

# Mersin City-Lab: Co-creative and participatory design approach for a circular neighbourhood

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## Abstract

While environmental, economical and social challenges that the world has been facing recently are increasing dramatically; cities have played critical role in generation many of these problems like negative impacts on environment and overconsumption of resources. Most of the cities today face severe sustainability challenges including sanitation, air pollution, environmental degradation, over population and lack of livability. However, cities may also raise answers to find solutions against many of such complex urban problems, since they are assumed as creative and innovative platforms for social ecosystem of ideas. In this sense, there is increasing interest in 'City Laboratories' or 'Urban Living Labs', which are established to provide creative experimental platforms with participation of city actors to discuss urban sustainability issues before implementation of deep and structural urban changes for citizens. They provide participatory, co-creative and experimental platforms for self-organizing cities. The aim of this paper is to discuss a collaborative City Laboratory approach -Mersin City Lab- to achieve sustainability principles during urban regeneration process for the selected case-study area located in Mersin. Mersin City Lab focuses on two aspects: Firstly, 'City Lab' approach, involves citizens and stakeholders into decision-making process. Secondly, it focuses on urban transformation process with circularity principles including water, mobility, energy, waste management, food and circular economy to achieve sustainable neighborhood development. The paper starts with introduction of 'city-gaming' methodology which has been adopted as the main structure of participation of multi-stakeholders. It continues with discussions on stages of the case-study project through implementation of workshops and game sessions by participation of multi stakeholders. Following, the results gathered from overall evaluations of participants' proposals regarding land-use, mobility and urban water management, local economy, urban development, urban agriculture and food strategies in neighborhood level are discussed. Finally, the paper concludes with impacts of City Labs approach and city-gaming methodology on decision-making process for real urban problems and urban settings.

**Keywords:** city lab, Mersin, city-gaming, circular city, neighbourhood.

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## 1. Introduction

Recent projections driven by UN Global Report on Human Settlements show that ratio of half of world's urban population passed for the first time the ratio of rural population in 2008. The ratio is projected to rise towards 70 % by 2050. Megacities with over 10 million population and hyper cities with over 20 million population will emerge during the following few decades (United Nations, 2009, p.4; Nevens et al., 2013, p.111). This situation also displays remarkable level of transition from production-oriented rural practices towards consumption-oriented urban living practices worldwide. Megacities with excessive population growth impose severe environmental risks such as large amount of carbon emissions due to heavy traffic, urban heat island affect, delimitation of underground water, degradation of forestry and agricultural lands, fragmentation of wildlife habitats, decrease in biodiversity. Cities play critical role with their negative impacts on environment and resource consumption. Most of them face severe sustainability challenges such as water and air pollution, sanitation problems, urbanization, and lack of livability (Von Wirt, et al. 2019, p.230). In addition to environmental problems, social and economic problems accumulated in these contexts cause severe urban development challenges for decision makers. But cities are also potential key factors to solve these problems since they are accepted as ecosystem of new ideas mainly open-minded and innovative (Nevens, et al. 2013, p.112; Von Wirt, et al. 2019, p.230). Fundamental principles of sustainable urban development goals include (i) environmental criteria integrating ecological constraints and mitigating adverse impacts of climate change, (ii) social criteria aiming to improve livability of communities, (iii) economic criteria empowering of self-sufficiency and wellbeing of citizens, and (iv) institutional criteria engagement of various stakeholders into planning and decision-making process (Wheeler, 2013, p.28; Sharifi, 2016, p.3).

### 1.1. Urban Living Labs: Co-Creative and Participatory Platforms

Although, cities are accepted as having potential role in sustainable development goals, there is still need for creative platforms to manage complex urban problems. Urban Living Lab approach is believed to close this gap by supporting inclusive medium for urban innovations (Steen and van Bueren, 2017b, p. 21; Hossain et al., 2019, p.977). Recently, there is an increasing interest in 'Urban Living Labs' (ULL) with high number of examples from different parts of the world<sup>1</sup>. ULL is derived from Living Lab phenomena, which has been developed a social innovative ecosystem to find solutions or products for a given problem. Steen and van Bueren (2017, p.11) classifies goals of ULLs as 'innovation'; to develop new products to find solutions for a given problem; 'knowledge development for replication' to exchange knowledge of existing products, 'increasing urban sustainability' to support local solutions. "Hub, incubator, makers space, city laboratory, urban lab, field lab" are other terms that are used for similar examples (Steen and van Bueren, 2017b, p.22).

Among them, 'Urban Living Labs' (ULL) or 'City Labs' concentrate on real urban problems or development processes accepting the fact that all city actors have potential role for decision-making process for real-life contexts and territories. They are designed or managed to provide creative experimental platforms before implementation of deep and structural urban changes for citizens, who should be assumed as end users (Von Wirt, T. et all, 2019, p. 232). These platforms are especially enhanced for new approaches and ideas to increase urban sustainability since they help to foster new ideas among citizens before complex urban interventions and redevelopment process are implemented. So, the main idea of ULLs is to provide tangible or digital collaboration medium for multiple-stakeholders and citizens where they can share and discuss their ideas about a given urban theme. Its conceptual content is summarized by Steen and van Bueren (2017, p. 4) as "real-life research with its multiple stakeholders in a co-innovating inclusive setting". First essential

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<sup>1</sup> There are around 90 Living Lab experiences only in Netherlands today as stated by (Steen and van Bueren, 2017,p.10). Habitat Norway, which has been established in 1988 has recently set up SLUM (Sustainable Living Urban Model) LAB initiative (URL 1).

criteria for ULL is the subject of the work; whether it is a product, system, technology or an urban context. Secondly, interaction of multiple stakeholders from different organizations is essential so that the focus of subject can be discussed or tested from different perspectives in advance. And lastly, a collaborative platform must be provided so that participants can share their ideas through a co-creating process to achieve the purposed goals (Steen and van Bueren, 2017, p. 4). Steen and van Bueren (2017b, p. 22) also discuss differences of ULLs from Living Labs according to their aims, activities, participants and context. Achieving urban sustainability is very essential for ULLs, so their content and activities should include development, co-creation and iteration motives (Steen and van Bueren, 2017b, p. 23). In order to call a process of a living lab as ‘co-creative’; the participants should be involved in development or generation process. In particular to urban problems; the participants must be part of decision-making process. According to the results of survey conducted by Steen and van Bueren (2017b, p.12) regarding 90 place-based sustainable innovation projects in Amsterdam; they evaluated that only 12 of them qualify living lab experience. There can be different place-making methods to provide involvement of participants into development of urban solutions. For instance; in Buiksloterham Living Lab experience in Amsterdam, the former industrial zone have been converted into a residential area. The new residents of the neighborhood, decision-makers responsible from the planning of the site, related institutions have come together to define the roadmap of the district together. City-gaming methodology has been enhanced for the round-table discussions and all results have been transformed into a circular manifesto for the neighborhood. Since than; residents have started to settle down the district and build their houses according to this manifesto (Tan, 2017; URL 2).

