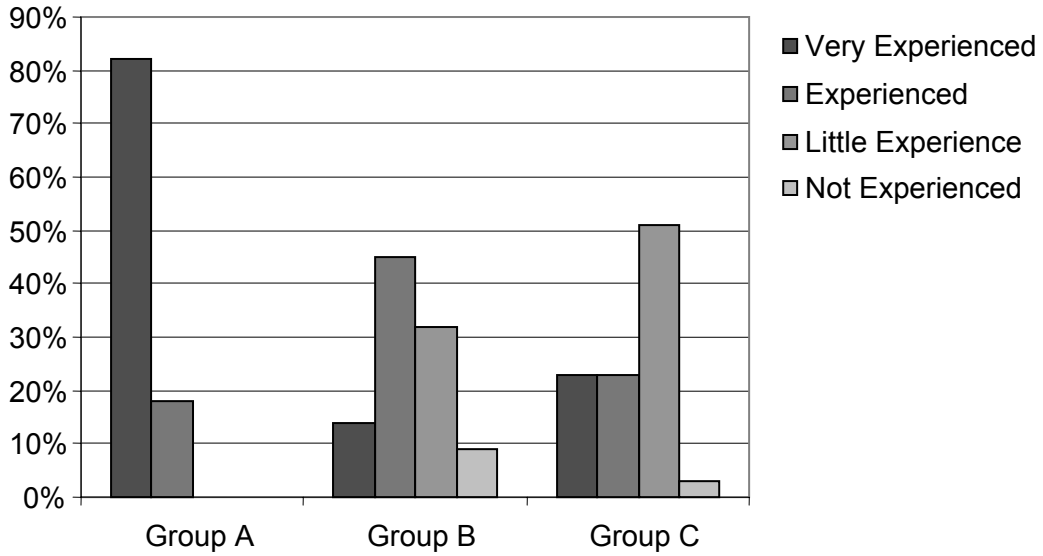


Figure 6.7: The experience with Master Plan map-reading among the three groups

6.4 Evaluation of the Stakeholders' Role in the Urban Planning Process in Lebanon

How will the municipality be able to implement a Master Plan project if it does not have the chance to be involved in the urban planning process from the beginning?
First the logical answer that the highly centralised system in Lebanon can not afford this involvement and second that only 2 municipalities in Lebanon and one federation municipality have their own engineering department (MoE 2001).
This first issue politically affects the possibility of enhancing the role of the municipality, especially because of the civil war in Lebanon which could effect the images of good governance, in which the municipality could play important role. It is important to mention that the first municipal election in Lebanon was in 1998 after 35 years).
The argument of the state is that the municipality does not have the capacity to deal with such complex task and more must be done in promoting this qualification.
In the case of Tripoli, which as one of the very few municipalities, has an engineering department it could be an advantage that the municipality can play a role in the urban planning process.
The effectiveness of this step as discussed above in Section 6.2 shows that about 50 % percent of the committee members (Group A) were satisfied with this step even though the conflict between the municipality and the planner representing the DGUP, which lasted for more than 5 years until summer 2007 is still not solved.
The reason for such a conflict has been discussed already in Chapter 3 and the result of such conflict was a reason for the DGUP to not repeat what happened with Tripoli by creating a committee from outside the DGUP. The cost in time and the demands placed on DGUP had been too great (Nakouzi 2006).
However, the DGUP did not consider that the ineffectiveness of such a step could be due to the existing planning process or the lack of tools for participatory planning rather than because it was a complicated issue which cost time and effort.
This decision of the DGUP to avoid the involvement of the societal actors and especially local government, which could play an important role in good urban governance, will negatively effect the quality level of urban governance in Lebanon.

6.4.1 Governance in Lebanon

The governance objective was discussed in detail in Chapter 4 and in particular in the issue related to urban planning. The possibility to reach a certain level of governance in the developing countries and in the MENA region, with particular reference to the case of Lebanon was also discussed in Chapter 4 (cf. Section 4.3).
The importance of governance in achieving a sustainable city was one of the main issues in the agenda of the third World Urban Forum in Vancouver, and as Friedmann (2006: 15) sees, the sustainable city dream is possible when the local

citizens are engaged in this common effort by “giving them a stake in the society of which they are part”.

From this it can be seen that inclusiveness, where all stakeholders are equally involved, is one of the main pillars of good governance. The positive impact on good governance that Lebanon could offer, as the World Bank says, is the political participation, civil liberties, free press and the large numbers of civil society organisations in the other Arab countries (cf. Table 4.1).

The negative impact on good governance is the highly centralised system in addition to the high level of corruption in Lebanon.

This interpretation is based on literature and on personal experience. The important question which appears here is, if all the effort of the UNDP and the World Bank to achieve good governance are known by the participants or if they see them as necessary at all?

To answer this question it was important to look into the number of participants who knew about the governance debate and the need for inclusiveness and equitable participation among the different actors from the society and why it is necessary or not necessary to be involved.

The answer to the question of whether the participants had heard about the international debate supporting so-called participatory planning, which means the involvement of the stakeholders from different backgrounds in planning process was 55 % who knew already about this debate and 45 % who did not know about it.

If the above result shows that only 55 % percent know about this debate this answers to the question of whether the respondents see that the involvement is necessary shows that 97 % percent of the respondents see it as necessary and one respondent who sees that this can bring more conflicts and is purely an engineering task (this respondent did not participate but was supposed to be involved as he belonged to the Group B list).

The question of why it is necessary, as 97 % of respondent see it, and because the questions were open-ended, is summarized in the qualitative analysis with common reference points.

There existed common understanding about the necessity of the different actors’ involvement in the urban planning process, first of all as a democratic issue where every person in the society should be heard.

The other answers referred to the importance of this involvement because the aim of the project is to decide on a plan which effects the environment in which the people involved live and they are the main people concerned in this decision.

An important answer was the relationship to the problem, especially the fact that these different actors and especially the civil society are near to the problem and their contribution can solve the problem faster.

Few answers refer to the urban planning that as a process and plan designing to which local knowledge and information could assist from the beginning on in order to build a clear structure to solve problems.

The 78 answers have been summarized above saying that all these actors should be involved, but the interesting thing was to look into the opinions of the participants on the level of importance of the different stakeholders' involvement in the urban planning process.
The following Sections discuss the importance of integrating a wider community into urban planning and the possibility of this integration in Lebanon and specifically in the case of Tripoli.

6.4.2 Importance of Integrating a Wider Community into the Urban Planning

The previous section shows that more than 55 % of the respondents are aware of the international debate on participatory planning and 97 % see participatory planning as necessary. The argument that all society should be integrated in participatory planning does not mean that they have the same importance but that they should be integrated into participatory urban planning.
The importance of integration of different groups of society with 4 levels of importance from very important to completely unimportant, which was categorised later under "important" and "unimportant" produces interesting results to be discussed as Figure 6.8 shows.
The highest or even the sectors where all the respondents see it as important to be involved were the municipality at the technical level and the University and Academic institutions with 100 %. An important comment on the importance of the municipality at the technical level to be involved in the planning process is that 31 % of the participant referred to the necessity of their being qualified.
This shows that there are important sectors which trust the municipality at the technical level but they are not satisfied with the existing level of qualification among the technical departments in the municipality. The same result can be seen in the UN-Habitat report entitled "Urban Sector Profile Study Lebanon" (UN-HABITAT 2004).

That the three important sectors which, in the interviewees' opinion, come at the technical level directly after the municipality are the Non-Government Organisations (NGOs), the Community-Based Organisations (CBOs) and the different syndicates with 99 %, 96 % and 93 % respectively, shows the high trust of the participants in these stakeholders.
The landowners and municipality at the political level were still relatively important with 64 % and 61 % respectively in comparison to the political and religious leaders who got a low level of importance between 47 % and 22 %.

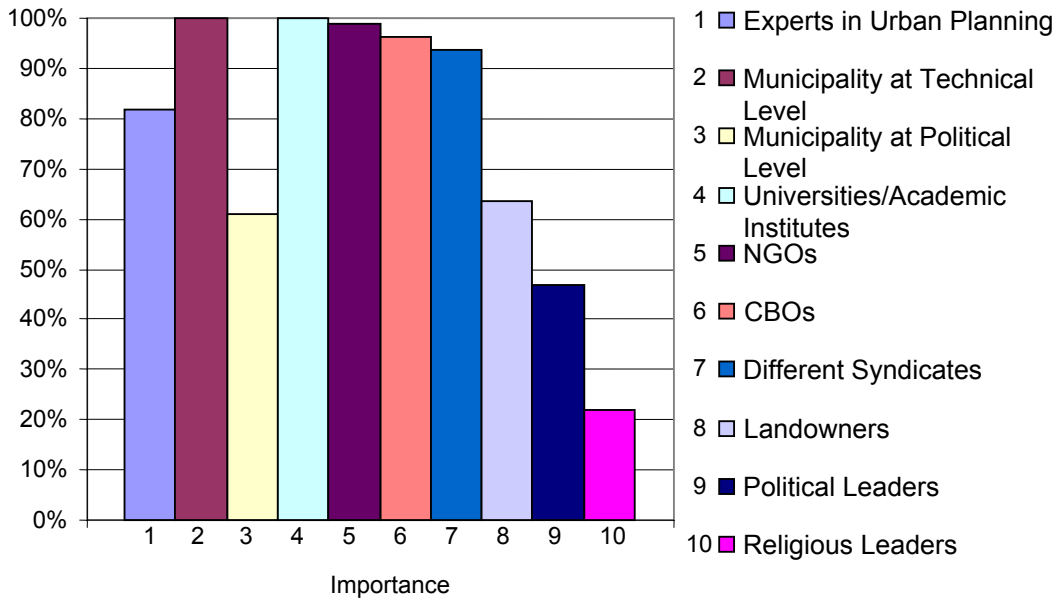


Figure 6.8: Participants' assessment of the importance of the involvement of the society's different actors in the urban planning process
For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

What is shown in Figure 6.8 does not mean that the high trust of the participants in the municipality at technical level, University/academic institutions, NGOs, CBOs and the experts in urban planning varies among the groups themselves. Figure 6.9 shows that the importance of the different stakeholders' involvement in the planning process among the groups is almost the same apart from Group B, which had relatively greater trust in the municipality at the political level and in the political leaders.

The result shows that participation is necessary and highly important, especially for building a consensus among all participants, with which the different stakeholders can play a more important role in the urban planning process (cf. Figure 6.8).

The question in this part of the interview was whether the participants saw any additional group that should be integrated and here 15% referred to the importance of the youth groups and the individual persons who belong to the civil society only and not to any organisation.

In addition a few participants refer to the importance of the environment protection organisation and the World Bank and other international organisations.

