

The effect of UGM on the implementation of city Master plan

Duhok City as case study

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Abstract— The main driving force for managing urban area toward the desired pattern of growth has concentrated on the effective preparation and implementation of city master plan. This study focuses on the implementation of Duhok City master plan (DMP), which is subjected to many obstacles for managing urban growth in Duhok city due to uncontrolled urban growth challenges that Duhok city have faced in the recent years. The aim of the study is to: determine the challenges of UGM in Duhok City that face decision makers to implement DMP. To determine the problems in the implementation of DMP related to managing urban growth in Duhok City. The study found out that; there is deep split between master plan on paper and the status quo, because of the absences of integrated implementation strategies. Finally the study provides recommendations for effective urban growth management to implement DMP toward smart urban growth.

Keywords-Urban growth; urbann growth management; city master plan; Duhok City .

I. INTRODUCTION

Poor implementation of city master plan on ground level is the big problems that most cities area faced today[1]. The most important tool for dealing with challenges of implementing master plans in the developing countries is their management [2]. Based on the result of Duhok conference entitled "Rapid urban growth and opportunities for sustainable development " held on 30th September 2012, the cities in Iraq have been subjected to absence of planning bases, even random and improvised became obvious features in it, and the general planning frameworks for Iraqi cities has faced management, technical, financial and social obstacles [3].

Duhok city is the most promising growth oriented development city in Kurdistan Region. According to [4] Duhok city suffered from imbalance between the development of urban area and growth of urban population. This kind of expansion has caused imbalance between the city plan and city growth subsequently the DMP faces the danger of becoming obsolete in the force of these challenges. Hence the plan cannot keep pace with the urban growth and carrying capacity, and here to be making some spatial planning updates to the plan in order to be able to cope with urban challenges [5].

This paper will focused on studying the effect of Urban management on the implementation of DMP, The aim of the study is to: To determine the challenges of the implementation of DMP related to managing urban growth in Duhok City. This paper will present essence of literature about urban

growth, urban management, and master plan. The second section will present the study area, urban growth challenges in Duhok city and new master plan for Duhok city.

II. THEORETICAL FRAMEWORK

1) *Urban Growth Management*

Urban growth is defined as, "the relative increase in the number of people who live in towns and cities. The pace of urban population growth depends on the natural increase of the urban population and the population gained by urban areas through both net rural-urban migration and the reclassification of rural settlements into cities and towns" [6].

Urban growth need to be managed by authorities to achieve desired urban growth vision. Therefore urban growth management (UGM) have a set of component, to achieve the planning vision, consists of essential, powerful and coordinated network between governmental jurisdictions. The critical component of UGM is budget setting in order to compare the estimated project cost with potential resources and to adjust programs and schedules to keep the two in balance [7]. The UGM consists of institutional factors, policies, standard, awareness and staff capacity (experience and staff)[8].

2) *Challenges of Urban Growth Management*

In the developing countries, urban growth is subjected to uncontrolled challenges due to rapid population growth, rapid technological change, increasing motorization rates, and urban expansion [8]. The "hot spots" of urban growth are focused on the transformation of the old town, urban townscape including historic heritage and not least the function and shape of public space[9]. The main worldwide urban growth challenges are: overpopulation, housing shortage, urban sprawl and consumption of farmland, unbalanced urban population density, deterioration of urban environment, inadequate Infrastructure, and traffic Congestion [10].

4) *Master Plan*

A master plan is a tool used to guide and manage the growth of cities in a planned manner. It is a long term plan and usually prepared to guide the future growth of a city for the next 20 years mainly consisting of a *report, land use maps, and programs* of action [2]. From the urban management point of view, master plan aimed to organize and coordinate the complex relationships between urban land uses to improve the quality of life. It also provides a resource

mobilization plan in relation to socio-economic characteristics for proposed development works. In brief, master plan is a design for the *physical, social, economic and political framework* for the urban centers[11]. In many countries of the developed world, master planning has now been replaced by *strategic spatial planning* which emphasizes only on *participation processes and key strategic elements of urban growth* [12],[13].

Master plan needs several issues to control urban growth which include: land use regulations, zoning, sub division, building codes and standards. Land use regulations are used to control urban development during the implementation stage, it include induced changes in the land in order to create order in an urban setting, and directing urban growth toward planning manner [14]. Urban planning need to balance between the rate of urban growth and the required services, facilities and infrastructure needed to attain reasonable urban development [15]. However [16], emphasize that acquisition of public land and legal base are the core element for implementation of implementation cities master plan.

