“A solution to Urban Sprawl: Management of Urban Regeneration by Smart Growth”

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Abstract:

Uncontrolled and sprawling growth in physical space is one of the primary problems of metropolitan cities. Urban sprawl, which can be defined as the rapid peripheral growth of cities, is criticized in terms of leading problems such as occupying cultivated areas and environment, removing away many advantages provided by natural open spaces, increasing transport costs, and transforming city centers into decayed areas. Smart growth, which is one of the important agenda topics of planning, creates an opportunity in terms of determining reuse strategies and priorities of urban area. Smart growth refers readdressing of urban macroform and land use preferences by emphasizing economic and environmental dimensions of spatial organization. Smart growth involves indicators that can be used for all cities for ensuring social, economic and physical sustainability required by urban regeneration.

This is an explanatory study suggesting use of smart growth principles in urban regeneration. This study is composed of two stages. At the first one, project specific matrix for smart growth is created by making literature investigation in sources dealing with international approaches and practice examples. At the second one, how the proposed development affects the surroundings is evaluated by project specifics matrix. By taking advantage of the matrix, positive or negative aspects of the project and the level of being successful is evaluated in terms of principles take advantage of compact building design, preserve open space farmland, natural beauty, and critical environmental areas as well as strengthen and direct development towards existing communities. Under these titles, following principles are also dealt with: convenience of the projects to high scale plan decisions; parallelism with preservation strategies and development strategies of the city; distribution of density decisions; compact design features; protection of existing areas, nature protection strategies, using brownfield or decayed areas, etc. Three urban regeneration projects, which are the biggest and the most important practices in Konya, the 6th metropolitan city of Turkey in terms of population, are selected for case study. The main determinant of selection of Konya is the fact that the metropolitan city has started to experience urban regeneration period quickly but with problems, and the city has unnecessarily sprawled.

The most important difference of the study is the creation of a guideline which will evaluate the management of urban regeneration being applied in Turkey and its effects on the cities as a solution for urban sprawl.

1. Introduction

Conventional planning approach is focused on low density and tends to expand as much as possible. Urban sprawl describes the fast expansion of fringe away from central urban areas. This sprawl causes many negative effects in all areas including resources, production to consumption chain, transportation and infrastructure. (Richardson et al., 2000).

Urban sprawl which can be described as urban decentralization has become a current issue both for academicians, planners and administrators. Its effects for metropolitan areas can be summarized as followings;

-Increasing use of cars and traffic jam, environmental pollution (Sierra Club, 1998),

- Expensive water, road network and infrastructure systems,

- Less emphasis on existing quarters, thus dispersed space use (Burchell et al., 2000; Gordon and Richardson, 2000; Glaeser and Kahn, 2004; Downs, 2005; Lewis, 2007),

- Lack of functional open space, agricultural area loss,

- Lack of accessibility,

- Intensified and dense poverty along with ethnic and economic disintegration (Ewing, 1994; Sierra Club, 1998; Siegel, 1999; Burchell et al., 2000; Gordon and Richardson, 2000; Glaeser and Kahn, 2004; Lewis, 2007).

Urban concentration-compactness which paves the way for a sustainable urban development process including the effective use of infrastructure and the preservation of nature, is the key element against this sprawl (Richardson et al., 2000). In order to be able to render urban development sustainable, the urban sprawl must be prevented (Çalışkan, 2004). Smart growth approach supports sustainable development and it is not against growth (Steward, 2005). Smart growth focuses on the future change of current sprawl. It aspires after using the existing infrastructure as effective as possible. Thus it aims at deterring from the sprawl (Gray, 2005).

1.1.Methods of The Study

The study consists of two stages which are the literature study and the case study. It is shaped by a process starting with a current situation analysis and the future expectations. The literature study evaluates the discussions and findings cited in the current academic literature relating to issues such as smart growth and project specific scorecards.