### *1.2. Urban Living Labs/City Labs Enhanced for Urban Transformation Discussions in Neighborhood Level*

Neighborhood and districts are smallest local planning units in city fabric. With the rise of sustainable development goals recently, there has been increasing interest in sustainable neighborhood level planning approaches again, since they are accepted to have remarkable impacts in achieving more sustainable and livable environments for citizens (Farr, 2008, p.44; Wheeler, 2013, p.294; Sharifi, 2016, p.2). Various planning theories and approaches have been developed for neighborhood planning from the beginning of 20. century: Garden City movement in the beginning of 20. century, Neighborhood Unit movement during 1920s, Traditional Neighborhood development during 1980s and Eco-Urbanism approaches since 2000s (Sharifi, 2016, p.3; Gülcan, Ünal & Erol, 2020, p.16). Each movement has contributed important impacts in neighborhood planning, while Eco-urbanism has more focus in climate-change adaptation and mitigation compared to previous ones (Sharifi, 2016, p.6,13). Besides, smart-growth principles also focus on compact city-cores with mixed-used neighboring units in walkability distance (Milosovicova, 2008). In result, “planning by neighborhood” model has been revived as “sustainable neighborhood” by contemporary sustainable urbanism theories (Mehaffy et al. 2014, p.12). While neighborhood level planning concerns more on livability standards of citizens; local level plannings aim to develop policies regarding affordable housing approaches for citizens as a basis for social rights, circular economy and self-sustaining fiscal models based on recycling potentials of the city, and its resilience against climate change (Wheeler, 2013, p.287). Therefore, involvement of city actors into urban transformation process is very important in every level to achieve good governance and to impact citizens’ behaviors towards more sustainable way.

Since neighborhood level planning for sustainable development goals in cities is still in the center of discussions today; there are several ULL or City Lab examples which are structured in

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neighborhood level<sup>2</sup>. ULLs or City Labs mainly concern with processes rather than single products or innovations. Very complex urban problems like urban transition process, new methods like participative planning tools, or integrated approaches such as neighborhood-level development with its inhabitants can be tested or simulated through these platforms. Moreover, they provide to test an idea, display alternative scenarios, or discuss multi-facet problems through an inclusive platform among multi-disciplinary professionals and interest groups before complex urban transformation solutions are implemented (Hoosain et al., 2019, p.980; Nevens et al., 2013, p.112). Besides, they help to foster urban transition process and principles among wider public and citizens. Such City Laboratories which particularly focus on management and governance of urban transition process in real-life context are conceptualized as 'Urban Transition Labs' by Nevens et al (2013, p.115). They state the need for such 'hybrid, flexible and transdisciplinary platform' to provide space and time for development of alternative solutions for multiple issues together such as energy, mobility, food, built environment. This is one of the smartest and most sustainable ways for discussing complex problems of cities (Nevens et al 2013, p.116). Von Wirt et al. (2019, p.229) also underline the need for 'experimentation process' for good governance of sustainable urban transitions since system innovation is inevitable to achieve expected goals. Essential principles to achieve expected goals in ULLs especially during urban transformation process are stated by Steen and van Bueren (2017, p.5) as "real-life setting, representation of users/researchers from multi-disciplines and active collaboration". Since ULLs are good platforms for "participation, experimentation and learning"; utilization of participatory and co-creative methodologies in these platforms are very important. This raises the question of what kind of methodologies should be applied in ULLs. Real-world experiments, gaining knowledge, experience sharing should be included into their process management. The iterative process for such experimental approach provides "learning by doing, doing by learning" experience amongst their participants as underlined by Von Wirt, T. et al. (2019, p. 230).

## 2. Aim and Content of the Study

Similar to negative urbanization impacts aroused during past decades worldwide; Turkey faces unsustainable development challenges and urban sprawl problems due to migration from rural to urban areas. The ratio of urban population compared to population living in countryside increased from 25 % in 1950s up to 77 % by 2012 (T.C Çevre ve Şehircilik Bakanlığı, 2014, p.v). Such a rapid migration towards cities have caused severe urbanization challenges such as generation of slums and informal neighborhoods, low quality of infrastructural and sanitary conditions, poor housing conditions, social gaps amongst newcomers and existing residents, lack of access to adequate education and descent work opportunities. Ataöv and Osmay (2007, p.61) classifies urban transformation movements in Turkey into three periods as 1950-1980s; 1980-2000s and from 2000s up to present. Accordingly; the Governmental policies regarding economic growth and industrialization between 1950-1980s aroused migration from rural to urban areas. This resulted in development of slum areas in the peripheries of big cities, some of whose population is doubled or even tripled in such short time. A number of legislative arrangements has been conducted in order to deal with development of slum areas and informal settings in the cities such as 'Squatter Law act no 775' adopted in 1966 (URL 3). Due to the decentralization process of planning authority from State institutions to local municipalities after 1980s; approaches towards migration and urbanization problems have shifted as well. Urban transformations from informal housing constructions to low-rise apartments or legitimization of existing illegal constructions have become into the scene as result of local political relationships aroused between the newcomers and locally

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<sup>2</sup> Buiksloterham Citylab -also introduced as one of the participants in this paper- is one of the neighborhood-level Citylab experiences in Amsterdam started after 2014.

elected mayors of cities (Görgülü, 2009, p.772). The planning tools developed during such phases were 'urban rehabilitation' or 'upgrading' approaches which aim to improve existing conditions of housing units, 'urban redevelopment' implementations which transform informal building stocks into multi-story buildings; or 'urban renewal' approach which relocate existing ownerships to reserved building lots in other parts of the city by private investment companies (Ataöv and Osmay, 2007, p. 63). Starting from 1980s, urban renewal projects based on demolition of existing unhealthy building stocks and reconstruct new ones instead, have become the main central strategy of the Government to deal with housing needs in cities. Adoption of Mass Housing Act no 2985 in 1984 and establishment of The Mass Housing Development Agency (TOKI) were important institutional and legislative arrangements of this period (URL 4). Starting from 2000s, the scale of urban renewal projects has increased especially in metropolitan cities with the impact of public-private financial collaborations between the State and big construction companies as a result of neo-liberal economic policies of the period. TOKI has produced 640.000 housing units through urban redevelopment process and mass-housing projects throughout Turkey between 2002-2014 (T.C Çevre ve Şehircilik Bakanlığı, 2014, p.42). Despite the increase of urban transformation and mass-housing experiences during the past decades, they are highly criticized by scholars due to following issues (Anlı and Osmay, 2007, p.71; Görgülü, 2009, p.771):

- Urban transformation approach perceived and practiced as physical and spatial improvements focusing on real estate problematics,
- Social gentrification, degradation of natural and historical values during such large-scale transformation interventions,
- Loss of local architectural and townscape identities in newly developed areas,
- Lack of participatory decision-making process and long-term strategic policies.
- Urban transformation increases environmental problems such as water demand, noise, excessive air pollution, dust and waste heat.