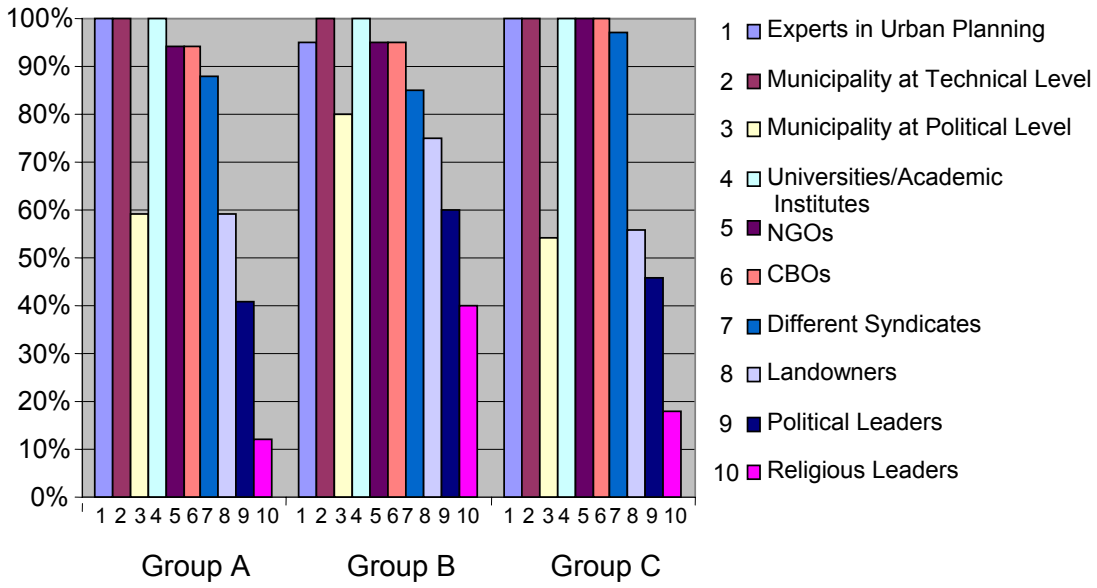


Figure 6.9: Degree of importance of the involvement of the different actors in the urban planning process

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

97 % of the participants see participatory planning absolutely necessary but the question is whether they are ready to spend time for such participation and how much time they are ready to spend. The result as Figure 6.10 shows, is that 94 % of the respondents were ready to spend a lot of time participating, 4 % to spend some time and 1 person who was ready to give only a little time and one was not willing at all.

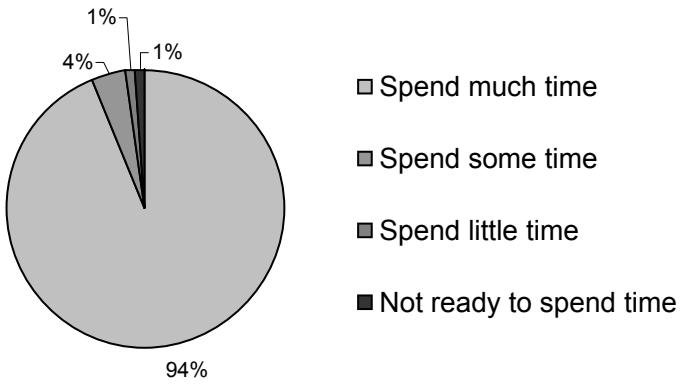


Figure 6.10: Readiness of interviewees to devote time to participatory planning

The result above shows the high interest in participation and during the field study: almost all respondents were very interested in supporting and discussing the proposed Master Plan and to share their knowledge and experience on the topics discussed.
The statement above is not only based on the author's personal interpretation. This is shown by the fact that the participants were asked if they were interested in discussing the Master Plan of Tripoli. 94 % were ready and interested in drawing conclusions and discussing their opinion on what should be done in the area of Tripoli. For some examples cf. Figure 6.10. The exact figures and percentages are given in Figure 6.10.

How geo-data visualization can play an important role in assisting in the participation on the basis of the model discussed in Chapter 4 will be discussed in the following section. The findings described are based on the empirical study of Tripoli Metropolitan Area Master Plan.

6.5 Evaluation of Geo-Data Visualization in Participatory Urban Planning

6.5.1 General

Geo-data visualization can play an important role in the urban planning process. In recent times geo-data visualization tools have started to become more important to support the involvement in the planning process of the society actors from a different background.
The selection of the appropriate means of visualization and the community planning tools in general depends upon the situation, the location, the knowledge of the participants and their ability to contribute through the visualised spatial data.
This is greatly dependent upon data availability as well as software and hardware to be used for performing the task and this can be closely related to the participants' education level and the approach to different types of visualization tools.
It is very important to gain as much benefit from GIT as possible, especially by "combining geospatial data with local knowledge and the active participation of the community creates a Community-Integrated Geographical Information Systems (CIGIS) representing and valuing themes related to community and economic development" (Elmes et al. 2005).
The term CIGIS, which is also known as Participatory GIS (PGIS) is currently one of the most discussed topic. The interest in this topic is related to the arguments discussed above on how to gain benefit from GIT in community, while planning at all the social levels.
Geo-data visualization is one of the most effective techniques for participatory urban planning if the tools are well based on a GIS. The use of the Multi-Flip

LFD and the transparent foils as alternative geo-data visualization tools is evaluated in the present case study.

6.5.2 Applied Visualization Tools and their Usefulness for PSS

In this research the Multi-Flip LFD (cf. Chapter 5) and the superimposed transparent maps were used to evaluate their role in participatory urban planning in comparison to the conventional transparent paper maps.
The assumed advantage of the Multi-Flip LFD in comparison to the transparencies is that the 3 layers are included in one product and the observer can use them easily by tilting the Multi-Flip display to view the information needed (for examples see Appendix C1 & the enclosed postcard).
To evaluate the role of the Multi-Flip LFD in participatory urban planning the participants were asked if they were interested first in discussing the 2000-2020 Tripoli Metropolitan Area Master Plan. The result was that 94 % were interested in discussing. It is interesting to see that it was the same result as for the readiness to devote time to participating in the planning process (cf. Figure 6.10). The Multi-Flip LFD was presented to the interested participants and they were asked if they were able to identify their actual location using the satellite image layer with their different areas of interest. After almost 2 minutes the participants were able to identify the different areas, started to become familiar with the product and were ready to look at the Present Land Use and the Master Plan “layers” for discussion.
The way the participants used their knowledge of the study area to orientate themselves on the image was that they based their search on particular features and landmarks. The main river, Abu Ali, and the Rashid Karami Forum Hall were frequently used (cf. Appendix F1).

A geo-referenced plastic transparency was later fixed over the Multi-Flip LFD and the participants had to select and draw, using a permanent pen. They marked, polygons indicating their areas of interest and they wrote their comments according to their map readings, the urgency of the required action and what they wished their area of to interest to look like in the future (cf. Figure 6.11). For example as Figure 6.11 shows that the four different respondents all of them selected the old city part and they focused on the poor infrastructure and social topics same as the albescence of green and open park areas the data analysis shoed that 70% of the respondent discussed this issues in the old city part.

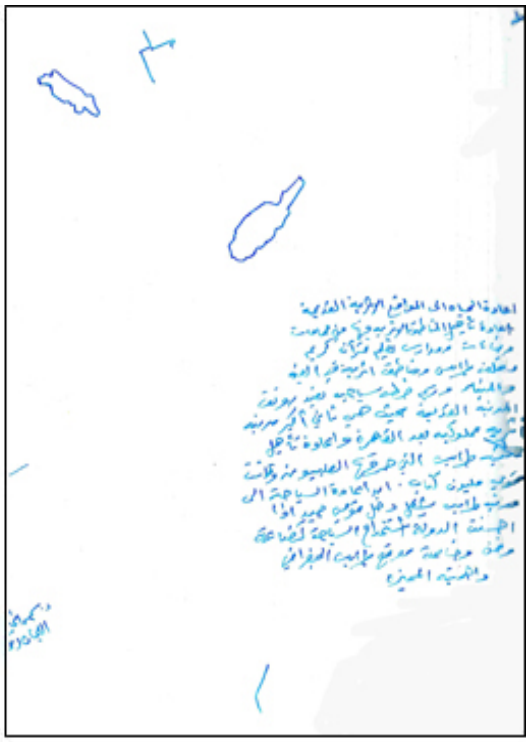
The geo-data visualization used in this study shows the role of these tools in assisting the participants in “creating” their own proposal.

The comments of the 4 respondents selected for the presentation in Figure 6.11 are considered representative and show, like the remarks of most respondents, that the

main problems in the Metropolitan Area of Tripoli are located in the old city. Respondent number 23 focused on the infrastructual problems in the old city and on the preparation of the strategic plan for the areas presently being under development. Respondent number 46 selected the two old cities in El-Mina and Tripoli and focused on the protection of the old monuments, the restoration of these monuments and the importance of this area for tourism. Respondent number 55, again, selected the old city and focused on infrastructural and heritage protection issues. He also emphasized the need for more green/parks. Respondent number 56 did not only select the old city. In addition, he outlined the city centre and expressed his opinion that this area is in urgent need for a better infrastructure and for heritage protection. Moreover, he also he criticised the lack of green and parks.
After the interviews the transparencies were scanned, imported into a GIS and geo-referenced. Since the transparencies are geo-referenced, the “sum of all personal transparency maps” of each respondent shows the areas which were most discussed among the respondents.

The purpose of the scanning was to investigate the topics of common interest which were selected by the participants. With 52 participants choosing it (cf. Figure 6.11), the old city was the most discussed class, followed by the city centre with 40 participants and the third class was the public gardens with 28. Some even had multiple interests and their choice was either related to their knowledge of their area of interest or because of their background. Few were at the same time landowners who were mainly interested in the zones under construction, for example.

Respondent 23



Respondent 46

Respondent 49

Respondent 56

Figure 6.11: Four examples of transparencies drawn and commented by participants showing some typical comments of the interviewees

The high levels of interest of the participants 71% in the old city and 55% in the city centre respectively are reflected by a qualitative analysis of the comments made by the participants. Tripoli's old city is historically very important and one of the most attractive tourist sites on the Mediterranean coast in Lebanon. The negative impact of the several Master Plans for the structure of the old city was mentioned and discussed in detail in Section 3.2 and also the impact of the Lebanese Civil War, which affected the physical infrastructure of the old city. The existing socio-economic situation in Tripoli in general and in the old city in particular has resulted in a certain identification of the old city as a residential area only for people with the lowest income or high unemployment.

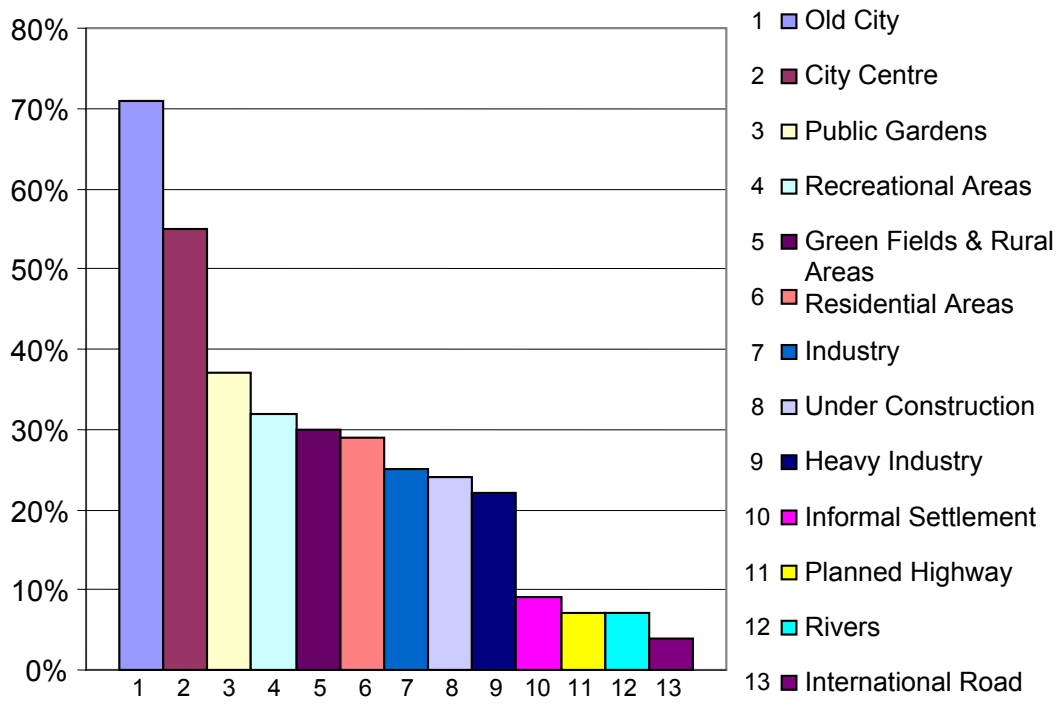


Figure 6.12: Classes outlined and discussed by the participants using map overlay transparencies

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

The above statements and the comments of the participants demonstrate that the old city urgently needs a new infrastructure, in particular traffic management and building restoration. To give an impression, several photographs of "points of interest" discussed during the interviews are shown in Appendix A.