3) The Relationship between Urban Growth Challenges, Management and Implementation of City Master Plan

The management of urban growth challenges in the developing countries arise and overwhelm of the public authorities to implement land use plan in a proper way[14]. There are plenty of studies that link between UGM, urban growth challenges and implementation of city master plan. Based on [17], managing urban growth has significant effect on the implementation of city master plan. The study of [1] emphasizes that implementation of city plan has direct implications for urban growth direction. However [15], state that a comprehensive implementation framework, based on judicious allocation of financial and institutional resources in a coordinated manner, is a main function of successful implementation plan. Based on legal platform, urban growth management falls into the general realm of land-use regulation[18].

III. STUDY AREA

Duhok is the center of the governorate of Duhok in the autonomous Kurdistan Region in Iraq. It connects Iraq and Kurdistan region with Syria and with Turkey. Duhok lies at (37°3'N 43°9'E / 37.05°N 43.15°E) northern equinoctial area. As one of the three big cities within the Kurdish region, the significance of Duhok has continuously grown[19].

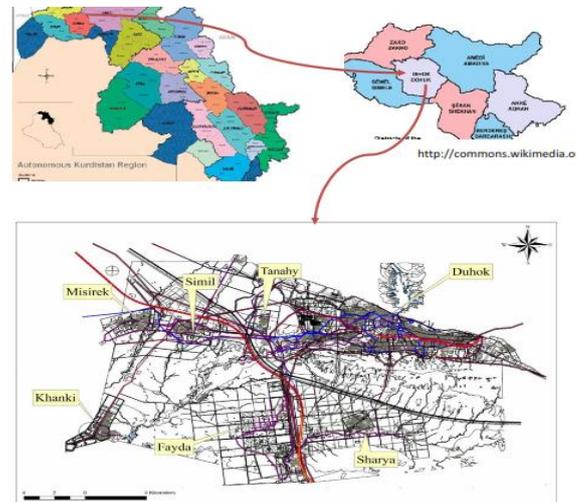


Figure 1 Study Area Location

1) Challenges of Urban Growth in Duhok City

A. Overpopulation

Duhok City population increased rapidly in the last decade as shown in the figure 2. It is increased from 5621 inhabitants in 1947 [20] to 338,028 inhabitants in 2013 [21].

TABLE 1 POPULATION OF STUDY AREA IN 2013 [21].

Year	1947-1957	1957-1967	1967-1977	1977-1987	1987-1997	1997-2007	2007-2014
%population growth rate	3.17	6.37	15.27	23.57	34.57	52.07	55.47

B. Housing Shortage

Generally high urban growth rate of the Duhok city caused a massive shortage in the housing sector, especially for low income families. This led to housing shortage in the city subsequently the cost of housing becomes high. It is very difficult for a low income citizens to get a house. Based on table 2 the maximum shortage occurs during two periods based: First one in 1977 at which Duhok become the center of Duhok governorate, and second in 2003 because of stability in political situation in KRG region.

TABLE 2 PERCENTAGE OF HOUSING SHORTAGE IN DUHOK CITY [21].

Years	1947	1977	1990	2003	2008	2014
%Housing Shortage	14.5	36.7	20.5	32.67	10.12	14.52

C. Unbalanced Urban Population Density

Variations in population density have effect on urban management to supply urban needs. Figure 2 illustrates that population density in the study area was not distributed in balance way. There is high population density in the central area(370 persons per hectars) and low population density (50 persons per hectare)on the edge of city.

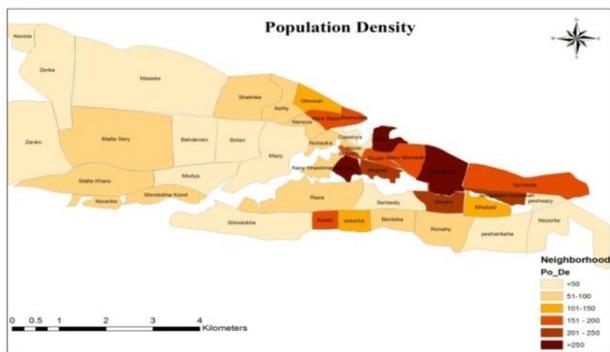


Figure 2

Figure 2 population densities in duhok city in 2013 [21] using Arc Map.



Figure 3 Traffic situation in Duhok City road network using ArcMap.

D. Urban Sprawl

In Duhok city, rapid urbanization has direct impact on land development, mainly consumption of agriculture land. Based on spatial analysis of the DMP by ArcMap, the area of urban land increased by 79.8% in the period of 2004 -2014 as in table 3.

TABLE 3 AREA (KM2) AND RATE OF URBAN SPRAWL FROM 1947 to 2013 (USING ARCMAP FOR STATISTICAL ANALYSIS).