Within the light of these discussions, the aim of this paper is to develop an inclusive and collaborative City Lab approach to achieve sustainability principles during urban regeneration process for the selected case-study area located in Mersin, which has been migrated since 1990s. "Mersin Citylab" Project<sup>3</sup> addresses two urgent aspects of city making: Firstly, "City Lab" concept aims to provide involvement of citizens into collaborative decision-making for sustainable urban transformation process. Providing open dialog among stakeholders, constant exchange of information, learning and negotiation are expected outcomes from the study. Secondly, Mersin Citylab proposes an academic refocus of city transformation process with circular systems of thinking including subjects related to water, mobility, energy, waste management, food and circular economy to achieve sustainable neighborhood development. Mersin CityLab is a research based process; which aims to test city-gaming methodology to achieve participation of stake-holders into decision-making process of a given urban problem. In practice; Turkey is very new to ULL or Living Lab experiences. Başakşehir Living Lab established by Başakşehir Municipality aims to support social innovation of individuals and create a collaborative ecosystem medium for citizens (URL 5). TAK Kartal and TAK Kadıköy led by Kentsel Strateji are two experiences, which aim to create a place making medium for citizens. They have developed several activities and approaches to increase

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<sup>3</sup> "Mersin (Toroslar) City Lab: An Interactive Planning Process for Inclusive Urban Visions in Mersin" is granted by Government of Netherlands, Ministry of Education, Culture and Science, Creative Industries Fund for Open Call Grants for Turkey 2018-2019. Project participants and researchers are Ekim Tan, Nida Naycı, Mehmet Ali Mazmanlı, H. Oya Saf, Mutlu Yalvaç, Hüdaverdi Arslan, Mehmet Ali Kurt, Ekim Tan, Irene Poortinga, Willem Velthoven, Cavidan Aksoy.

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public awareness about participatory and co-creative planning approaches and to make them become active citizens about their city or districts (URL 6). In this point; Mersin CityLab experience is one of the first case focusing on urban transformation process, which is one of the complex and conflictive urban problematics of the city.

### *2.1. Definition of Case-Study Area: The Yumuktepe Mound, Müftü Stream and Informal Neighborhoods*

Case-study area, which administratively comprises Demirtaş and Alsancak neighborhoods today, is located in Toroslar District of Mersin city. The site is bordered with the Müftü Stream and marked with the prehistoric Mound of Yumuktepe, which are important natural and historical landmarks of the city respectively. The Yumuktepe Mound, whose historical background dates to around 7000 BC, is the oldest settlement core of Mersin. Archaeological excavations in the Mound started in 1993 and have revealed historic significance of the site since then (Caneva, 2010). The Mound is located by the Müftü Stream (former name Efrenk), which connects springs of Bolkar Mountains to Mediterranean Coast along 100 km north-south direction while 10 km. of the stream passes through the urban areas (Çakmak, 2010, p.42). The geology and natural context had changed since then, while the Mound reached up to 23 m. and the stream had changed its original streambed in time.

Mersin city has flourished as a port town of Çukurova plain located on East Mediterranean Region after the second half of 19. century (Ünlü, 2007, p.426). The Müftü Stream remained as eastern boundary of the city until 1940s since the historic urban core developed around the port area. North sections of Müftü Stream including today's Demirtaş and Alsancak Districts were enhanced as cultivated fields and gardens of the city, while Yumuktepe Mound remained within agricultural vicinities of the city (Figure 1). The Mound and the River used to be enhanced as recreational destination of families coming from downtown<sup>4</sup>. Mersin city has faced rapid urban population growth due to migration moves especially from Central, Eastern and South-Eastern provinces of Turkey because of new economic investments in the city and development of Mersin International Port (Kaygalak, 1999; Tümtaş, 2009, p.116)<sup>5</sup>. Meanwhile, former agricultural lands located along the Müftü Stream and around Yumuktepe Mound became one of the focal points of this migration process. Former gardens were replaced with illegal constructions and the whole context were transformed into informal settlements of Demirtaş and Alsancak neighborhoods (Figure 2) with severe urban and infrastructural problems (Naycı, 2018, p.135).

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<sup>4</sup> This information has been underlined by number of resource persons during interviews with local residents in the site and workshop sessions of the Project.

<sup>5</sup> According to Turkish National Statistic Records; the urban population of Mersin raised from 221.861 in 1980, to 422.357 by 1990 and to 537.642 by 2000 (Tümtaş, 2009. 116).

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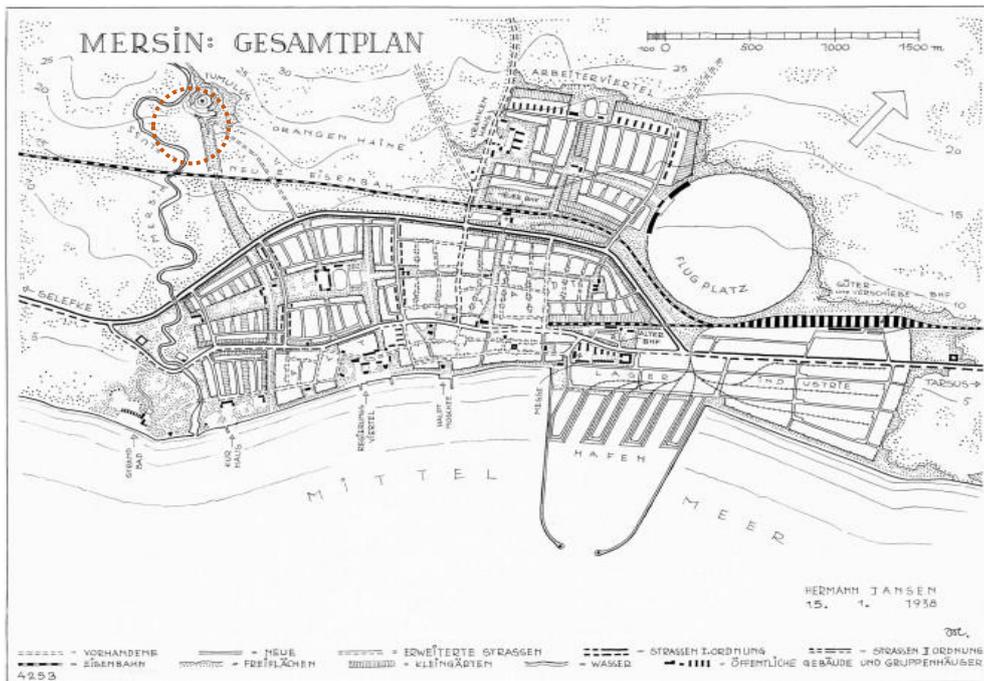