Why the old city or the city centre were more mentioned and discussed by the participants is explained in the case study description of Chapter 3. The recently published study about the old city of Tripoli by Maha Kayal and Aatif Aateih

discusses all the various issues in more detail and shows the urgent need for a strategic plan and, even more, an action plan to stabilize the situation in the old city of Tripoli (cf. Aatieh, Kayal 2006 & UN-HABITAT 2004). The statements of the participants support their concerns and point to a strong public support for improved management of the city's heritage.
The statement above shows that Tripoli urgently needs a strategic plan to solve the issues discussed by the participants more than the Master Plan, which has taken more than 6 years and was not approved until summer 2007.
The findings described in this section show that active participation is possible and the participants were ready to spend time, express their opinions, draw their ideas on transparencies and write their comments as to what should be done and how it can be done.
The focusing on the old city area by the 52 participants shows the importance of geo-data visualization when the actors concerned have the chance to participate in formulating comment agreement on the problem identification process was carried out in accordance with the collaborative PSS discussed in Chapter 4 (cf. Figure 4.16).
All participants were impressed by the Multi-Flip LFD. This goes along the line that every participant was ready to spend time and was interested in discussing the proposed Master Plan. One of the most attractive features was the satellite image of Tripoli used as a visualisation tool.

The satellite image of Tripoli showed the participants the "reality" of the study area. It helped them to identify various locations. The integration of the satellite image as a background information was very important. 97% of the participants considered it very useful, and only 1 participant thought it was not necessary.
The idea of using transparencies over the Multi-Flip LFD for drawing and discussion was stated by all participants to be very useful. However, a few participants said that it would be more useful if the scale was larger, and a few thought that adding labels as geo-references could be useful too.

6.6 Assessment of Stakeholder Opinions of the Multi-Flip Display and Transparent Maps as a Means of Visualization

The participants were asked for their preference between the 2 types of geo-data visualisation was: the Multi-Flip LFD and the transparent maps for urban planning participation.
The results displayed in Figure 6.13 show that 31 % preferred the Multi-Flip LFD technique, 30 % preferred the transparencies maps and 39 % preferred to work with

both techniques, with the argument that both techniques are useful and important for participatory urban planning.

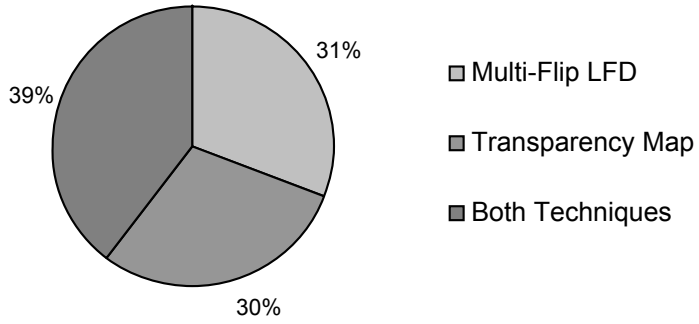


Figure 6.13 : Comparison of preferences of the test persons between the satellite image map combined with 2 transparent maps and the multi-flip LFD

The next question after the participants selected the techniques they preferred was: why do you prefer these geo-data visualization techniques?
The usual answer of those who preferred the Multi-Flip LFD is that it offers the advantage of containing in a “three-in-one” form all the needed “layers”, and the user does not need to look at different maps at the same time. The participants who preferred to work with the transparent maps appreciated the “clearness” of this technique, which the Multi-Flip LFD could not offer, even when using an ultra-high resolution satellite image. This also applies to participants who would like to work with both techniques, because they see that each one offers important qualities features which the other does not display.
The evaluation of the participants on the two types of geo-data visualization are even more interesting to look at in the light of the self assessment of the participants regarding Master Plan map-reading. Figure 6.14 shows that the participants who considered themselves experienced with Master Plan map reading first preferred mainly to work with both techniques to 46% and second with transparency maps to 33%, and only 21% preferred the Multi-Flip LFD were non experienced participants their strongest preference was firstly the Multi-Flip LFD with 51% and secondly to both techniques with 33% and only 16% preferred the transparency maps.
It is important to look into the different groups’ preferences to the two geo-data visualization presented which we can see in Figure 6.15 Group C who, are mainly NGO’s, CBO’s and the highest percentage of participants less experienced with Master Plan map reading clearly preferred the LFD. But at the same time we see an important percentage in Group A who are all experienced 24 % preferred the LFD and 41 % preferred both. That certainly means that the experienced participants preferred to work with LFD instead of the transparency map.

The weaknesses and strengths of the LFD in comparison to the transparency map and the conventional paper map are discussed in the next section.
The statements above show that the Multi-Flip LFD is an important geo-data visualisation medium to assist the non-expert or the less-experienced Master Plan map-reader. The result shows the need to make use of different geo-data visualization media which are suitable for various actors in the urban planning process and there is no single method or model. All of them should be accessible through one data base model (cf. Figure 4.16).
The Multi-Flip LFD was for the first time world-wide used as geo-data visualization medium in participatory urban planning.
The study shows that further investigations are needed to look into new media such as LFDs which are suitable to enhance participation and knowledge-sharing.

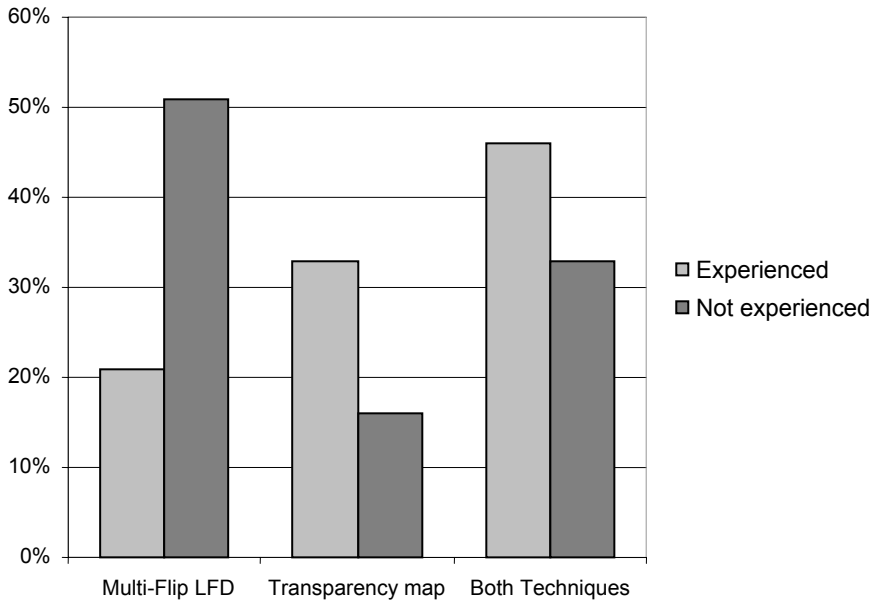


Figure 6.14 : Preferences for geo-data visualization of the participants regarding the satellite image map on paper combined with 2 transparent maps and the multi-flip LFD in relation to the participants' experience in Master Plan map-reading

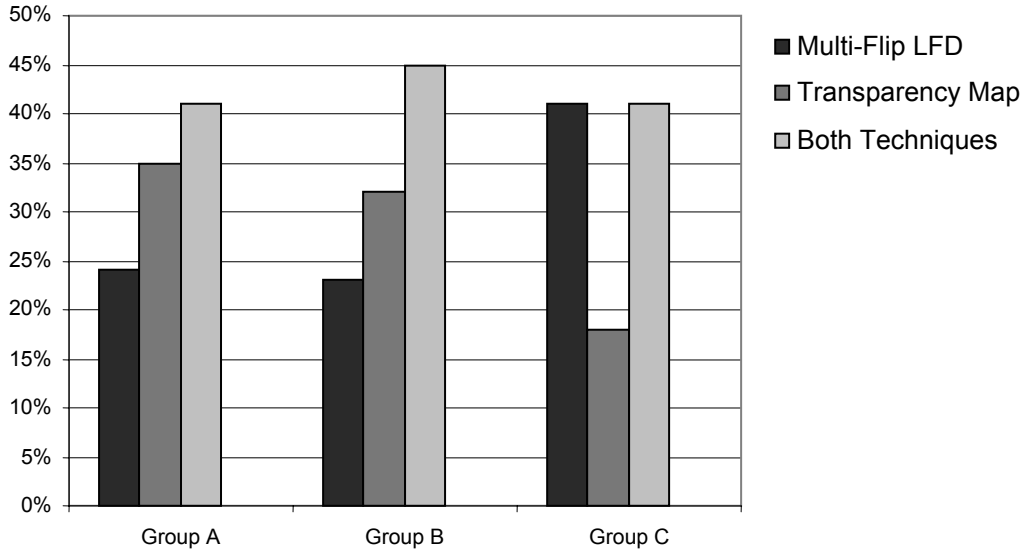


Figure 6.15: Preferences for geo-data visualization of participants regarding the satellite image map on paper combined with 2 transparent maps and the multi-flip LFD among the different groups of test persons

6.6.1 Strengths and Weaknesses of Multi-Flip LFDs as Visualization Tools

The results presented in the previous section show that geo-data visualization should be integrated into every urban planning process as one of the basic tools for participatory planning.

The strongest feature of the Multi-Flip LFD is what Buchroithner et al. called the “three-in-one“effect, i.e. the comprehension of three “layers” in one map (Buchroithner et. al. 2005). The statement above is based on the assessments of the test persons and mainly these who considered themselves as little experienced in Master Plan map-reading and who preferred the Multi-Flip LFD to transparencies. The critical comments on the Multi-Flip hardcopy (which may be considered as references to weak points) were made by those participants who preferred the two techniques or the transparencies because of the lenticular foil’s low resolution.
The opinions of the test persons on the Multi-Flip LFD and the transparency maps represent an important opinion. However, there are still “technical” aspects which are not known to the tested persons and which should also be considered as a part of the strength/ weakness analysis of the Multi-Flip LFD (cf. Table 6.2).