Year	1947	1977	1990	2003	2008	2013
Area(Km ²)	0.769	10.587	8.53	21.737	40.965	107.632
Percentage		90.99	19.43	51.3	46.96	61.94

The above table shows that Duhok city passed through distinguished urban development progress, thus urban growth made unexpected jump in consumption of agricultural land. Maximum urban sprawl happened in the 1977 which was about 90.99% due to the political situation the Iraqi Revolutionary Command Council met on 27th May 1969 and based on the Law no. 211 decided to create Duhok governorate which consisted of four districts, Duhok, Zakho, Amedy and Sumel Districts. Thus, Duhok spatial planning experienced significant transformation in all sectors, such as economy, social, and cultural sectors [20]. But in 2014 urban sprawl was about 61.94% due to migration because of political instability of neighbor area.

E. Traffic Congestion

Duhok City faced the problem of unbalanced growth in urban sectors, there is significant growth of some sectors mainly car dependency. On the other hand there is decay in other sectors mainly transportation system. The transport system in Duhok city in spite of urban growth faced big challenges, mainly traffic congestion and absence of public transportation system [21]. Duhok city faced un-controlled increase in the private cars this subsequently need cars parking place and accessible transport network. By using ArcMap 9.3, the traffic data were converted to spatial data, traffic congestion is measured by the rate of traffic volume over road capacity and the result is shown in figure 3.

2) The New Master Plan of 2032(DMP)

The DMP for 2032 was prepared by Vossing Company, for Duhok and its suburbs including (Tanahi, Simil, Misirek, Khanki, Sharya, Domiz and Fayda Municipalities). It is long term plan (25 year plan), divided to five five-yr plan based on forecasting of urban growth. Urban Growth trends indicate urban expansion towards west and east (Tanahi, Simil, Etot) because they are plain areas as shown in figure 4.



Figure 4 the new master plan of Duhok City.

IV. METHODOLOGY

1) Study Variables

This study is an effort to find out the effect of UGM on the field of implementation of DMP due to urban growth challenges. This study includes one dependent variable (implementation of DMP), one independent variable (UGM) and one moderated variable (Urban growth Challenges) as it is in the figure 5.

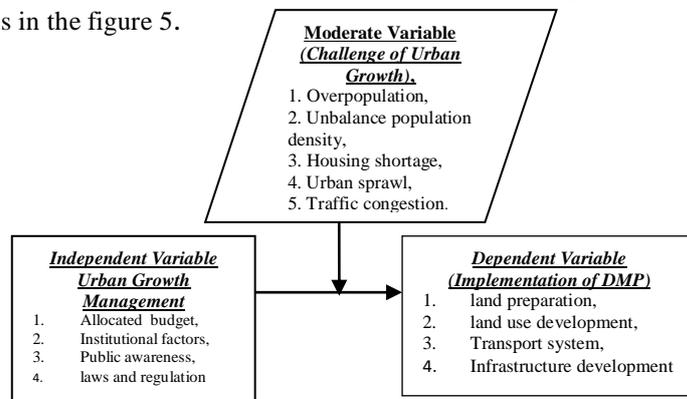


Figure 5 study variables.

2) *Data Collection Methods*

During this study three methods are used to collect necessary data. Unobtrusive methods, *survey method (in-depth interview)*, *field observation*. A sample of study is selected for collecting data as a subset of study population observed in order to make inferences about the nature of the total study population using non-probability sampling particularly purposive or judgmental sampling is used as in table 4.

TABLE 4 TOTAL NUMBERS OF INTERVIEWEES

	Ministry	General Directorate of urban Planning	Duhok Providence	General Directorate of municipalities	Directorate of Urban planning	Municipalities
Staff	1	1	1	3	3	13
Manager			1	1	1	7
Council members			1			7
Land owners						12

V. RESULT

1) *Implementation of DMP*

A. *Land Preparation*

According to the document from governmental directorate in Duhok city, the DMP2032 is planned to extend toward Simil, Misirek and Sharya. Based on the interviewee with General Director of Agriculture in Duhok Governorate, 2014, the main land preparation problem is property right. Some of this land was owned by landowner and the rest have agriculture contracts on it, as explained below:

Land ownership right, the land is used for agricultural preprocess, where, the farmer purchases the stake of Ministry of Finance. In this way, when such type of land is entered in the urban master plan, the landowners compensate by 20% of the area of land, Owned by the state, with using right, this compensate by 12% of the area according to the Law of Agricultural Lands Amortization No 5 in 2007, article 1 paragraph 2 by compensation in kind (compensate by plots of land). However the trees and structures, such as farmer house and irrigation wells inside this land, compensate by cash based on the estimation of Land Amortization Committee in municipality directorates in Duhok governorate.