Figure 1 Müftü (Efrenk) Stream as western boundary and Yumuktepe Mound as important landmark of the city in Herman Jansen's plan for Mersin in 1938 (URL 7)

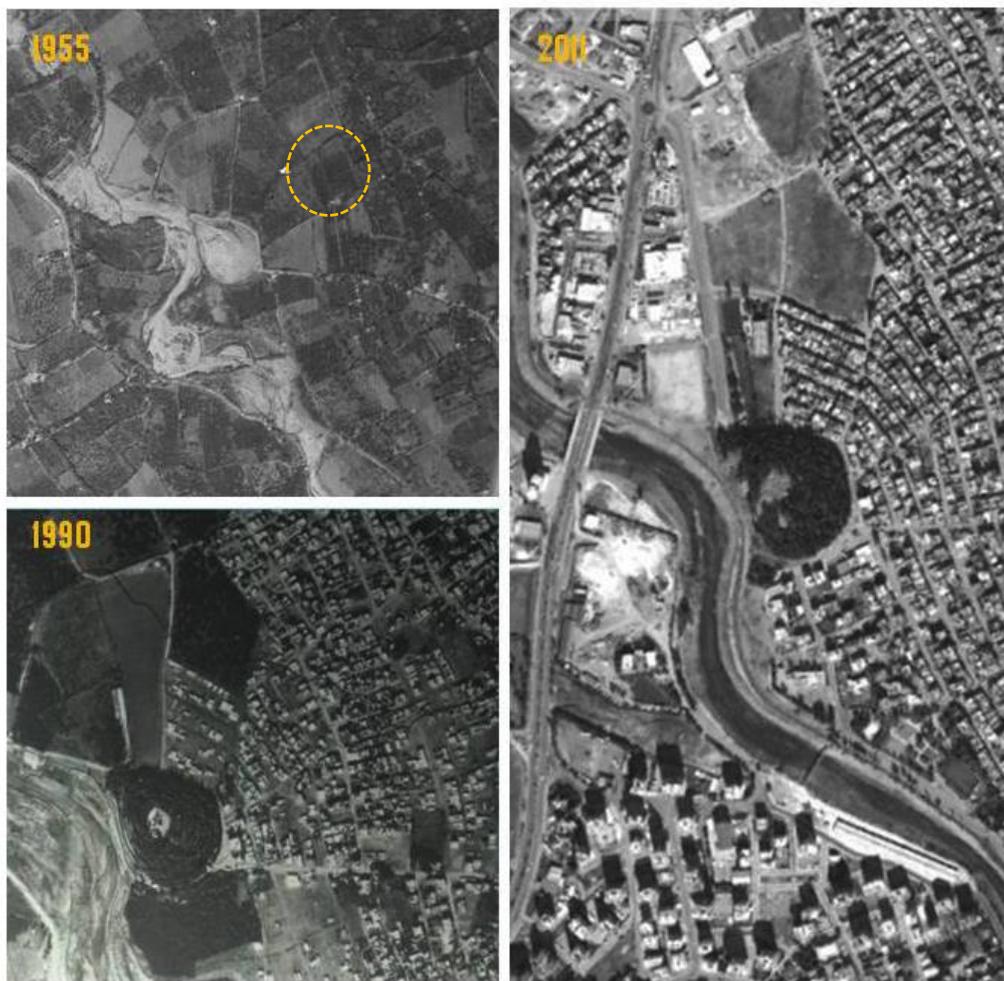


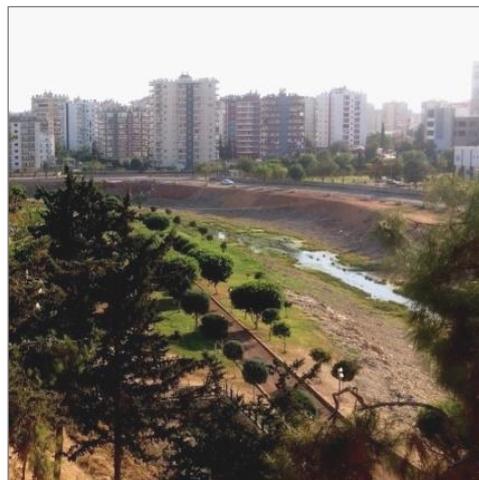
Figure 2 Urban development process around Yumuktepe Mound through 1955, 1990 and 2011 (Nayci, 2018)

The unsustainable development process of the region caused not only urbanization problems but also generated socially isolated immigrant neighborhoods. Gradually; integration of local inhabitants into socio-economical system the city stayed weak and public reputation of the area has become associated with crime and insecurity in time. In addition to social problems in terms of education, access to descent work and housing opportunities; local urbanization problems such as air pollution, sanitary and infrastructure have become important challenges stemming from its informal development background generated for the past three decades. Surrounded by unplanned urban context, significant potentials of the cultural heritage site of Yumuktepe Mound and potentials of Müftü Stream as green and blue corridor of the city has been neglected for a long time.

Another important aspect of the case-study area is administrative fragmentation in the planning and management context of the city. The Müftü Stream borders two administrative districts of Toroslar and Yenişehir Municipalities, each of which is responsible from urban development plans in their responsible areas. Besides; Metropolitan Municipality of Mersin is responsible from preparation of master plans including all districts in the city. Legitimization of low-quality informal settings within Toroslar district in time and recent planning decisions related to high-rise blocks across the river in Yenişehir area have been indicating an uncontrolled and fragmented urban transformation process in both sides of the Stream (Figure 3,4).



**Figure 3** Housing constructions in the informal neighborhoods of Toroslar District



**Figure 4** Changing urban silhouette with new construction in Yenişehir District

The mismatch between the local community and new residents living in high-rise buildings across the stream is only adding to socio-economic tensions in the city. In result, Müftü Stream

becomes a social boundary rather than single natural border separating inhabitants living on each side of the stream. Ecological degradation along the Müftü River and the historic and morphological protection required by the Yumuktepe archeological site add to the complexity of the local development challenge (Figure 5).