Table 6.1: Comparison of multi-flip LFDs and current conventional maps

Multi-Flip LFDs	Conventional Paper or Transparency Maps
Advantages	**Correspondence**
1. Good portability	Very good portability
2. "Three-in-one" hardcopy effect	Three individual copies
3. Easy location of homologue points in different "map layers" by simple tilting	Location of homologue points in separate map sheets frequently rather difficult and in separate map sheet cumbersome
4. Larger-size print-out possible (in comparison to computer display size)	same
5. No computer skills of needed by the participant	same
6. No computer plus screen needed	
7. No electric power/ no batteries needed	same
8. Easy to capture stakeholders' comments and ideas	same
9. Improvement of the role of participatory urban planning and specially the involvement of non-experts in thematic-map reading	n.a.*
10. Flexibility in "switching" (tilting) and reading more than one layers in one copy by flipping the multi-flip display (cf.3)	n.a.*
Disadvantages	**Correspondence**
1. Insufficient geometric resolution for some experienced experts	Sufficient geometric resolution for some experienced experts
2. "Cross-talk"/("ghosting") of individual "layers"	No cross-talk impact due to the individual map reading
3. Cost higher in comparison to the paper maps print out	Relatively lower in comparison to the LFD
4. Special knowledge needed for data processing and publishing	No special knowledge needed
5. No real-time access to data-base content, searching for data other than that displayed	same
6. No real-time data manipulation	same
7. Digital data storing done manually and technical equipment required (scanner)	same
8. Limited amount of spatial data integration in comparison to softcopy animation	same

*n.a. : Not applicable

The results obtained show that Multi-Flip Displays can play an important role in participatory urban planning in general and especially in developing countries and areas where the participants involved are less experienced with Master Plan map-reading and where they prefer hardcopies to softcopies.

Table 6.2 shows the advantages and disadvantages of the LFD over conventional paper or transparent maps, i.e. to offer the possibility of a higher resolution and more spatial data layers to be integrated.

7 Conclusions, Recommendations and Outlook

7.1 General Considerations

The aim of this study was to evaluate the usefulness of Multi-flip LFDs as geo-data visualization tools for participatory urban planning. In doing so it was important to look into developments in three major domains of interest: governance, urban planning and management and geo-information technology. Each of these domains has been examined in a broader perspective, looking at the respective development trends internationally, providing a reference framework for the empirical case study of Tripoli, Lebanon.

The planning process in Lebanon has not been updated for 23 years and the existing planning process is still a highly technocratic and bureaucratic process which cannot support participation of all actors from the society. The Tripoli case study has shown that some first steps have been taken to adopt more participatory planning processes, in line with international trends. The steps taken by the Directorate General for Urban Planning (DGUP) to establish a committee to follow the Tripoli 2000-2020 Master Plan planning process is important. However, 53 % of the committee members see the present procedure as ineffective in certain parts.

This thesis has shown that one of the contributing factors for this ineffectiveness is related to the lack of tools and the criteria for limiting the participation only to experts. The highly limited of the participation of broader societal forces or civil society and non-experts is one of the main reasons for the conflict which to this day has blocked the approval of the 2000-2020 Master Plan which is one of the main instruments guiding orderly and sustainable development of Tripoli. The prevailing view of government is that the planning of urban development is basically a technocratic process and that participation would foster conflicts rather than address and solve them.

This study has shown that the existing planning process in Lebanon urgently needs to be updated to be more collaborative one, in keeping with trends found elsewhere in the world where purely technocratic approaches to urban planning have been gradually phased out in favor of participatory planning processes. For example, in the German speaking regions any planning process includes the so-called “Buergeranhoerung”. This means “to listen to the citizens’ opinion”. This is done in a kind of workshop related to the types of planning. The date of the workshop should

be announced in the local news paper one month before on the notice board of public buildings same as in the internet. The workshop is at the core of the planning process and is not related to the size of the project. For every planning project, even in small districts “Buergeranhoerung” should take place and the project should be presented and discussed in an open workshop where every citizen has the right to contribute and discuss by offering different geo-data visualization, dependent on the project.

7.2 Reflections on the Tripoli Case Study

From the Tripoli case study we see that participation is possible at all social levels. What was missing was a willingness to engage stakeholders and to innovate, including in particular to adopt innovative approaches to geo-data visualization. Geo-data visualization plays an important role for different actors’ involvement, and can support enhanced participation, even for the individual participant with limited knowledge or even with no experience in map reading at all.

The scope for adopting map based participation in urban planning was examined during the evaluation of the Multi-Flip LFD. The Multi-Flip LFD readily allowed 76 participants to express their opinions and write their comments concerning the development of Tripoli. In addition they were able to draw their ideas regarding their main areas of interest on geo-referenced transparencies. This demonstrated clearly the potential of such approaches to establish effective communication across all social strata with relatively little effort and expense.

The integration of the satellite image as background onformation into the Multi-Flip LFD played an important role. For the participants it represented the “virtual reality”. Since they are very familiar with the study area they could orient themselves and identify the different specified areas within only a few minutes. The major criticism of the Multi-Flip LFD from about 30 % of the participants was the low resolution of the satellite image in comparison to the ortho-image map. This was however compensated for by its “three-in-one” effect, i.e. the ability to combine 3 different spatial related “layers” in one hardcopy. This makes it an especially attractive tool for map reading for non-experienced test persons. About 8 % of the test persons who considered themselves experienced with Master Plan map-reading preferred the Multi-Flip LFD on the basis of the fact that they can get an overview over the changes and the developments in the study area in one hardcopy only by simply tilting it.

This experience raises the question whether different planning methods and tools such as Multi-flip LFDs can enhance the participation to an extent that the government would be encouraged to reconsider its current highly centralized and technocratic approach to urban planning.

The centralized system in Lebanon is a major barrier to the improvement of urban governance. Many stakeholders recognize the potential importance of the Municipality for the technical aspects of urban planning, however 30 % of the participants expressed reservations about the technical competence and quality of the Municipality at this time. This shows that more investment is needed to promote the level of qualification of this important actor whose role is internationally recognized as being critical in urban planning and urban governance.

Although the roles of central and local government are important, the majority of the participants (77%) also recognized important groups such as NGOs, CBOs and different syndicates. Participants recommended the involvement of the universities and academic institutions which speaks for a more collaborative model and a broader engagement of civil society in Tripoli's planning process.

The lesson to be learned from this research is that the planning tradition should move towards a more collaborative planning and a flexible process which is based more on creating a shared urban development strategy than a rigid blueprint or Master Plan. The centralized systems have failed and governance can play a greater role where all the society actors should be involved.

The Multi-Flip LFD played an important role in encouraging the different participants to contribute and exchange knowledge by "map-drawing" and discussing the critical issues in their environment. Multi-Flip LFDs can be one of the visualization media but not the only one which contributes to collaborative planning support systems. More investigations are needed to increase the "clearness" of the satellite image. The selection of the geo-data visualization media is always related to the data availability and the existing situation. Community planning methods can be different depending on the respective situation.

The Tripoli case study recommends further research into the situation in the old city and city centre, which were indicated as being especially critical areas through this research. More detail investigations for these areas should involve a broad spectrum of concerned stakeholders from the public and private sectors and civil society.

Further studies are needed to improve the quality of participatory urban planning and to adopt a collaborative approach in which the identification of development problems and the finding of solutions is a shared responsibility.
It is hoped that new geo-data visualization tools like the Multi-Flip LFDs will be further developed and evaluated in such processes.

7.3 Outlook

The result of this research shows that public participation in urban planning in Lebanon's is possible and that geo-data visualization can help to enhance it. It is necessary to avoid the repetition of the previous technocratic Master Plan process. If the participants have the chance to be involved from the beginning, they will support all phases of planning. The first attempt to establish a community like the one founded in Tripoli shows that more time is needed to look into the weaknesses of the existing planning process, because it is such an important democratic undertaking. The fact that 50 % see this development as effective and their main criticism concerns the selection of architects or construction engineers only points to a technocratic legacy that will perhaps resist substantial change toward high levels of participation and shared power.

The types of geo-data visualization currently used in planning and the complexity of the Master Plan maps are barriers to participation. A positive side-effect of the present study is that the Director of the DGUP in Lebanon, who was one of the interviewed participants, actually preferred the Multi-Flip display (LFD). Thus, at least one of the leading experts in urban planning could see and evaluate the advantages of this technique. This gives hope that the DGUP will look further into the decision to establish a committee to follow the urban planning process and to support a more decentralized system by advising the local government and providing them with methods and tools instead of just preparing a ready-made Master Plan for the local government.

Geo-information technology offers a high potential to find and develop new methods and models which can be useable for every member or group in the society and to provide every citizen the chance to contribute in the urban planning process. In the long run, "the future will be digital", and interactive VR cartography displayed in true-3D allowing for real-time over flights and walk-through (Buchroithner 2005, Buchroithner & Habermann 2006) will allow all players in participatory planning to get a type of photorealistic impression of both the present time status and projected scenarios with cartographic information. But where digital technologies are not yet commonplace and many stakeholders lack the required knowledge and skills to utilize such tools, analogue GIT, such as LFD, still offers considerable potential and usefulness in participatory urban planning.
The study shows that Harcopies (still) highly recommended for developing (and even for developed countires as the recent development and investigation in the plasticlogic technology (www.plasticlogic.de), 3D physical model printer (www.contex.de and www.dimensionprinting.com) and lenticular foil technology (web.tu-dresden.de/kartographie and www.mbmSystems.de).