Within the scope of the project, a scorecard is made up in order to evaluate the changes in urban regeneration areas in terms of smart growth principles. While preparing the scorecard, sample cards and rating methods including those adopted by USA EPA Development, Community Advisory and Environment Groups are collected and evaluated. The project and scorecard system addresses only three principles of smart growth: to take advantage of compact building design, to preserve open space, farmland, natural beauty, and critical environmental areas, to strengthen and direct development towards existing communities.

During case operations, Kule-site and surroundings (old terminal building) urban regeneration project (which is completed in 2006) and Meram Meat Combinat and surroundings urban regeneration project (which is completed to a large extent by 2014) are evaluated using the scorecards made up within the scope of the project. In terms of abovementioned principles, the following rating scale is used and proposals are developed in line:

100-80 %, smart growth,

79-60%, in transition,

59-0 %, needs attention.

2. Conceptual Review

2.1. Smart Growth

Smart growth develops a scheme which brings the mixed use in sub-regions to forefront against dispersed functional use (such as recreation, working and living areas) and favors public transportation against privately owned vehicle and existing transportation network. As an alternative to sprawled development which is costly in terms of economy, environment and community, smart growth supports a compact urban area with higher density which will revive the metropolitan area within its reach. (Burchell et al., 2000).

Smart growth puts emphasis on the development of slummed urban areas in city centers. It is seen as a leader tool which can steer urban development and urban regeneration projects in terms of sustainable urban development principles. Thus, it may prevent or slow down urban sprawl.

The main purpose of use for smart growth is to revitalize metropolitan areas. Municipalities may take advantage of new cost-free infrastructure systems when new investments are made and re-development projects are carried out. Plus, urban sprawl can be prevented while important urban areas are kept populated. 10 main principles of smart growth:

1. Mix Land Uses
2. Take Advantage of Compact Building Design
3. Create a Range of Housing Opportunities and Choices

4. Create Walkable Neighborhoods
5. Foster Distinctive, Attractive Communities with a Strong Sense of Place
6. Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas
7. Strengthen and Direct Development Towards Existing Communities
8. Provide a Variety of Transportation Choices
9. Make Development Decisions Predictable, Fair and Cost Effective
10. Encourage Community and Stakeholder Collaboration in Development Decisions (Smart Growth Network, 2002).

2.2.Project Specific Scorecards Covering Smart Growth Principles

Scorecards are made up for analyzing development pattern of urban populations along with concerning policies and arrangements. In this way, current and potential progression of the projects can be evaluated using these scorecards (See in Table 1).

Smart growth scorecards can evaluate proposals 'compatibility with communities' social, economic and environmental goals. Within the scope of the project, scorecards are made up for the 10 main principles of smart growth. Nonetheless, smart growth compliance of urban regeneration projects will be assessed in terms of three principles which are directly related to urban sprawl within the frame work of this evaluation. Therefore, only these three principles of the project scorecard are included in the study.

Table 1. The scorecard of three criteria of smart growth

goals	elements	criteria	value	weight	score
1. Take advantage of compact building design	1. Suitable density levels for residential, commercial or mixed use in terms of current development.	More density than existing	3	X 2	
		Same density level	2		
		Lower density than existing	1		
	2. Maximize allowable floor-area ratio	Maximum	4	X 2	
		%10	3		
		%20	2		
		%30	1		
	3. The project includes investments which are going to intensify existing density in the area.	Yes	2	X 2	
		No	1		
	4. Site area devoted to parking is minimized	Yes	2	X 2	
		No	1		
	5. Vehicle dependency is minimized.	Yes	2	X 2	
		No	1		
	6. High % of "usable" open space for gathering and recreation as compared to undeveloped open areas such as parking planters and traffic islands	More than %75	4	X 3	
		%50-75	3		
		%35-49	2		
		%20-34	1		
		Yes	2	X2	