Agricultural contracts, with agriculture land reform, this compensate by 3% of the area of land based on the Law of Raising Hand on Agriculture Land No 80 in 1970.

For measuring the land preparation as indicator for implementation of DMP, in addition to content analysis, in-depth interview was also conducted with key actors in the implementation of DMP, related to land preparation. As a result of in-depth interview, the researcher finds out that; 100% of the interview confirm that, the current **land preparation** process have negative effect on the implementation of DMP. Generally, all of the interviewees confirm that land expropriation proceedings and amortizing land ownership right, greatly limit decision makers to follow

up the implementation of DMP per phase of development and current need of urban growth. On the other hand, this process is not integrated with delivering of infrastructure and public services.

B. *Land Use Development (Conformance Based Approach)*

In the current study, the map of the built-up area throughout the study area was taken from the Directorate of Municipalities, in form of AutoCAD file (Duhok Map, for 2014 "DM2014"). The researcher used the second five-year Duhok Master Plan (ten year DMP form 2008 to 2017"DMP2017") as the nearest period to 2014, based on the DMP report. Since the first five-year plan was done for 2012, as it was past period. The result of grid overlay between the actual land use and DMP2017 is shown in table 5.

TABLE 5 RESULT OF GRID OVERLAY BETWEEN THE MAP OF DM2014 AND DMP2017

Land Use Items	% Accordance	% Deviation
Central Area	23.8	76.2
General building	56.8	43.2
Health services	69.28	30.72
Industrial area	10.81	89.19
Mixed use	47.9	52.1
Residential	74.1	25.9
Stadium	57.8	42.2
Tourist Facilities	35.7	64.3
Urban green park	45.9	54.1

C. *Transportation System*

Figure 5 illustrates that the transport network in DMP is divided into four categories: main road, express train, motorway and railway to provide efficient access to various activities that satisfy human needs [24].



Figure 5 Transportation network in Duhok City based on (DMP, 2009)

According to the documents from directorates of municipalities, construction of main roads in the area within DPM, as basic infrastructure is shown in the table 6. It illustrates that Duhok had maximum construction length of road among all districts, as it is the center of Duhok governorate, and subjected to more urban growth than

suburban area namely in new area such as Masike, New Malta, and New Nizarke. Need to mention that in 2014 there are not any transportation projects constructed throughout study area due to absence of budget in KRG (President of Duhok Municipality, August, 4, 2014 & Director of Transportation Directorate August, 7, 2014).

TABLE 6 MAIN ROAD (ML) THAT CONSTRUCTED THROUGHOUT STUDY AREA(2010-2013) (GENERAL DIRECTORATE OF MUNICIPALITIES/DUHOK)

Years	Simil	Misirek	Khanki	Fayda	Sharya	Duhok
2010	0	2000	2010	5700	856	23580
2011	722	0	1730	8200	0	40630
2012	924	7220	1610	12000	0	67450
2013	4000	9245	2085	16000	2015	10430

D. Infrastructure Development

In the current study, the basic infrastructure such as electricity, water supply, education and health services are used as indicators for measuring infrastructure development through implementation of DMP. In-depth interview are done with Presidents of Municipalities throughout study area, General Director of Education, General Director of Electric Supply, Directorate of Water Supply and General Director of Health.

The finding of measuring infrastructure services shows that all of the interviewees confirm that there is not any comprehensive plan for delivering infrastructure services throughout study area due to two main problems: absence of budget and random urban growth.

2) Effect of UGM factors on the implementation of DMP

A. Inadequate Allocated Budget

During the period of current study Kurdistan Region as a whole was affected by low and inadequate budget. Besides allocating high cost for preparation of DMP, there isn't any allocated budget for their implementation. With reference to War newspaper no. 1219 on October, 25, 2014, Duhok Municipality needs 250,000,000 USD for implementation of DMP.

B. Insufficient Institutional Capacity

Based on He (2012) the effect of institutional capacity on the implementation of city master plan can be measured by *institutional system*, and *co-operation* within and between governmental directorates. khazae and Razavian (2012) added that lack of the information sharing is numerous challenges for UGM to implement master plan. *Institutional power* is very essential tool for measuring the effect of UGM on the implementation of land use master plan (Aribigbola, 2008).