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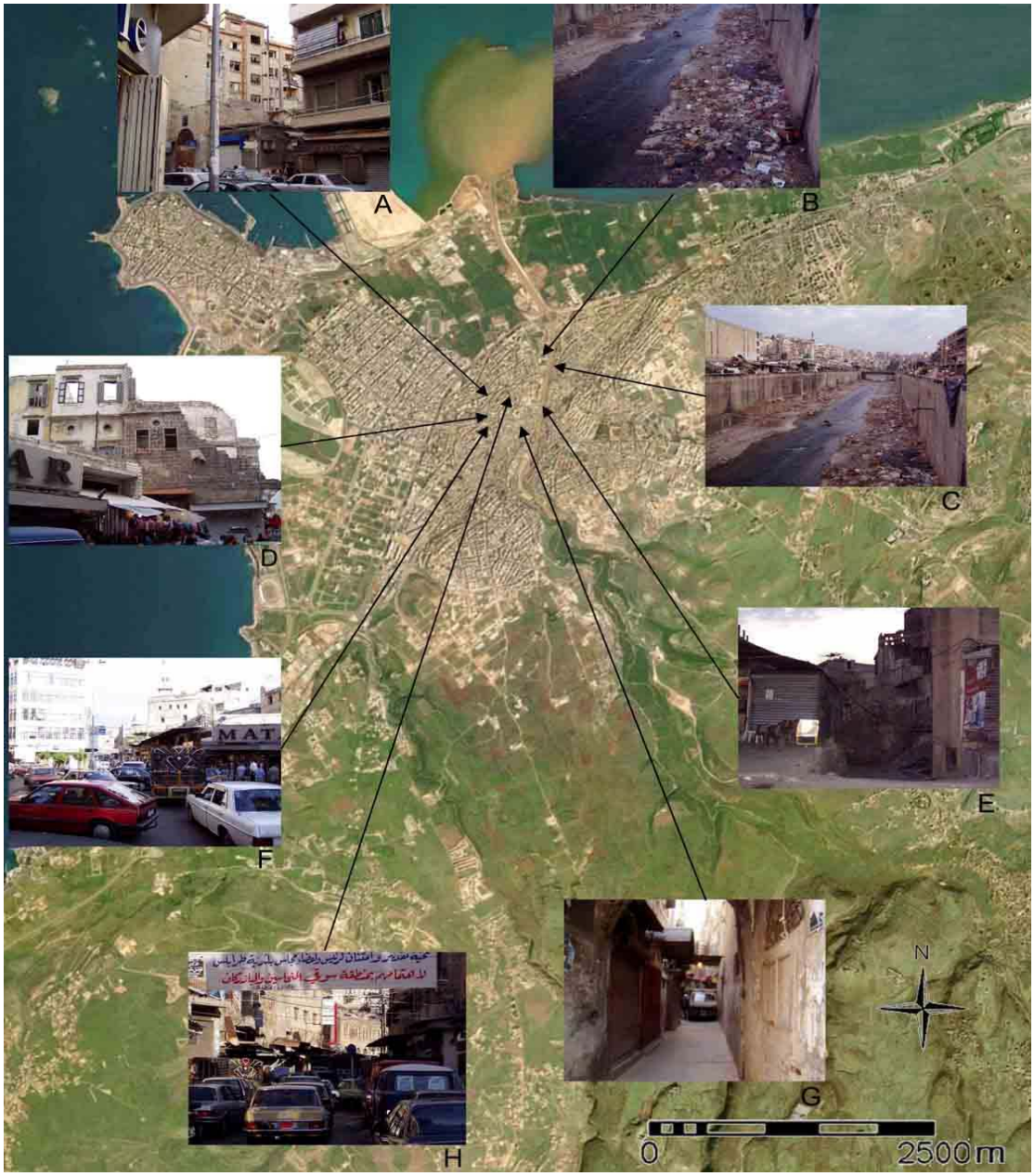
Appendix A : Pictorial Impressions of Tripoli



A: Disused buildings in the city centre

B: Waste in the Abu Ali River

C: Waste on the both sides of Abu Ali River

D: Old houses in the old city waiting for a renovation since 1990

E: Eastern entrance of the old city, which was known as the “Golden Gate”

F: Daily traffic jam at the main entrance of the old city

G: Truck locking the path into the old city

H: Daily traffic in the old city

For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Source: Based on a QuickBird satellite image mosaic from spring/summer 2003 and photographs taken by the author in August 2005

Appendix B: Questionnaires, English & Arabic Version

Questionnaire for Stakeholders Group A (English Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

Interview questions to Group A

This interview explores the need for and development of new visualization tools, which should enhance the participation of stakeholders to optimize the planning processes in Lebanon (especially in the Tripoli Metropolitan Area).
This is a PhD research project of the Dresden University for Technology, Institute for Cartography, Dresden (Germany) in Corporation with the International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (The Netherlands).

Date of the Interview:
Time of Beginning: Time of Ending:
Respondent number:

1. There are a few ways of being connected with Tripoli Metropolitan Area. Which of the following applies to you? Are you…
   (More than one case possible)

   a. an inhabitant
   b. with administrative responsibility
   c. a land owner
   d. Others:_____

A. Research questions:

2. You were one of the Stakeholders who were involved in the discussion of the Tripoli Master Plan proposal in 2002-2003. In general how do you evaluate the overall stakeholders' involvement? How effective would you say it was...and Why?

   a. Very effective
   b. Rather effective
   c. Rather ineffective
   d. Very ineffective
   e. don't know*(not to read it out)*

_____

_____

3. I will now read you a list of some activities which could be undertaken by the

planners who prepared the Master Plan of Tripoli Metropolitan Area during the discussion. Please tell me how effective you think each of the following was. Would you say they were very effective, rather effective, rather ineffective, or very ineffective? How about …

	Very effective	Rather effective	Rather ineffective	Very ineffective
Methods how the Master Plan was presented				
Timing of the meeting				
Approximate duration of the meeting				
the discussion of the Master Plan				

3a. Were there any other activities which I have not mentioned? (If a. go to the following question, if b. skip to question 4)

a. Yes
b. No

3b. Which activities were there and how do you rate the effectiveness of these activities?

	Very effective	Rather effective	Rather Ineffective	Very ineffective

4. A wider community was intended to be involved in the discussion of Tripoli Metropolitan Area Master Plan by the President of Tripoli, El Mina and El Bedawoui municipality Union. This did not take place. What do you think were the reasons for this? (possibly more than one) Would you say it was because of…

f. Political decision
g. Financing (problems?)
h. The timing
a. Others: _____

5. There has been an international debate about the so-called Participatory Planning, which means the need for integration of stakeholders from different backgrounds into the planning process. Have you heard about this debate?

    a. Yes
    b. No

6. Do you think it is necessary to integrate stakeholders from different backgrounds into the planning process or do you think it is unnecessary? (If a. go to the following questions if b. skip to question 8).

    a. Necessary
    b. Unnecessary

6a. Why do you think it is necessary? / Why do you think it is not necessary?

Necessary	
Unnecessary	

7. For each of the following groups please tell me how important you think their integration into the discussion is. Please tell me if you think it is very important, rather important, rather unimportant or very unimportant?

	Very important	Rather important	Rather unimportant	Very unimportant	don't know *(not to be read out)*
Additional experts in the planning field for assisting and explanation					
Municipalities at the technical level					
Municipalities at the political level					

Universities & Academic Institutions					
Non-Governmental Organizations					
Community Based Organizations					
Different syndicates					
Land owners					
Political Leaders					
Religious Leaders					

7a. Are there other groups which could be integrated into the planning process? (If "Yes" go to the following question, if "No" skip to the Question 8?

c. Yes
d. No

7b. Which groups could be integrated and how important do you think their integration of … is?

	Very important	Rather important	Rather unimportant	Very unimportant

8. There are different types of planning. Have you heard of the following types or have you not heard about them? What about …
(If "Yes": go to the following two questions. If "No": skip to Question 9)

	Yes	No
The Strategic Plan		go to question9
The Action Plan		go to question9
The Master Plan		go to question9

8a. Could you please tell me in few sentences what you understand by the term…?

The Strategic Plan	
The Action Plan	
The Master Plan	

8b. How much experience do you have with each of the following types of plan? Would you say you are very experienced, experienced, little experience or no experience?

	Very experienced	Experienced	Little experience	No experience
Strategic Plan				
Action Plan				
Master Plan				

8c. How would you rate the overall quality of these plans? Would you say they are very useful, rather useful, rather useless, and very useless?

	Very useful	Rather useful	Rather useless	Very useless
Strategic Plan				
Action Plan				
Master Plan				

9. How much experience do you think you have in reading a Master Plan map? Would you say that you are…?

   a. Very experienced
   b. Experienced
   c. Little experienced

d. Not experienced

Evaluating the Lenticular Foils : Presenting the Lenticular Foil with an explanation about the different layers, the meaning of each with a description of how to look to the product and give the corresponding time to become familiar with it).

10. Are you able to identify the different places on the image?

    a. Yes
    b. No

11. I will now name different zones which could be included in the Tripoli Metropolitan Area Master Plan. Please tell me with “Yes” or “No” in which of the following classes you are interested in knowing more about the future plans?

	Yes	No
International Roads		
Main Roads		
Secondary Roads		
Internal Roads		
Planned Roads		
Planed Highway		
The Old City		
The City Centre		
The Residential Zones		
The Commercial Zones		
The Recreational Zones		
The Agricultural Zones		
Green Field and Rural Community		
Public Gardens		
Forests		
Light Industry		
Industry		
Heavy Industry		
A particular neighborhood		

12. Are there special reasons why you are interested in these areas or zones?

Fixing a geo-referenced transparency on the lenticular foil

13. Are you interested in discussing with me the size and the spatial distribution of the zones, especially the zones which you mentioned in the previous question?(if a. go to the following questions if b. skip to question 15)

    a. Yes
    b. No

14. Please mark your areas of interest on the transparency.

    Time of Beginning:

14a. If you have the possibility to change the size and the distribution of the zones in these areas, please draw on the transparency what you would change, and how you think it would be better distributed.

    Time of Ending:

15. This is called a “lenticular foil technique”. In your opinion, how useful do you think it is for enhancing stakeholders’ participation? I will list several aspects which you can rate. Please tell me for each, how useful you think it is very useful, rather useful, rather useless or very useless.

	Very useful	Rather useful	Rather useless	Very useless	don’t know
Integration of image with different maps in one copy					
Different maps in one copy without image integration					
Transparency over the Lenticular Foil to discuss & draw					
Scale and size					
The left-right sequence of the maps and the image					
Other:					

16. How important do you think the integration of text, labels and other comments are in this lenticular foil?

	Very important	Rather important	Rather unimportant	Very unimportant
Text				
Labels				
Other:				

Presenting another technique: same maps printed on transparencies and geo-referenced to the satellite image.

17. Which technique do you prefer?

    a. Lenticular Foil
    b. Image and maps printed on transparency
    c. Both technique
    d. Prefer none

18. Why do you prefer … (a., b., c. or d.)?

_____

_____

_____

B. Personal Details

19. Age?

_____

20. Education?

_____

21. Current position?

_____

22. Since when are you in this position?

_____

23. Male: Female:

24. Additional notes or comments?

_____

_____

_____

Thank you very much!

Questionnaire for Stakeholders Group B (English Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

Interview questions to Group B

This interview explores the need for and development of new visualization tools, which should enhance the participation of stakeholders for the optimization of the planning processes in Lebanon (especially in the Tripoli Metropolitan Area).
This is a PhD research project of the Dresden University for Technology, Institute for Cartography, Dresden (Germany) in Corporation with the International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (The Netherlands).

Date of the Interview:
Time of Beginning: Time of Ending:
Respondent number:

1. There are a few ways to be connected with Tripoli Metropolitan Area. Which of the following applies to you? Are you…
(More than one case possible)

   b. an Inhabitant
   c. with Administrative responsibility
   d. a Land owner
   e. Others:_____

A.Research questions:

1. You were one of the Stakeholders who were selected to be invited for the discussion of the Tripoli Master Plan in 2002-2003. This meeting did not take place. What do you think were the reasons for this? (more than one possible) Would you say it was because of…

   a. Political decision
   b. Financing (problems?)
   c. The timing
   d. Others:

1. There has been an international debate about the so-called Participatory Planning which means the need for stakeholders' integration from different backgrounds into the planning process. Have you heard about this debate?

a. Yes
b. No

Continues equal to Group A questionnaire.

Questionnaire for Stakeholders Group C (English Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

Interview questions to Group C

This interview explores the need for and development of new visualization tools, which should enhance the participation of stakeholders for the optimization of the planning processes in Lebanon (especially in the Tripoli Metropolitan Area).
This is a PhD research project of the Dresden University for Technology, Institute for Cartography, Dresden (Germany) in Corporation with the International Institute for Geo-Information Science and Earth Observation (ITC), Enschede (The Netherlands).