Figure 5 Changing urban silhouette with new constructions across Müftü Stream

During the past few years; Demirtaş and Alsancak neighborhoods have become subject to urban transformation discussions since the city grew towards north. Its close location to the city center; existence of Müftü Stream and prehistoric Yumuktepe Mound as significant landmarks of the city revalorized urban-land values of the context again. In order to overcome existing urbanization problems, existing Demirtaş and Alsancak neighborhoods have been designated as “Urban Transformation Zone”, which delivered development planning authority to Mersin Metropolitan Municipality from district municipality. This situation has caused further speculative development and social gentrification pressures in the area. There is recently a number of local investments started in forms of high-rise residential and office blocks around the area. The ongoing developments disregarding local residents poses future social challenges as social gentrification or dislocation of existing residents. The new status of the area has induced a lot of rejections not only from the residents but also from various stakeholders since there is great doubt that proposed master plan will replace the existing urban tissue and historical morphological traces with a completely new urban layout. Besides, there is a high possibility of delivering this transformation process to big investment-contractor companies like occurred in similar examples in Turkey after 2000s.

Within the light of historical and urbanization developments stated above, the selected case-study area portrays a good ‘city laboratory’ to discuss sustainable urban transformation process with circular systems of thinking through an inclusive and participatory process with multiple stakeholders of the city. ‘Mersin CityLab’ Project aims to reveal following urban challenges and potentials of the case study area:

**Historical and Geographical Context:** The case-study area houses outstanding historical and geographical landmarks of city. Müftü Stream constitutes a very important green and blue ecosystem corridor potential passing through the city today. Similarly, prehistoric Yumuktepe Mound represents very important scientific and historic value along the stream. Signals of tourism potentials for developing the Mound as an open-air archaeological site or creating Müftü River waterfront projects have started.

**Built-up Context:** The study area now faces various urban challenges such as unsustainable urban development problems and informal settings generated in time. However, there is still ‘neighborhood’ identity in the site and there is strong awareness by the residents related to this.

**Social Context:** The multi-ethnic social structure of citizens immigrated in past few decades with different backgrounds accumulates very important potentials in means of social innovation resources and alternative local economy models for the city.

Administrative Context: Planning history of the case-study area portrays a local portion from urban migration problems and development challenges of Turkey that have been experienced since 1980s up to present. It provides good basis to discuss a self-organizing decision-making approach in relation with existing top-to-bottom planning regimes.

### 3. Methodology

Mersin CityLab project aims to practice a collaborative city planning methodology for thinking and strategizing city futures by providing a collaborative platform for formal and informal actors of city. The main principals regarding methodological approach of the project can be outlined as follows:

#### 3.1. City Gaming as the Backbone of Mersin CityLab

City-gaming is the main method that has been adopted for integrating a dialog-based collaborative decision-making process in Mersin CityLab approach. City-gaming provide open-ended and dynamic simulation platform where different scenarios by various players can be discussed through game systems. Since Urban Living Labs and City Labs are claimed as 'conceptual laboratories' of cities, where various urban rules are tested, adapted and shaped through participatory sessions; city gaming becomes a strong and highly potential tool to discuss complex urban problems in city laboratories. It provides great opportunity for 'self-organizing' urban development process (Tan, 2017) where citizens and multiple stakeholders can take active role in development of their close environment, neighborhood, or any city context.

The methodology and its tools utilized during Mersin CityLab project have been developed by Play the City<sup>6</sup>. 'City Gaming' facilitating knowledge exchange and required partnerships through multiple city game sessions have been previously tested in CityLab Buikslooterham since 2014<sup>7</sup>. In city-gaming, the goal or urban problematic that is in the focus of discussions are defined as 'game'. Participants whoever contribute to discussions like multiple stakeholders, professionals, citizens, representatives from administrations are called as 'players'. Numerous iterative discussions, which are conducted by participants until a consensus is achieved, concrete or satisfactory results are obtained, have been identified as 'game sessions'. These three pillars constitute general idea of game structure. The city-gaming methodology developed by Play the City (Figure 6.) includes seven stages (Tan, 2017, pp. 42-43). The process starts with defining the game challenge that is expected to display a real-life situation or urban problem. Secondly, the stakeholder network related with subject of discussions is prepared. Following, the data that will be utilized during design of game tools are gathered and processed. Similarly; physical, economic or social resources that will provide input data to the game process are defined. In the next level, game rules and conditions, which will help simulating multiple conditions by participants and moderators are defined. All the tools data and resources prepared to be utilized during game sessions should be bring together through physical or digital platform. This is called as game interface or game room. Having completed all the data, tools, sources and game medium that can be defined as preparation of game format; the game sessions become ready to be played and recorded (Tan, 2017).

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<sup>6</sup>Play the City is an architectural and urban design company established in Amsterdam, who develops city-gaming methodology for city actors according to given urban design problem.

<sup>7</sup> By using city gaming method, various stakeholders joined the initiative to discuss future scenarios and co-created their neighborhood according to principles they obtained after these sessions.

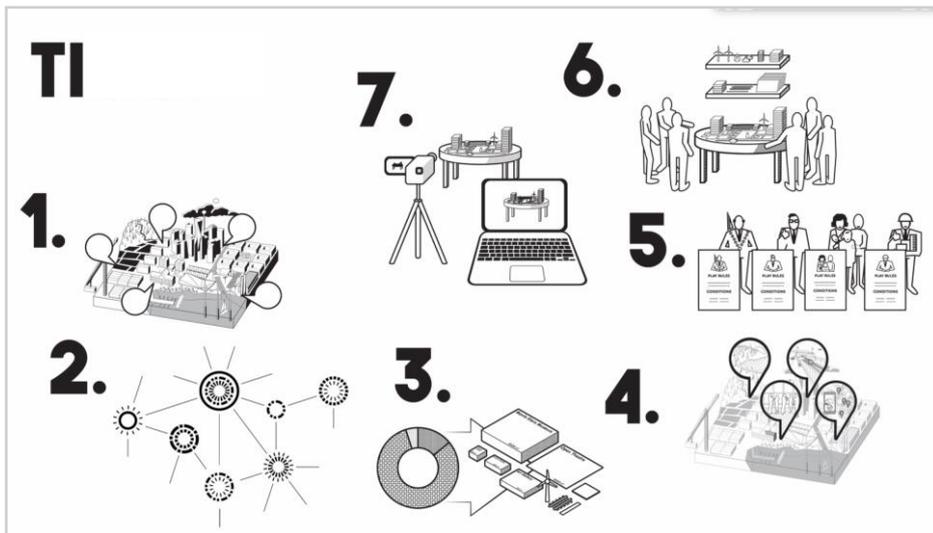


Figure 6 City-Gaming methodology applied during sessions (Tan, 2017)

### 3.2. Circular Systems as the Main Target for Sustainable and Livable Neighborhood

Circular thinking in cities is a systemic approach that integrates flow of energy, water, food, materials and people into sustainable urban development and transformation discussions. Mersin CityLab project aims to define a new dimension for the circular city where multicultural communities are valorized as crucial resources for the regeneration of the city. Beyond flows of water, energy and materials; migration potential of Mersin is assumed as main driver of urban transformation. The multicultural social structure of the city residents provides also great potential for determining social innovation as the key factor for local economy and urban environment. Thus, city-gaming methodology for Mersin CityLab is built on this holistic approach. Based on the input of the first game session, themes of mobility, water, urban agriculture and local economy has come to the forefront (see section 3.3.3); while each circular theme has been linked with workshops and game sessions.