	7. Legal incentives are provided to increase the density.	No	1		
	8. The project meets the objectives of the local government's comprehensive plan or applicable plan.	Yes	2	X 3	
		No	1		
	9. In line with potential future services, public transportation use is intensified.	Yes	2	X 3	
		No	1		
2. Preserve open space, farmland, natural beauty, and critical environmental areas	1. The project avoids development on wetlands, streams, shorelines and related buffer areas.	Yes	2	X 3	
		No	1		
	2. At least 30 % recyclable and low impact material is used within the scope of the project.	Yes	2	X 1	
		No	1		
	3. At least 10 % of the materials from demolished buildings will be recycled.	Yes	2	X 2	
		No	1		
	4. Open spaces are preserved and existing natural sites are restored.	Yes	2	X 2	
		No	1		
	5. To spare at least 25 % of open space in residential lots	Yes	2	X 1	
		No	1		
	6. To spare at least 15 % of open space in commercial lots	Yes	2	X 1	
		No	1		
	7.To create and preserve natural sites in and around the area	Green space is distributed evenly at all levels.	3	X 1	
		Only one main green space which is available for the whole site is allotted.	2		
		Only residence gardens are included.	1		
	8. Use local regional vegetation on site	Yes	2	X 2	
		No	1		
	9. Use green building materials	Yes	2	X 2	
		No	1		
	10. Bearing environmental impacts in mind, the project aims preserving nature and minimizing the development pressure on natural resources.	Yes	2	X 3	
		No	1		
	11.The project protects and/or reuses historic structures	yes	2	X 3	
	12. Funds are raised for the protection and re-use of heritage buildings of historical and architectural importance.	Yes	2	X 2	
		No	1		
	13. Parallel with project preservation strategies.	Yes	2		
		No	1	X 3-2	
3. Strengthen and direct development towards existing	1. Distance to roads, water and sewer service	adjacent	4	X 3	
		Less than 500 m.	3		
		500-800 m	2		
		More than 800m. to 1600 m.	1		
	2. The project shows parallelism with development strategies of the city.	Yes	2	X 3	
		No	1		
	3.Project located within designated development/redevelopment area.	Yes	2	X 3	
		No	1		
	4.The project includes an “organization first” strategy in order to enhance existing opportunities.	Yes	2	X 1	
		No	1		
		Adjacent	4		

	5. For residential development, proximity to any one of the following: food/convenience retail/services, schools, daycare, recreation centers	Less than 500 m.	3	X 2-3	
		500-800 m	2		
		More than 800m. to 1600 m.	1		
	6. For commercial development (employment), proximity to any one of the following: housing, restaurants, entertainment	Adjacent	4	X 2	
		Less than 500 m.	3		
		500-800 m	2		
		More than 800m. to 1600 m.	1		
	7. The project site is close to at least three of the following: housing, restaurants, retail/services, school, recreation centers and offices etc.	Less than 400 m.	5	X 2	
		400-800 m.	4		
		800-1200 m.	3		
		1200-1600 m.	2		
		More than 1600 m.	1		

(Serdaroğlu Sağ, 2011; Benefited resources; Fleissig and Jacobsen 2002; City of Mobile Planning Department: Urban Development, Smart Growth Criteria Matrix; Smart Growth Scorecard: Proposed Development 2002, New Jersey Future Scorecards; Maryland Smart Growth Scorecard, 2002; Smart Growth Matrix, 2001, Transportation, Planning, and Design Department, Austin, TX; Smart Growth Development Checklist, 2004, City of New Westminster, BC: Planning; Aurbach, 2005; Charlotte, NC Sustainability Index, 2005; http://www.epa.gov/ smart growth/scorecard/proposed developments.pdf, *Martins, 2004).*

Determined elements can be modified in line with the project priorities conferring on experts.

Table 2. The project specific summary scorecard (Serdaroğlu Sağ, 2011)

Smart Growth Princibles													**Smart growth %100-80**	**In transition %79-60**	**Needs Your Attention %59-**
1. Take advantage of compact building design													54-43	42-32	31-21
1	2	3	4	**5**	**6**	**7**	**8**	**9**							
1st princible score:															
2. Preserve open space, farmland, natural beauty, and critical environmental areas													53-42	41-31	30-26
1	2	3	4	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**			
2nd princible score:															
3. Strengthen and direct development towards existing communities													56-44	43-33	32-17
1	2	3	4	**5**	**6**	**7**									
3rd princible score:															

3.Case Study

Examination of the Status of Urban Growth and Sprawl in the City of KonyaThe city of Konya, one of the earliest settlements in Anatolia, is located in the central part of Turkey (Figure 1).