Date of the Interview:
Time of Beginning: Time of Ending:
Respondent number:

1. There are a few ways to be connected with Tripoli Metropolitan Area. Which of the following applies to you? Are you…
   (More than one case possible)

   c. an Inhabitant
   d. with Administrative responsibility
   e. a Land owner
   f. Others:_____

C. Research questions:

2. The Lebanese government decided to prepare a Master Plan for Tripoli Metropolitan Area in 2000. You were not invited for the discussion of the Tripoli Master Plan proposal. What do you think were the reasons? (more than one possible) Was because of…

   g. Political decision
   h. Financing (problems?)
   i. The timing
   j. Others:_____

3. There has been an international debate about the so-called Participatory Planning which means the need for stakeholders' integration from different backgrounds into the planning process. Have you heard about this debate?

k. Yes
l. No

Continues equal to Group A questionnaire.

Questionnaire for Stakeholders Group A (Arabic Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

أسئلة مقابلة المجموعة (أ)

الهدف من هذه المقابلةِ هو تقيم الحاجة لتطوير أدوات مرئية جديدة، وتفعيل دور المشاركين (البلديات، النقابات، الجمعيات، الخ.) في تحضير ألمخططات التوجهية في لبنان (خصوصاً في منطقةِ طرابلس).
ان هذا المشروع هو بحث دكتوراهِ في جامعةِ دريسدين التقنية (ألمانيا) و المعهدِ الدولي لنظام ألمعلومات ألجغرافية وألأستشعار عن بعد، اينشده (هولندا).

تاريخ المقابلة:
التوقيت
بدء المقابلة: انتهاء المقابلة:
رقم المستجيب:

1. يتمثل ارتباطك بمنطقة طرابلس و محيطها في كونك...
(أكثر مِنْ احتمال ممكن)

a. ساكن
b. مسؤول اداري
c. مالك أراضي
d. احتمالات اخرى:

A أسئلة البحث:

2. لقد كُنْتَ أحد المشاركين في مُناقشةِ المخطط التوجيهي لمدينة طرابلس ومحيطها سنة 2002-2003. كَيفَ تُقَيِّمُ دور المشاركين عُموما؟ هل تَقُولُ بأنّه كَانَ. . .و لماذا؟

a. فعّال جداً
b. فعّال بالأحرى
c. غير فعّال بالأحرى
d. غير فعّال جداً
e. لا تَعْرِفْ **(ليست للقرأه)**

_____
_____
_____
_____

3. سَأطرح عليك بَعْض النشاطات التي يُمكنُ أنْ تكُونَ قد استعملت أثناء مُناقشةِ المخطط التوجيهي لمدينة طرابلس ومحيطها. الرجاء تقيم مدى فعالية كُلّ مِنْ هذه النشاطات. هل كَانت فعّالة جداً، فعّالة بالأحرى، غير فعّالة بالأحرى اوغير فعّالة جداً؟

	فعّال جداً	فعّال بالأحرى	غير فعّال بالأحرى	غير فعّال جداً
الطريقة التي عرض بها المخطط التوجيهي				
توقيت الأجتماع				
طول فترة الأجتماع				
مناقشة المخطط التوجيهي				

3a. هَلْ هناك أيّ نشاطات أخرى لَمْ يتم ذكرها؟ (إذا a. إذهبْ إلى السؤال التالي، إذا b. إذهب للسؤال 4)

a. نعم
b. لا

3b . ما هيّ هذه النشاطات وكَيْفَ تُقدّر فعالية هذه النشاطات؟

	فعّال جداً	فعّال بالأحرى	غير فعّال بالأحرى	غير فعّال جداً

4. كان من المُفترض أنْ تشارك مجموعة اخرى في مُناقشة المخطط التوجيهي لمدينة طرابلس ومحيطها بتوصية من رئيس اتحاد بلديات الفيحاء، لكن ذلك لَمْ يَحْدثْ. فما هي الأسباب التي كانت وراء ذلك؟ (أكثر مِنْ احتمال ممكن) كَانَ ذلك ...

a. قرار سياسي
b.(مشاكل؟) تَمويل
c. اختيار التوقيت
d. اسباب اخرى

---

5. هناك نِقاشُ دوليُ حول ما يسمّى بالتخطيط التشاركي والذي يَعْني الحاجة لدمج المشاركين مِن الجهات المختلفةِ ك(ألبلديات، ألنقابات، ألجمعيات، الخ.) في عمليةِ التخطيط. هَلْ سَمعتَ عن هذا النِقاش؟

a. نعم
b. لا

6. هَلْ تَعتقدُ بضرورة دمج المشاركين مِنْ الجهاتِ المختلفةِ في عمليةِ التخطيط ؟ (إذا a. إذهبْ إلى الأسئلةِ التاليةِ إذا b. إذهبْ للسؤال 8).

a. ضروري
b. غير ضروري

a6. لماذا تَعتقدُ بأنّه ضروري / لِماذا تَعتقدُ بأنّه ليسَ ضروري؟

ضروري	
غير ضروري	

7. كيف ترى اهمية اشراك كل مِنْ المجموعاتِ التالية في المُناقشة. هل تَعتقدُ بأنّه مهمُ جداً، مهمُ بالأحرى، غيرمهم بالأحرى أوغيرمهم جداً؟

	مهمُ جداً	مهمُ بالأحرى	غيرمهم بالأحرى	غيرمهم	**لا ادري (ليست للقراءة)**
خبراء إضافيون بلمخططات التوجهية للمُسَاعَدَة والتوضيح					
البلديات على المستوى التقني					
البلديات على المستوى السياسي					
الجامعات والمؤسسات الأكاديمية					
المنظمات غير الحكومية					
المنظمات الحكومية					
النقابات المختلفة					
اصحاب العقارات					
الزعماء السياسيون					
الزعماء الدينيون					

a7. هَلْ هناك مجموعات أخرى يُمْكِنها المشاركة؟ (إذا a. إذهبْ إلى الأسئلةِ التاليةِ إذا b. إذهبْ للسؤال 8)؟

a. نعم
b. لا

b7. أيّ من المجموعات يُمْكِنها المشاركة في المُناقشة و كيف تقييم اهمية ذلك...؟

	مهمُ جداً	مهمُ بالأحرى	غيرمهم بالأحرى	غيرمهم جداً

8.هناك أنواع مختلفة مِنْ ألمخططات، هَلْ سَمعتَ عن الأنواع التاليةِ؟
(إذا نعم إذهبْ إلى الأسئلةِ التاليةِ إذا لا. إذهبْ للسؤال 9)

	نعم	لا
المخطط الإستراتيجي (The Strategic Plan)		إذهبْ للسؤال 9
المخطط العملي (The Action Plan)		إذهبْ للسؤال 9
المخطط التوجيهي (The Master Plan)		إذهبْ للسؤال 9

8 a. ماذا تفهم من المصطلحات التالية باختصار؟

المخطط الإستراتيجي (The Strategic Plan)	
المخطط العملي (The Action Plan)	
المخطط التوجيهي (The Master Plan)	

8 b. ما مقدار خبرتك بكُلّ مِنْ أنواع المخططات التاليةِ؟ أأنت كثير الخبرة، ذوخبرة، قليل الخبرة أو بدون خبرة؟

	كثير الخبرة	ذو خبرة	قليل الخبرة	بدون خبرة
المخطط الإستراتيجي (The Strategic Plan)				
المخطط العملي (The Action Plan)				
المخطط التوجيهي (The Master Plan)				

8 c.) كَيْفَ تُقييم نوعية هذه المخططِات بشكل عام؟ هل هي مفيدة جداً، مفيدة بالأحرى، عديمة الفائدة بالأحرى او بدون فائدة؟

	مفيدة جداً	مفيدة بالأحرى	عديمة الفائدة بالأحرى	بدون فائدة
المخطط الإستراتيجي (The Strategic Plan)				
المخطط العملي (The Action Plan)				
المخطط التوجيهي (The Master Plan)				

9. ما هي درجة الخبرة لديك في قراءة خرائط ألمخططات التوجهية ؟ انت ...؟

a. كثير الخبرة
b. ذو خبرة
c. قليل الخبرة
d. بدون خبرة

تَقييم the Lenticular Foils Displays: مع توضيح حول الطبقاتِ المختلفةِ و شرح كَيفَ يتم استعمال هذه التقنية.

10. هَل باستطاعتك تَحديد الأماكن المختلفة في الصورة؟

a. نعم
b. لا

11 . سَأذكر لك الان مناطقَ مختلفة يتضمّنها المخطط التوجيهي لمدينة طرابلس ومحيطها. أي المناطق التالية يهمك ان تعْرف أكثر عن مستقبلها. رجاءً أجب بنعم او لا ؟

	نعم	لا
الطرق الدولية		
الطرق الرئيسية		
الطرق الثانوية		
الطرق الداخلية		
الطرق المُخَطَّطة		
الطرق السريعة		
المدينة القديمة		
وسط المدينة		
المناطق السكنية		
المناطق التجارية		
المناطق الترفيهية		
المناطق الزراعية		

الحقول الخضراء والمناطق الريفية		
الحدائق العامّة		
الغابات		
الصناعة الخفيفة		
الصناعة		
الصناعة الثقيلة		
أحياء مجاورة		

12. هَلْ هناك أسباب خاصّة لاهتمامك بهذه المناطق؟

_____

_____

_____

تَثبيت الورقة الشفّافة على Lenticular Foil Display

13.هل لديك اهتمام بمُنَاقَشَة الحجم والتوزيع المكاني للمناطق، خصوصاً المناطق التي ذكرتَ في السؤال السابق؟ (إذا a. إذهبْ إلى الأسئلةِ التاليةِ إذا b. إذهبْ للسؤال 15)

a. نعم
b. لا

14. الرجاء تحديد المنطقة التي تهمك أكثر على الورق الشفاف!

Time of Beginning:

14 a. اذا توفرت لديكَ الإمكانيةُ للتَغييرفي حجم وتوزيع القطاعات في هذه المناطقة. الرجاء ارسم على الورق الشفاف ماتريد تغييّره واعادة تُوزيعه.

Time of Ending:

15. تُدْعَى هذه التقنية lenticular foil. سَأقْرأ عليكَ عِدّة مميزات لهذه التقنية التي يُمْكِنُ تصنيفها. في رأيكَ، ما هي درجة الفائدة من هذه المميزات في تفعيل دور المشاركين؟هل تَعتقدُ بأنّها مفيدة جداً، مفيدة بالأحرى، عديمة الفائدة بالأحرى اودون فائدة؟

	مفيدة جداً	مفيدة بالأحرى	عديمة الفائدة بالأحرى	دون فائدة	**لا ادري (ليست للقراءة)**
دمج الصورة والخرائطِ المختلفةِ في النسخة الواحدة					
الخرائط المختلفة في النسخة الواحدةِ دون الصورة					
امكانية وضع الورق الشفاف على					

الصورة للمُنَاقشَة والرسم					
المِقياس و الحجم					
تسلسل الخرائطِ والصورة					
شيء اخر					
شيء اخر					

16. ما هي اهمية ادخال نصوص و رموز في هذه التقنية برأيك؟

	مهمُ جداً	مهمُ بالأحرى	غيرمهم بالأحرى	غيرمهم
نصوص				
رموز				
أشياء اخرى :				

هنا تقنيةٌ أخرى تحتوي على نفس الخرائطِ التي طُبعتْ على الورق الشفّاف وثبتت فوق نفس صورة القمر الصناعي.