### 3.3. Research and Implementation Stages of the Project

The project starts with literature research and site surveys related to physical, technical, and social capacity of the project area by the research team as well as existing legislative tools to understand circular system potentials of the neighborhoods. This stage has provided important basis for the content of discussions that will be moderated regarding urban transformation principles and define key actors that will join to workshops and game sessions. The project team has conducted physical surveys related to natural and built-up context, existing infrastructural conditions of the settlement, historical and planning background and social surveys through in-depth interviews with the residents in the site.

#### 3.3.1. Identification and Engagement of Stakeholders:

Since the scope of Mersin CityLab has been defined as to facilitate an open dialogue and shared knowledge amongst stakeholders and citizens who feel responsible for the future of their city; focused workshops and game sessions were organized to ensure an open platform for new group of participants around the table each time (Figure 7). Each game iteration has brought citizens, local experts from professional associations and companies, representatives from local administrations and municipalities, academics and NGOs, as well as Dutch circularity experts from Amsterdam Rainproof, Mediamatic and Buiksloterham Citylab on the particular topic. While research team has provided local data related to existing land-use, urban agriculture, urban ecology, mobility, waste flows, and demographical data; all city stakeholders contributed to discussions with their experiences and future expectations from the site.



Figure 7 Participants in the first game session

### 3.3.2. Game Development and Focus of Sustainability:

Play the City team has iterated city gaming methodology during the workshops to support and moderate participants' decisions into city making process. Game utilities help to visualize principles (strategies) of circularity and their reflections on the built environment proposed by players during the discussions. All the collected data obtained during research and survey process have been transferred into the 'game board' that would be utilized as the base platform of discussions. Three groups of game utilities have been prepared for game sessions. 'Roleplay' cards represent actual role or profession of participants who attend the game sessions. 'Strategy cards' represent principles for each circularity concept including water, mobility, food, waste, energy and local economy (Figure 8). And finally building and land-use props represent functions of open and built-up such as types of buildings, housing typologies, blue and green land-use systems in cities (Figure 9). All the game utilities were prepared in 1:500 scales so that results of discussions could be transformed into realizable plans.

<b>ULASIM</b> ULASIM Ulaşım Transfer Merkezi	<b>ULASIM</b> ULASIM Yanıkçılık Servisi	<b>ULASIM</b> ULASIM Yeni Yaşayış Alanları	<b>ULASIM</b> ULASIM Erişilebilir Erişim Servisi	<b>ULASIM</b> ULASIM Denizcilik Servisi	<b>ULASIM</b> ULASIM "Ticari" Park	<b>ULASIM</b> ULASIM Gül ve Akademi	<b>ULASIM</b> ULASIM Kırsal Akademi	<b>ULASIM</b> ULASIM Erişilebilir Erişim
<b>ENERJİ</b> ENERJİ Elektrik Test Hizmeti	<b>ENERJİ</b> ENERJİ Pasif Ev Sistemleri	<b>ENERJİ</b> ENERJİ Fotovoltaik Güneş Paneli	<b>ENERJİ</b> ENERJİ Elektrikli Taahhüt Servisi	<b>ENERJİ</b> ENERJİ Küçük Ölçekli Biyogaz Enerji	<b>ENERJİ</b> ENERJİ Normal Elektrik Servisi	<b>ENERJİ</b> ENERJİ Yenilenebilir Enerji Kullanımı	<b>ENERJİ</b> ENERJİ Düzeltilmiş Enerji	<b>ENERJİ</b> ENERJİ Biyomas - Anarokali Çözümleri
<b>SU</b> SU Su Kullanan	<b>SU</b> SU Kullanım Suyu Servisi	<b>SU</b> SU Yağlı Çöp Servisi	<b>SU</b> SU Su Kütlesi	<b>SU</b> SU Geçirgen katman	<b>SU</b> SU Yer altı su tabakası	<b>SU</b> SU Deniz Suyu Arıtma Sistemi	<b>SU</b> SU Yağmur Suyu Hattı	<b>SU</b> SU İçme suyu Filtreleme sistemi
<b>ATIK</b> ATIK Ahişen Kompost Yapı Elemanlarına Dönüştürme	<b>ATIK</b> ATIK Biyolojik Atık Yağların Geri Dönüştürme	<b>ATIK</b> ATIK Kompost Tesisi	<b>ATIK</b> ATIK Teknoloji atığı	<b>ATIK</b> ATIK Yarıdan Atık	<b>ATIK</b> ATIK Evsel Atıkta Değerlendirme	<b>ATIK</b> ATIK Evsel atık	<b>ATIK</b> ATIK 3D yapılar için değerlendirme	<b>ATIK</b> ATIK Yeniden Kullanılabilir Yapı malzemeleri
<b>YEREL EKONOMİ</b> YEREL EKONOMİ Sürdürülebilir Turizm Tesisi	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Festival Alanı	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Arkeopark	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Sevindirici alanlar	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Aqaponik	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Sesiz üretim	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Ortaklaşa butik	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Organik pazar	<b>YEREL EKONOMİ</b> YEREL EKONOMİ Tatir Atölyesi
<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ İçme suyu deşarjı tesisi	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Çiğnen ürünlerin değerlendirilmesi	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Bal ormanı	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Tahımların genişletilmesi	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Topraklı bahçesi	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Kent çimliği	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Hidroponik tarım (suyla tarım)	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Permakültür çimliği	<b>GIDA DÖNGÜLERİ</b> GIDA DÖNGÜLERİ Kentli mera

Figure 8 Strategy cards representing circular principles of mobility, water, energy food, waste and local economy



Figure 9 Utilization of all game utilities and props onto the game board during game sessions with participants

### 3.3.3. Multiple City-Game Sessions and Workshops:

Five city-game sessions and two workshops with participation of stakeholders were organized in Mersin. The first city-gaming session has provided initial think-tank discussion platform focusing on strategic and larger scale planning questions for the neighborhoods along the Müftü Stream: How to upgrade and preserve the natural riverbank? Which interventions are required for connecting neighborhoods? These fundamental questions provided to discuss future scenarios of Müftü Stream for its enhancement as blue and green ecosystem corridor through the city, circular development principles along the streambed and consider its linkages between the settlements. Participants' expressions onto the gameboard also displayed features for circularity principles and pointed out the focus of following game-sessions.

Workshops, which focused on sustainable mobility and urban agriculture topics, helped participants experience the case-study area and provided new inputs for the thematic game sessions afterwards (Figure 10,11).