Figure 1. The location of Konya (goearth.gosur.com/, 2014).

As municipalities in Konya has become the authority in planning by the 1980s, comprehensive development studies were conducted and urban regeneration projects came to the forefront. Urban regeneration concept in Konya came to the fore mostly when the city's tendency for growth gained acceleration. By 1990s, shifts in approach started to take place. The new approach tended not to see the city and planning as a whole, and quantity became more important than quality, while new urban projects were carried out in line with the strategic planning methods.

Urban regeneration projects of Kule-Site and surroundings (1) and Meram Meat Combinat and surroundings (2) (see in Figure 2. the location of projects in Konya) are evaluated using the project scorecards and results are specified below.

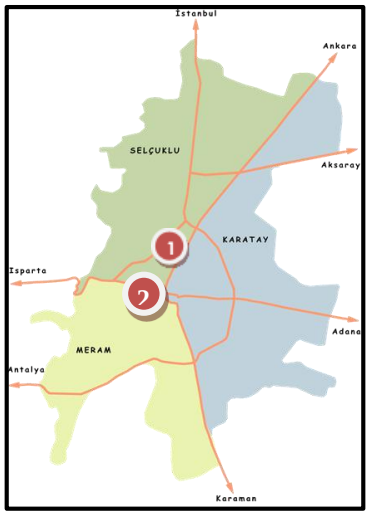


Figure 2. The location of projects in Konya

3.1. Smart Growth Scorecard Evaluation of Kule-Site and Surroundings (Old Terminal Building) Urban Regeneration Project

Kule-Site and surroundings (Old Terminal Building) urban regeneration area is located on the city center's north development corridor. The area covering up to 110,000 m^2 (most of which is publicly owned) became inactive when a new terminal building was constructed and the old terminal went out of use in 2000. From its construction date until the day it went out of use, the old terminal building functioned as an important junction point for Konya and served as an important complex for all kinds of visitors.

Completion of the project:

After three years, the old terminal building and surroundings went through a 2 staged project in 2003 and it became a commercial complex along with multi-storey residences. The complex includes a shopping mall, tower and exhibition hall. The first stage covering an area of 50,000 m^2 included the demolition of the old terminal building and Adese Mall along with the construction of Kule-Site. The second stage covering an area of 5,000 m^2 includes the construction of Manolya Residences (composed of 3 high-rise buildings) and three commercial buildings composed of exhibition/retail stores. The regeneration project is completed in 2006.

Table 3. Kule-site and surrounding urban regeneration projects properties

Project Area	11 hectare	
Applied Method	Public-private partnership	
Proposed Uses	Shopping mall , Tower, Apartment Blocks, Showroom	
	Current	Propose
Population	-	768
Number of Housing	-	192
Number of Employees	380	1380
Housing Area	-	3000 m^2
Green Area	20000 m^2	19696 m^2