17. أيّ تقنية تُفضّلُ؟

a. The Lenticular Foil
b. الخرائطِ التي طُبعتْ على الورق الشفّاف
c. كلتا التقنياتان
d. لا شيء

18. لماذا تُفضّلُ ... (a. , b. , c. أو d.)؟

B. الآن عِنْدي بَعْض الاسئلة حول شخصِكَ

19. العمر؟

20. المهنة؟

21. موقعكَ الحالي؟

---

22. منذ متى أنت في هذا الموقع؟

---

23. ذكر: أنثى:

24. هَلْ لديك أيّ مُلاحظات أو تعليقات إضافية؟

شكرا جزيلا

Questionnaire for Stakeholders Group B (Arabic Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

أسئلة مقابلة المجموعة (ب)

الهدف من هذه المقابلةِ هو تقيم الحاجة لتطويرِ أدوات مرئية جديدة، وتفعيل دور المشاركين (البلديات، النقابات، الجمعيات، الخ.) في تحضير ألمخططات التوجهية في لبنان (خصوصاً في منطقةِ طرابلس).
ان هذا المشروع هو بحث دكتوراهِ في جامعةِ دريسدين التقنية (ألمانيا) و المعهدِ الدولي لنظام ألمعلومات ألجغرافية وألأستشعار عن بعد، اينشده (هولندا).

تاريخ المقابلة:
التوقيت
بدء المقابلة: انتهاء المقابلة:
رقم المستجيب:

1. يتمثل ارتباطك بمنطقة طرابلس و محيطها في كونك...
(أكثر مِنْ احتمال ممكن)

a. ساكن
b. مسؤول اداري
c. مالك أراضي
d. احتمالات اخرى:

A أسئلة البحث:

2. لقد كُنتَ أحد الذين تم اختيارهم لدعوتهم للمشاركة في مناقشة المخطط التوجيهي لمدينة طرابلس ومحيطها سنة 2002-2003. بتوصية من رئيس اتحاد بلديات الفيحاء، لكن هذه المشاركة لم تتم؟ فما هي الأسباب التي كانت وراء ذلك؟ (أكثر مِنْ احتمال ممكن) كَانَ ذلك ...

a. قرار سياسي
b. (مشاكل؟) تَمويل
c. اختيار التوقيت
d. اسباب اخرى

---

3. في حال كنت قد دعيت و ان هذه المشاركة قد تمت، فما هي درجة استعدادك لتقديم وقت لهذه المشاركة ؟هل أنت...

a. على استعداد تام
b. على استعداد لتقديم بعض الوقت
c. على استعداد لتقديم قليل من الوقت
d. لست على استعداد

يتبع مطابقا لأسئلة المجموعة أ

Questionnaire for Stakeholders Group C (Arabic Version)

The Dresden University of Technology
Institute for Cartography
Dresden-Germany

أسئلة مقابلة المجموعة (ت)

الهدف من هذه المقابلةِ هو تقيم الحاجة لتطوير أدوات مرئية جديدة، وتفعيل دور المشاركين (البلديات، النقابات، الجمعيات، الخ.) في تحضير ألمخططات التوجهية في لبنان (خصوصاً في منطقةِ طرابلس).
ان هذا المشروع هو بحث دكتوراهِ في جامعةِ دريسدين التقنية (ألمانيا) و المعهدِ الدولي لنظام ألمعلومات ألجغرافية وألأستشعار عن بعد، اينشده (هولندا).

تاريخ المقابلة:
التوقيت
بدء المقابلة: انتهاء المقابلة:
رقم المستجيب:

1. يتمثل ارتباطك بمنطقة طرابلس و محيطها في كونك...
(أكثر مِنْ احتمال ممكن)

a. ساكن
b. مسؤول اداري
c. مالك أراضي
d. احتمالات اخرى:

A أسئلة البحث:

2. لقد قررت وزارة الأشغال اللبنانية اعداد مخطط توجيهي لمدينة طرابلس ومحيطها سنة 2000. لم تكن من بين المدعوين للمشاركة في مناقشة مشروع هذا المخطط؟ فما هي الأسباب التي كانت وراء ذلك؟ (أكثر مِنْ احتمال ممكن) كَانَ ذلك ...

a. قرار سياسي
b. (مشاكل؟) تَمويل
c. اختيار التوقيت
d. اسباب اخرى

---

3. في حال كنت قد دعيت و ان هذه المشاركة قد تمت، فما هي درجة استعدادك لتقديم وقت لهذه المشاركة ؟هل أنت...

a. على استعداد تام
b. على استعداد لتقديم بعض الوقت
c. على استعداد لتقديم قليل من الوقت
d. لست على استعداد

يتبع مطابقا لأسئلة المجموعة أ

Appendix C:

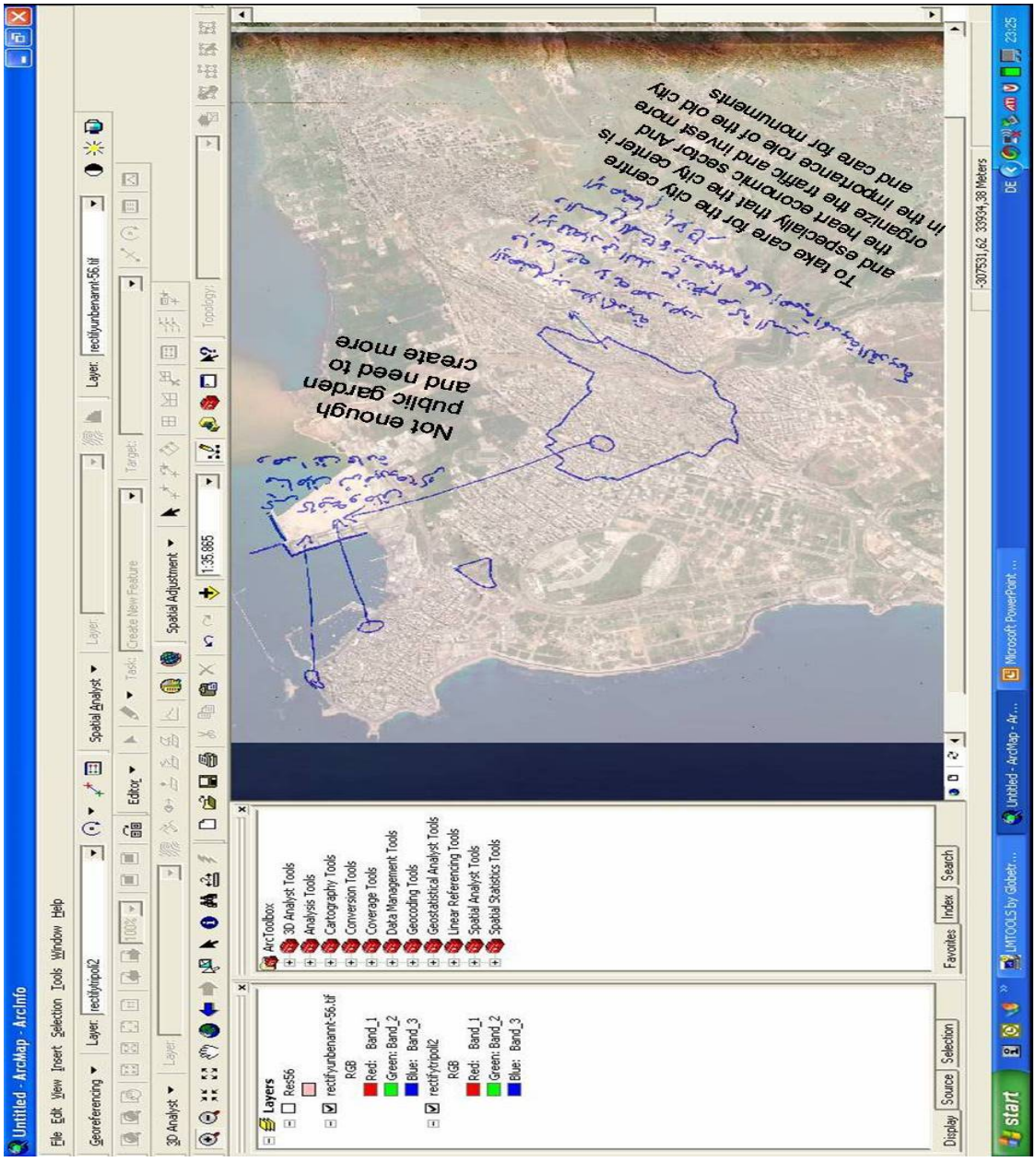
Appendix C.1: Demonstration of functioning of Multi-Flip LFD

Explanation to Appendices C1 and C2:

The 8 pictures above were selected as an example, to give the reader an idea of how the participants used the Multi-Flip Display to extract the information from the different layers and to draw and write their comments on the geo-referenced transparent paper. The first three pictures show the three layers where the participants could see the different layers by changing the angle of viewing, for example picture A show the satellite image, picture B the present land use and picture C the Master Plan with Building Heights.
The second alternative, as pictures D and E show, is that by holding the Multi-Flip Display and with flip movements the observer can read the next layers. After about 2 minutes in average the participants could identify the different areas. A geo-referenced transparency was fixed over the Multi-Flip display, which allowed the participants, using a permanent pen, to draw and discuss and write their comments on the transparency (cf. Photo F, G & H above). After finishing the participants were asked to evaluate some of the characteristics of the geo-data visualization tool (cf. Appendix B) and almost all the participants saw the greatest advantage of the Multi-Flip Display in the integration of the satellite image as supporting the reality factor.
Later the alternative geo-data visualization, which is based on the same satellite image printed on white paper, and the two geo-referenced layers printed on transparent foil were presented for the participants (cf. Appendix C.2). Picture I show the ortho-photo map printed on paper and picture J show the present land use layer printed on transparent paper and how the user trying to fixed over the ortho-photo map. The user was easily able to remove one layer and look at the other using a special holder which can allow him/her to fix the geo-referenced transparent over the satellite image as pictures K, L and M shows. Pictures N shows the user looking under the through and under transparent layer to the ortho-photo map.
The participants were asked to evaluate the 2 techniques later and the result has been discussed in Chapter 6.