Figures 10-11 Workshops and hand-on activities integrated with game sessions with participants

Each thematic game-session (Figure 12) was organized to discuss principles related to circular system thinking based on water, sustainable mobility, urban agriculture and local economy topics:

**Urban Water Management:** Clean water and sanitation has been stated as one of the important Sustainable Development Goals by UN (URL 8). Mersin is climatically subjected to hot and drought seasons during long summer periods and heavy rainfalls during short term winter seasons. So, principles related to sustainable urban water management issues such as preservation of Müftü Riverbank, flood risk zones, household and neighborhood level rainwater harvesting methods, grey water recycling methods, green roof systems were discussed during the game-session. The expected outcomes of this workshop have been identified to explore principles of sustainable urban water management systems that can be integrated into city planning process to achieve adaptation for climate-resilient strategies.



Figures 12 Game sessions conducted according to each urban theme

**Sustainable Mobility:** The role of sustainable transport systems to achieve SDGs was first stated in 1992 UN Earth Summit (URL 9). All levels of transportation systems based on fossil oil consumptions worldwide must be replaced with carbon-free and sustainable systems including mobility systems in cities. The main focus of mobility workshop was how to adapt our cities into more sustainable mobility principles with particular focus on neighborhood level implementations such as bicycle oriented and walkable environments.

**Urban Agriculture and Food:** The increasing ratio of world's urban population has raised the question of food security and sustainable food supply systems for cities. Public policies, structures and systems that will ensure resilience for good and quality food of communities living in the cities have become subject of sustainable urban development studies as well (Whittaker, J. et al, 2017, p. 7). Therefore, there is now a new role a waiting for planners to connect the food system with other urban systems. In this sense, urban agriculture is accepted as anew catalyst for urban food planning process (URL 10). Within the light of these discussions, the content of urban agriculture and food workshop was defined to discuss potentials of food-based planning system for case-study area. Topics related to reducing food waste, shortening local supply chains, improving infrastructure for safe food supply systems, alternative techniques to minimize environmental pollution on soil and water such as aquaponics systems were discussed during the workshop. Expected outcome of workshop has been defined as a holistic urban agriculture vision focused on the empty lands within the study area and along the Müftü Stream.

**Table 1.** Participation of Stake Holders during game sessions

GAME SESSIONS			Game Session #	Game Session #	Game Session #	Game Session #	Game Session #
			1	2	3	4	5
STAKE HOLDERS			Urban think-tank	Sustainable Mobility	Urban Water Management	Local Economy &	Urban Agriculture &
			Municipalities	Toroslar Mun.	Planning & Development Unit,		
Parks & Gardens Unit							
Yenişehir Mun.	Planning & Development Unit,						
Mersin Metropolitan Mun.	Environmental Control Unit,						
	Urban Transformation Unit						
	Water Affairs Unit						
Mezitli Mun.	Social Union						
Local Agency	State Agency for Water Affairs	Mersin Directorship					
NGOs	ÇITTA- Food Society						
	Sokak Bizim Derneği						
	Amsterdam Rainproof						
	Mediamatics						
	CityLab Buiksloterham						
	Roma Community Association						
	Tarsus Slowfood Union						
Citizens	Headsman from Neighborhood						
	Activists, artist, etc						
	Icel College (students and						
Represent of Professional Organizations	Chamber of Architects						
	Chamb. Environmental Engineers						
	Chamb. Landscape Designers						
	Chamb. Commerce & Industry						
	Local Contractors Union						
Academia, Experts, Scientists	Project team members						
	Resource persons from MEU						
	Yumuktepe Res. Team						

**Local Economy and Urban Development:** The focus of local economy game session was to explore economic capacity of the neighborhood based on local resources; innovative and productive potentials of residents. Before the game session, participants conducted a site visit to visualize potentials of the site and understand loops of community skills, local economic activities such as basket weaving of Roma community, pottery-making atelier established for tourism potential of Yumuktepe. Development of existing local skills and establishment of new circular economy principles were discussed under this topic.

The first game session was enhanced as a triggering level for the following city-gaming sessions. So, 38 participants from different professions and institutions have been attended to first workshop (Table 1). According to results of first game-session; four sessions themed with mobility, water, urban transformation and local economy; urban agriculture and food are organized respectively. Thus, the participants of following workshops have been defined according to subject of each session. By this, 93 participants in total have been attended to the four sessions defined for the whole process.

## 4. Findings

Having completed five city-game sessions and two workshops with participation of stakeholders; results and evaluations game sessions have been translated into realizable plans and a circular manifesto has been reached according to collaborative discussions of participants. Suggestions generated related to sustainable urban transformation process for Demirtaş and Alsancak neighborhoods can be summarized with reference to circularity principles as in the follows:

### 4.1. Sustainable mobility:

During the in-situ workshops and mobility game sessions; integrated sustainable mobility solutions such as [electric] bikes, public transport systems, pedestrian zones were discussed. Participants pointed out existing problems and threats that prevent cyclists and pedestrians commuting safely through the site. Accelerated traffic passing along the Stream, traffic jam occurring in the school junction, unregulated vehicle flows through the neighborhood, lack of parking areas were some examples portrayed during the discussions. With the moderation of 'Sokak Bizim Derneği'; participants presented their proposals to overcome these problems and provide sustainable mobility principles in the neighborhood such as new suggestions for vehicle transportation routes, improvements for pedestrian zones, declaration of 'Bike to School' hours, establishment of cycling NGOs in the neighborhood. Accessibility from different parts of the city, greenery of the riverside, significant monument of Yumuktepe Mound increases recreational potentials of the site as one of the attractive destinations in the city. Thus, proposals to integrate biking potentials of the site with the rest of the city are also discussed by participants (Figure 13).



Figure 13 Cycling and experiencing the site before Sustainable Mobility game session