The study finds out, all of the interviewees confirm that absence of durable management system by Directorate of Municipalities is the critical obstacle for implementation of DMP due to un clear vision, mission, and program as well as, almost all the interviewees confirmed out that, there is lack of co-operation between and among governmental directorates to implement DMP according to the approved plan. There is only co-operation in the topology of land use. However, for

measuring the qualification of *directorate staff for implementation of DMP*, 55.56% of the interviewees confirmed that there is lack of staff qualification for implementation of DMP, due to misunderstanding of the attribute of the plan itself and the framework behind their implementation. The employees that work with team of preparation master plan and get training abroad , do not co-operate in implementation process at which most of them get knowledge for them self , without sharing it with department who responsible for implementation of master . In the other words the ones who participate in the plan preparation process don't participate in the implementation process of DMP

C. Lack of Public Awareness

According to Sharya Forum, October, 20, 2009; the Sharya people refused the extension of DMP toward sharya due to identity and religious of their population. As result public awareness in the study area plays negative role in the implementation of DMP, most of the land owners in sharya disagree about DMP and their implementation toward sharya. This enforce decision makers in Duhok city to in spite of directing urban activities toward Sharya according to master plan , they direct growth toward Fayda, Simil and Misirek at which the landowners accept to implement the DMP.

D. Outdated Laws and Regulation

The researcher find out that as opinion come from all interviewees, legal protection framework of DMP, is very weak, and there are no clear laws, regulations and standards for their implementation that will be in accordance with current trend of urban growth in Duhok City.

Based on Kurdistan Region Law of Municipalities Management No 6 in 1993 which consists of 20 articles, related to management of municipality staff, there are no any laws related to management of urban growth and implementation of land use master plan. It includes only the task of Municipality employees' create municipal unit or cancel it. In 2010 the Kurdistan Municipality Management Law was updated under Law No. 12 in 2010 published on formal newspaper on September 26, 2010 , but contain remain as before, mainly there were nothing related to implementation of master plan and manage urban growth.

VI. CONCLUSIONS

The major findings of this study demonstrated that the implementation of DMP by governmental directorate is not in accordance with the approved plan through inappropriate land preparation, un-integrated land use development, un-integrated transportation system and insufficient infrastructure, which were resulted from inefficiency of UGM. However the current trend of urban growth in Duhok city (over- population, imbalance population density, housing shortage and traffic congestion) increased negative effect of UGM due to limited and inadequate allocated budget, insufficient institutional capacity, lack of public awareness and outdated laws and regulations. These findings presented empirical proof of a relationship between urban growth challenges (moderated

variable), urban growth management (independent variable) and implementation of DMP (dependent variable).

VII. RECOMMENDATIONS

Urban growth challenges: Controlling over population through improving families' awareness and controlling immigration. Allocate reservoir area within city master plan for urgent needs, or un-predicted events. Improving housing sector to keep enough attractive, affordable, updated housing choices, provide mixed housing units. Immediately halt the random entering of cars into Duhok City urban roads network.

Implementation of DMP: Improving land preparation system. Oversight and amendment the law of agricultural land amortization and law of land acquisition by preparing land earlier stage of the DMP. the city should use the "Task Table Sorted by Priority". Provision of integrated infrastructure development plan according to DMP, at which the process of subdivision or implementation any part of DMP should be integrated in all sectors namely land use development, public services, road network, delivering water supply, power supply, education services, health services, civil services, etc. Efficient UGM for Implementation of DMP: Adopting the principle of self-sufficient, clear accountable, performance, review measure to ensure successful implementation of DMP master plan. Coordination and revitalization efforts of governmental directorates, and smart growth. Formulating laws and regulations is needed. Carrying out public awareness campaigns among the community revising land use regulations for compact development related to DMP in a way to be accordance with current trend of urban growth and sustainable city in form of Manuel issued by upper jurisdiction to be legal constitution.

Recommendations for Local Government: Adopting overall policy to deal with DMP and adopting it. The government is required to resolve the condition through handling them to specialized institution, without the government interference with the Implementation process.

There is urgent need for establishment of Master Plan Implementation Board (MPIB) who is chaired by Directorate of Urban Planning, whose mission is to manage the plan and ensure that the elements of the plan are properly addressed and to ensure that the goals and objectives of the DMP come to fruition through current and future activities.

The (MPIB) is aimed to balance and coordinated achievement between the various elements of the plan, in order that Duhok City develops as a viable community environmentally, recreationally, educationally, and commercially. The role of MPIB will be advisory body, functioning and monitoring all aspect of DMP. This board is recommended to have eight subcommittees in order to achieve participatory approach and encourage team work task between governmental directorates in Duhok City such as : Housing and infrastructure, land use development ,traffic and transportation investment and government, social and cultural,

public participation and environment protection committees.

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