Appendix C.2: Demonstration of the use of transparency layers

Appendix D: Process of scanning and importing the results of the interviews into the GIS

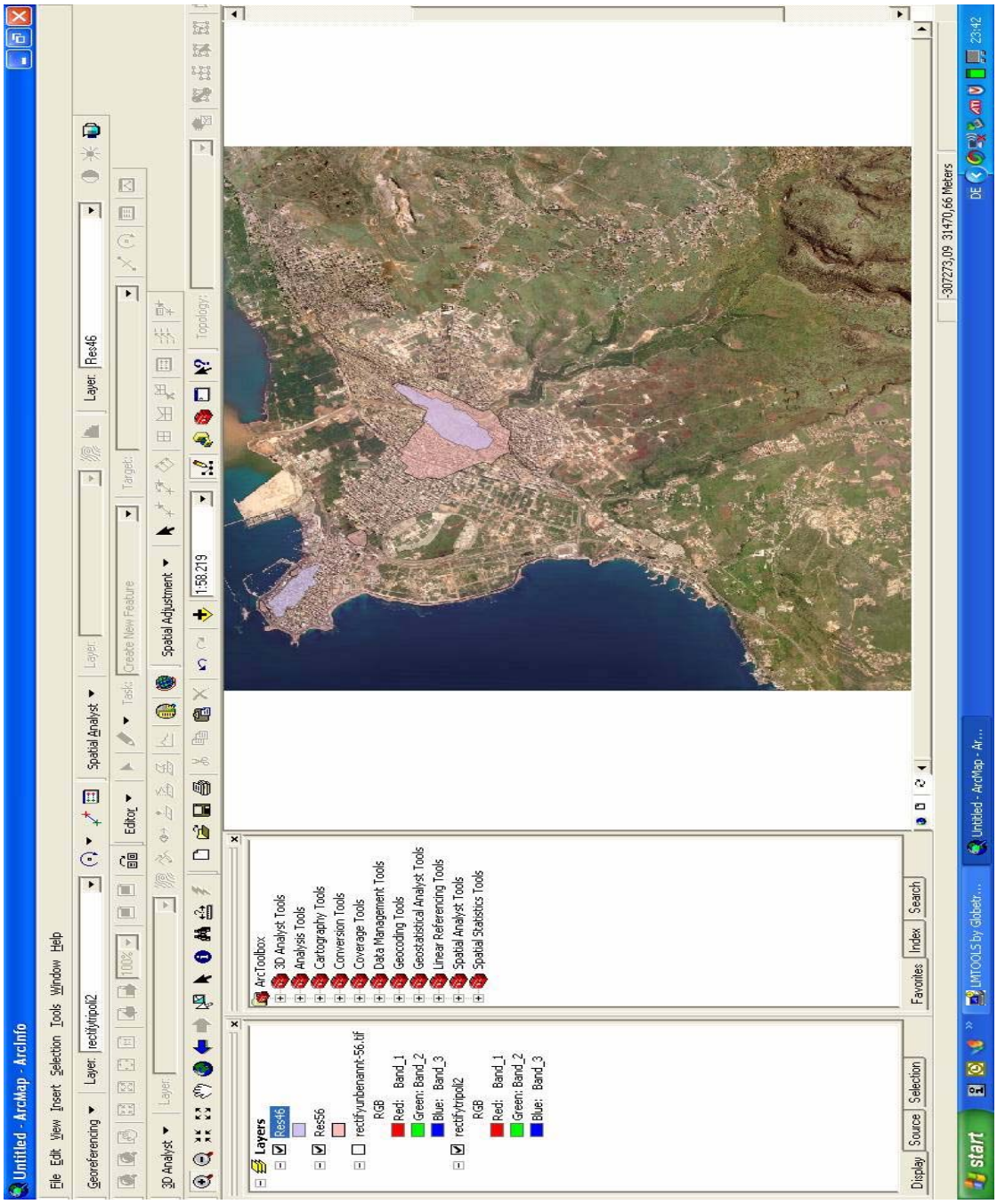


For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Appendix D shows the process of scanning and importing the maps of each participant into GIS software. The transparent maps of each participant were scanned and imported into ArcGIS. Since the scanned transparent maps were geo-referenced it was easy to overlay the different corresponding maps and to analyse the different areas of interest and the corresponding remarks.

Later the transparent maps were manually digitized on the screen to analyse what the main and most discussed areas were for the participant. The result has been

discussed in Chapter 6, which shows that the old city and city centre were the areas most discussed by the participants. As an example of this the figure below shows that the polygons of the two respondents 46 and 56 covered the old city one of the most discussed part of the city among the participants.



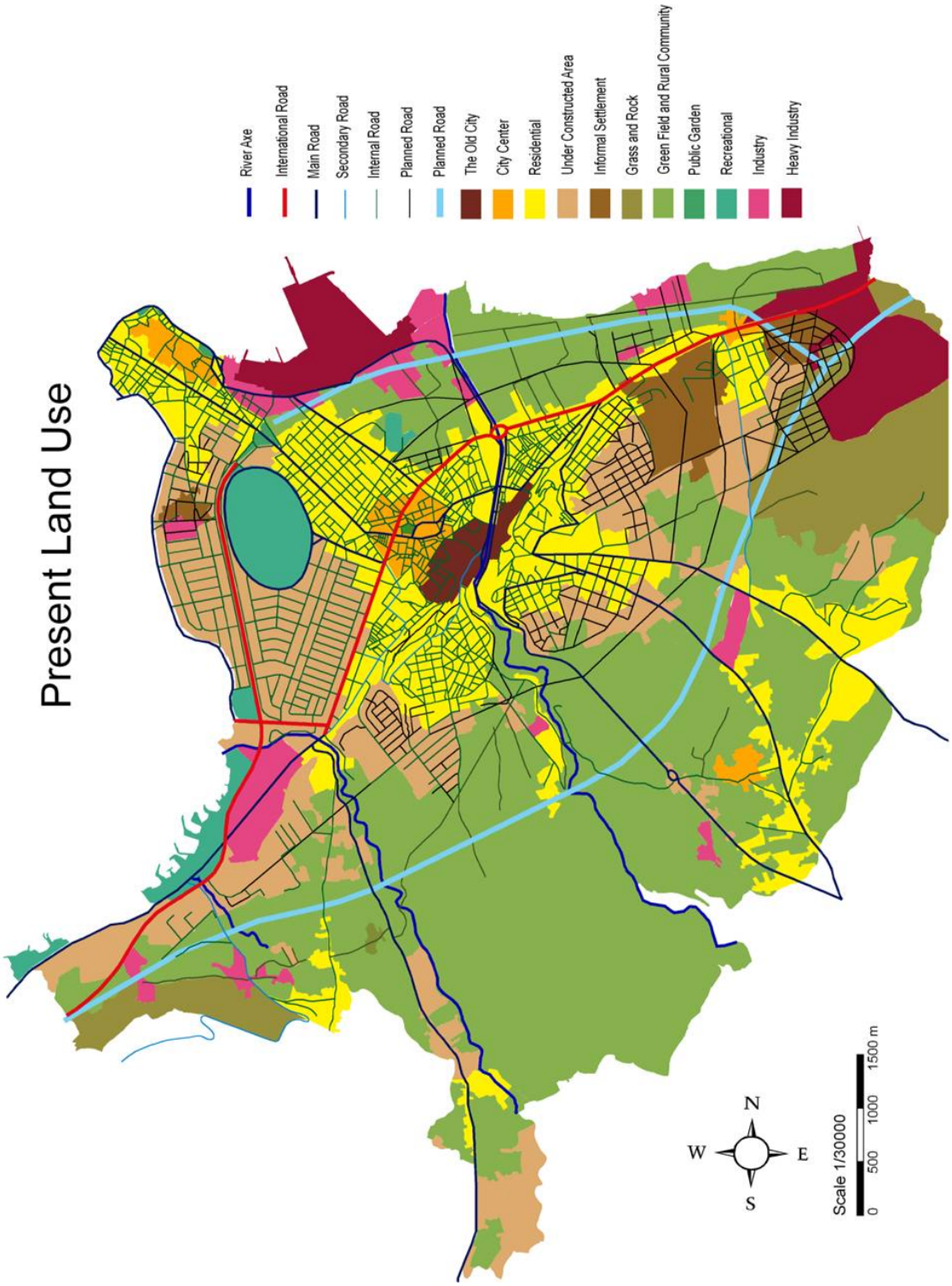
For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD.

Appendix E: The three layers of the Multi-Flip LFD of Tripoli

Appendix E1: Satellite image of Tripoli acquired in 2003 (scale 1:30000)

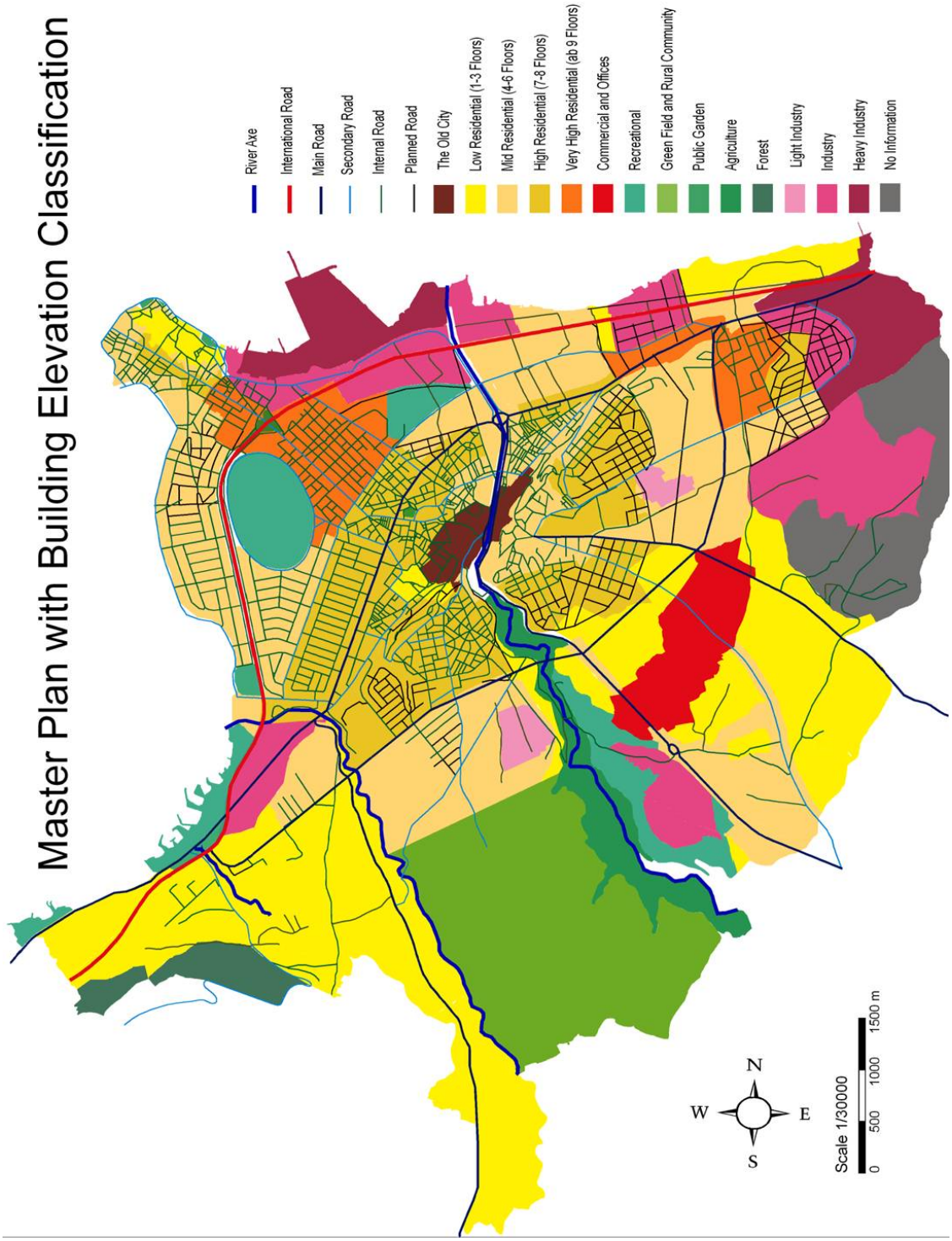
Source: Mosaic of three QuickBird scenes:
Scene1: 26 January 2003
Scene2: 8 April 2003
Scene1: 2 July 2003
For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD and Maps.

Appendix E2: Land Use in 2004



For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD and Maps.

Appendix E3: Tripoli 2000-2020 Master Plan with building height classification



For a colour version of this black-and-white figure the reader is kindly referred to the enclosed CD and Maps.