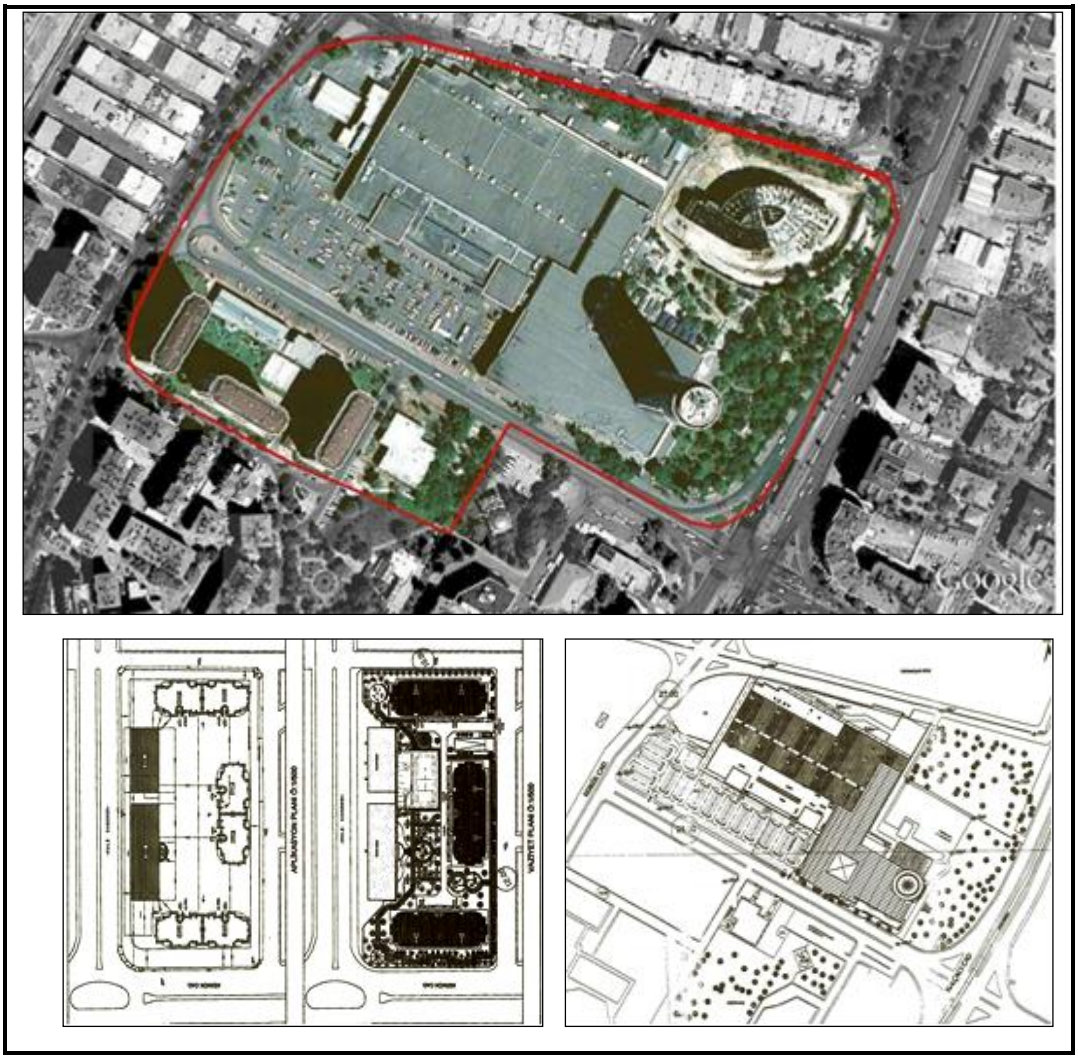


Figure 3. Kule-site and surrounding (Serdaroğlu Sağ, 2011; Metropoliten Municipality of Konya, 2010)

The main objective of the project was to develop working spaces, put inactive areas into use again and revive the economy in the area. The old terminal building and shopping mall have been replaced by a new commercial center, residence and shopping mall. Since it has economic priorities, principles related to economic development are rated three on the scorecard and others are rated 2 and 1 depending on priority levels. Smart growth scorecard of the project is specified in the table.

Table 4. The scorecard of kule-site and surrounding urban regeneration Project (Serdaroğlu Sağ, 2011)

Smart Growth Principles	**Smart growth %100-80**	**In transition %79-60**	**Needs Your Attention %59-**
1. Take advantage of compact building design **1 2 3 4 5 6 7 8 9** **6 4 4 4 2 6 4 6 6** **1st principle score: 42**	54-43	42-32	31-21
2. Preserve open space, farmland, natural beauty, and critical environmental areas **1 2 3 4 5 6 7 8 9 10 11 12 13** **6 1 2 2 2 2 2 4 2 3 3 2 4** **2nd principle score: 35**	51-40	39-30	29-25
3. Strengthen and direct development towards existing communities **1 2 3 4 5 6 7** **12 6 6 2 8 8 10** **3rd principle score: 52**	52-41	40-31	30-16

Figure 4. Kule-site and surrounding urban regeneration project showroom, shopping mall and housing (Serdaroğlu Sağ, 2011)

***Take advantage of compact building design;**

The project complies with development density level for commercial and mixed use while the density is higher than it used to be. Building coverage area for the project was 35 % and investments to raise the existing density were proposed. While need for parking lot was minimized, vehicle dependence could not be minimized. Compared to open space designated for parking and transportation, open space allotted for entertainment and gathering was moderate (37 %). Legal incentives were provided to increase the density. Urban regeneration area is located in a potential re-development quarter in the city center, plus it is suitable for urban development and density rise. The area has also been integrated in regional planning

works. Within the scope of the transportation master plan, bus network has been modified and an LRS stop has been planned to serve the regeneration area. Thus, it put an emphasis on public transportation and supports potential services. The project received 42 points according to compact building design principle and qualified as in transition.

***Preserve open space, farmland, natural beauty, and critical environmental areas:**

Since the project was carried out on an existing residential lot, the project has not done any actual harm to environment. During the construction period, recyclable and low impact building materials were used. No material was recycled after old buildings were demolished, open spaces weren't preserved. 25 % and 15 % of open space were created for residential and commercial lots respectively. The project includes resident gardens along with limited green space which are available for the whole site. No local vegetation work was carried out in the area. The project doesn't comply with green building design techniques and doesn't include any measures to protect the ecological system except for green spaces. The project didn't intend to preserve or restore old buildings. The project revived an inactive area. Since the area was neither protected nor registered, the project was carried out in line with preservation strategy. The project received 35 points according to the principle of preserving open space, farmland, natural beauty, and critical environmental areas, and qualified as in transition.

***Strengthen and direct development towards existing communities;**

The buildings constructed within the scope of the project were positioned next to existing road, sewage and water network. Rising life quality and arrangements made in the city center have parallelism with city's development strategies. Thanks to the project, an inactive area which needed redevelopment was revived. In order to enhance existing opportunities, an "organization first" strategy has been formed. Other required services for residential and commercial development are in walking distance. The project received 52 points according to the principle of strengthening and directing development towards existing communities, and qualified as ***smart growth***.

Figure 5. Kule-site and surrounding urban transportation, parking (Serdaroğlu Sağ, 2011)

3.2. Smart Growth Scorecard Evaluation of Meram Meat Combinat And Surroundings Urban Regeneration Project

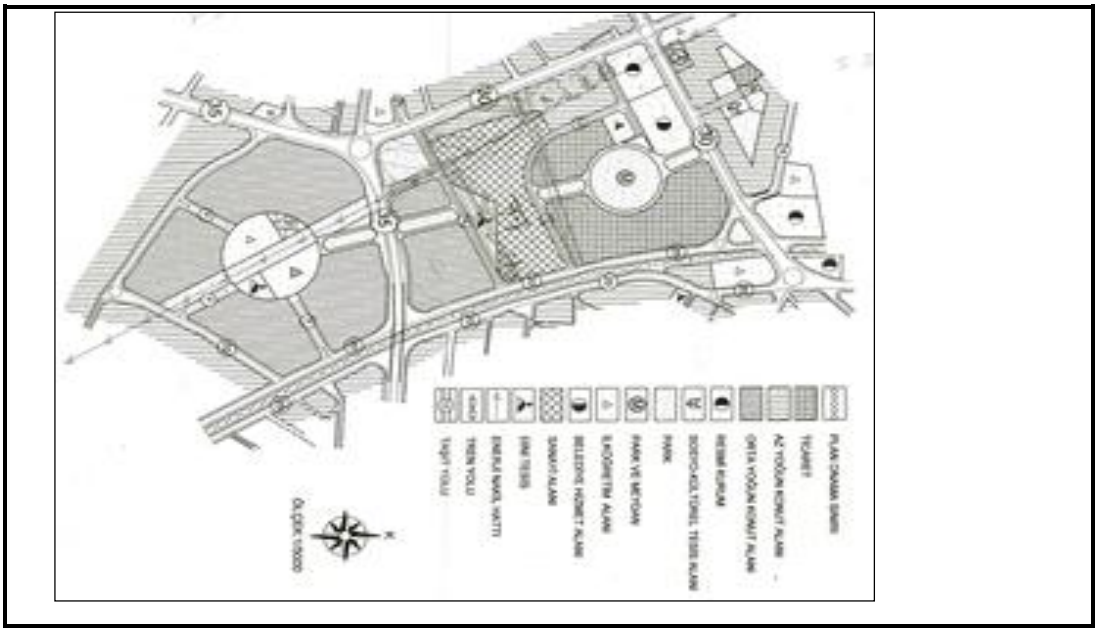
Meram Meat Combinat is located in the northwest of Konya city center, within the boundaries of Meram Municipality. After the planning decision dated 1966, the area was opened to settlement. The area included several one storey residential buildings and an evicted facility once owned by meat and fish authority. When its high development potential, close location to city center, accessibility to existing infrastructure system and major public ownership are considered, the area is of high importance. Even if there are residential and commercial buildings along with a public primary school in the site, mixed use is limited and it lacks especially primary schools, high schools, health facilities and cultural centers.

Completion of the project:

Table 5. Meram Meat Combinat and Surroundings urban regeneration projects properties

Project Area	60 hectare	
Applied Method	Agreement of Municipality and Housing Development Administration of Turkey	
Proposed Uses	Housing, official instituon, commercial areas, socio-culturel facilities, religious facility, industrial areas	
	current	propose
Population	5000	10500
Number of Housing	1256	2624
Number of Employees	-	-
Housing Areas	250000 m^2	190000 m^2
Green Areas	-	30000 m^2

Figüre 6. Meram Meat Combinat and Surroundings urban regeneration projects (Meram Municipality, 2010)



Figüre 7. Meram Meat Combinat and Surroundings urban regeneration projects and area

Proposed functions and project objectives aim at residential and economic regeneration. Therefore, principles related to residential and economic regeneration are rated three on the scorecard and others are rated 2 and 1 depending on priority levels. Smart growth scorecard of the project is specified in the table 6.

Table 6. The scorecard of Meram Et Kombinası ve çevresi urban regeneration project (Serdaroğlu Sağ, 2011)

Smart Growth Principles	**Smart growth %100-80**	**In transition %79-60**	**Needs Your Attention %59-**
1. Take advantage of compact building design	54-43	42-32	31-21
1 2 3 4 5 6 7 8 9			
6 4 4 2 2 3 2 6 6			
1st principle score: 35			
2. Preserve open space, farmland, natural beauty, and critical environmental areas	53-42	41-31	30-26
1 2 3 4 5 6 7 8 9 10 11 12 13			
6 1 2 2 2 1 2 4 2 3 3 2 4			
2nd principle score: 34			
3. Strengthen and direct development towards existing communities	56-44	43-33	32-17
1 2 3 4 5 6 7			
12 6 6 1 9 6 8			
3rd principle score: 48			

*** Take advantage of compact building design;**

The project complies with development density level for commercial and mixed use while the density is higher than it used to be. Building coverage area for the project was 35 % and

investments to raise the existing density were proposed. While need for parking lot was minimized, vehicle dependence could not be minimized. Compared to open space designated for parking and transportation, open space allotted for entertainment and gathering was at the lowest level (19 %). Legal incentives were not provided to increase the density. Urban regeneration area is located in a potential re-development quarter in the city center, plus it is suitable for urban development and density rise. The area has also been integrated in regional planning works. Within the scope of the transportation master plan, bus network has been modified and an LRS stop has been planned to serve the regeneration area. Thus, it put an emphasis on public transportation and supports potential services. The project received 35 points according to compact building design principle and qualified as ***in transition***.

Figure 8. Meram Meat Combinat and Surroundings housing

***Preserve open space, farmland, natural beauty, and critical environmental areas;**

Since the project was carried out on an existing residential lot, the project has not done any actual harm to environment. During the construction period, recyclable and low impact building materials were used. No material was recycled after old buildings were demolished, open spaces weren't preserved. Minimum 25 % open space was created for residential lots, but open space for commercial lots couldn't reach the minimum of 15 %. Efforts have been made in order to create residential gardens and green spaces which are available for the whole site. No local vegetation work was carried out in the area. The project doesn't comply with green building design techniques and doesn't include any measures to protect the ecological system except for green spaces. The renewal of an area with the potential to become a collapse area and the reuse of an idle industrial area are positive steps in terms of eliminating the negative effects of industry. As they are not carried out within a protected area, they do not conflict with the protection strategies. The project received 34 points according to the principle of preserving open space, farmland, natural beauty, and critical environmental areas, and qualified as ***in transition***.

*** Strengthen and direct development towards existing communities**

The buildings constructed within the scope of the project were positioned next to existing road, sewage and water network. Rising life quality and arrangements made in the city center have parallelism with city's development strategies. Thanks to the project, an unused area which needed redevelopment was revived. First of all, an arrangement policy is required in order to enhance the existing opportunities. Other required services for residential and commercial development are in walking distance. The urban regeneration project for Meram Meat Combinat and surroundings, which have got 48 points for the principle of proximity to existing development and infrastructure is qualifies as ***smart growth***.

Figüre 9. Meram Meat Combinat and Surroundings (Serdaroğlu Sağ, 2011)

Figüre 10. Meram Meat Combinat and surroundings current housing, open spaces and brownfield area (Serdaroğlu Sağ, 2011)

Figüre 11. Meram Meat Combinat and Surroundings proposed housing, open spaces after Project (http://www.meram.bel.tr/#article=3713846, 2012)

Results of Case Study

Table 7 Smart growth level of three princibles for two cases

Smart growth princibles	**Kule-Site and surroundings**	**Meram Meat Combinat and Surroundings**
Take advantage of compact building design	In transition	In transition
Preserve open space, farmland, natural beauty, and critical environmental areas	In transition	In transition
Strengthen and direct development towards existing communities	Smart growth	Smart groth

Also two projects intended for compact design has stayed within the transitional process for smart growth. More attention should be paid to provide compact design. The projects intended to preserve preserve open space, farmland, natural beauty, and critical environmental areas have stayed again within the transitional process for smart growth. This situation indicates that the importance given to protection is insufficient. The principle of proximity to the existing

progress and the infrastructure is at the smart growth level in both of the projects. This principle has become an important mentor-guide with regard to pointing out the learning points concerning what needs to be done for the projects to be made.

4. CONCLUSION

Consequently, so as to prevent the urban sprawl pointed out as an important problem, the projects for sustainable growth should be developed. The main objective of the formed policies is to facilitate the concentration and development in city centers and to keep the creation of new development areas as limited as possible.

The main objective of smart growth which is developed against the sprawl is to revive the city centers. Instead of opening the new areas to settlement, the old city areas should be revived and put into the service of urban areas. In this way, the arrangement costs will be cut using existing infrastructure and in addition to this, the risk of transformation of rural areas into urban areas will be reduced.

Smart growth scorecards, which are created in line with smart growths principle will help with choosing the best and most beneficial means for the society in terms of growth and development. At the same time, it will be helpful for measuring the progress of the society for the best possible future.

The smart growth matrix enables to conduct two basic operations for urban regeneration projects: to assess the important principles that cannot be put into use at all and to determine basic deficiencies.

****NOTES:**

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2. This paper is supported by Selcuk University, Coordination of Scientific Research Projects. The project number is 14701423.

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