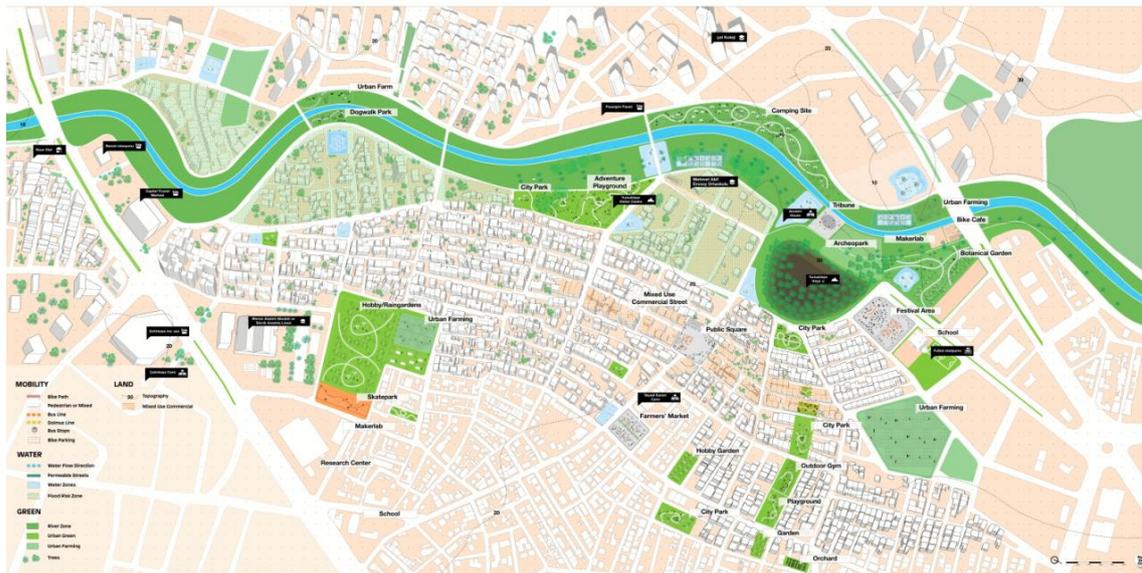
Figure 14 Game session on sustainable urban water management

### 4.2. Urban Water Management:

Sustainable urban water management has been one of the intensely discussed game-sessions with stakeholders. Contribution of Dutch and Turkish experts from Amsterdam Rainproof, Mersin

Directorate of State Agency for Water Affairs and Water Network of Mersin Metropolitan Municipality provided comparative evaluation on recent impacts of climate change on Amsterdam and Mersin, which are threatened by intense rainfalls and flood risks recently (Figure 14). In particular to the study-area; participants have drawn attention to drought summer seasons and heavy rainfalls during winter times. Müftü Streambed has been designated as ‘flood risk zone’ into the current master plans. Within the light of these discussions; urban design principles and strategies in neighborhood level related to rain harvesting methods such as rain gardens and parks with collective reservoirs, street fountains, permeable streets directed towards the stream and rain gardens were developed. Additionally, building scale interventions such as green and blue roof systems to collect and direct roof water towards the street scale collective systems have been proposed. By this way, integrated approach to link building, street and neighborhood scale design principles to collect and reuse of clean water sources through rainwater harvesting methods were discussed. These strategies would provide a more resilient urban water management system for drought seasons of the city. Second group of proposals included ecosystem strategies related to flexible water level control and habitat sustainability along the streambed. During the long and heavy rainy seasons; the water level of Müftü Stream raises and causes flood risk for the buildings along the riverbed. Participants proposed a green belt along the riverbed to provide controlled flood sections managed with appropriate landscape elements. This approach also increases publicity and accessibility of the stream as a recreational zone by the residents and wider users from the city (Figure 15).

Availability of water and mobility experts simultaneously made it possible to integrate ideas for pedestrian and cycle routes and creative use of parking areas along with the water systems. This provided generation of linked ideas from the water and mobility teams; for example, soft parking grounds along the streambed that can be flooded during rainy season.



**Figure 15** Results of participants’ proposals related to land-use, mobility and urban water management strategies in neighborhood scale

#### 4.3. Local Economy and Urban Development:

One of the main aspects of the case-study area are its close location to the central business district of the city. Tourism potential of Yumuktepe Mound, recreational potential of Müftü streambed, existing local markets on each side of the stream, local handicrafts produced in the neighborhood provide important potentials for development of alternative and innovative small-scale business models for local people. Thus, participants developed proposals related to

strengthen socio-economic structure of the neighborhood in relation with new land-use zonings such as culture and tourism areas, recreational axes, and commercial streets.

The study area preserved its 'neighborhood' characteristics, which has been defined as 'positive' by the residents. Although existing housing conditions are very poor and needs urgent improvements; their satisfaction levels from their neighborhood are very high (Naycı, 2018)<sup>8</sup>. They feel connected to their neighbors and expect to preserve their existing lifestyles provided within their neighborhood context. Within the light of these discussions, participants suggested on alternative housing models that would fit circular principles and sustainable goals such as rainwater collection, green/blue roof systems, waste recycle, sustainable building materials; but also would provide collective sharing mediums amongst the neighbors such as parks and gardens, terraced roofs, courtyards within the blocks.

With the contribution of city planners, architects, and environmental engineers in the participants; master plan strategies that would integrate environmental data such as micro-climatic conditions, sun orientation, constant winds, underground water, stream hydrology and topography into land-use zonings and height control of building blocks were proposed (Figure 16). The integration of the neighborhood with the rest of the city in macro-level such as urban transportation and city economy have also been discussed and proposals related to new commercial and mixed-used zones, traffic circulation axis were developed.



Figure 16 Proposals regarding urban redevelopment strategies onto the game board

#### 4.4. Urban Agriculture and Food:

Game session about Urban Agriculture and Food was integrated with workshop activities conducted by contribution of Dutch experts from Mediamatics in Amsterdam and Turkish experts from Tarsus Slowfood Union. Participants shared their experiences related to alternative food production techniques such as aquaponics and community-supported local farming systems during the workshop (Figure 17). During the session, valuable knowledge related to practice of the residents who produce edible vegetables and flowers on green roofs and in their backyards were pointed out. Agricultural sites are present within the newly developed areas especially in northern

<sup>8</sup> In-depth interviews conducted in the case-study area. The results of this social research is analyzed and discussed in another paper (Naycı, 2018, p.142)

sections along the Stream. Although animal husbandry within the city is banned due to current urban laws, the practice still continues. Volunteer groups supporting local farmers and safe food production are increasing each day. In the framework of these inputs, participants developed proposals such as circular farm models, alternative food production systems in aquaponics, community gardens, collective compost systems to be located in neighborhood food markets to increase existing food production and farming activities along the Müftü streambed and in the neighborhood; and their transformation into more sustainable urban agricultural lands (Figure 18). By this way, an alternative economy can be created for local residents while accessibility of citizens to good and fair food is achieved at the same time.



Figure 17 Aquaponic workshop before game-session on urban agriculture and food



Figure 18 Urban agriculture proposals during game-session

#### 4.5. Development of the Circular Manifest for a Liveable Neighborhood:

Based on the outcomes obtained during the game sessions and workshops spreading over one-and-half year; the project team conceptualized the content generated collaboratively by the stakeholders all through this process into a realizable plan (Figure 19). Altogether evaluation of collaborative debates, decision-making game sessions and research conducted in the neighborhood provided to develop a set of comprehensive proposals, which offer complementary design, policy, planning and strategic interventions for future development of the study area. Some of the results provided tangible and concrete design interventions that can be implemented by the local agencies, residents or civil society organizations; whereas some proposals include long-term visions which needs change of mindsets towards more circular systems of thinking by policy makers.



Figure 19 Realization of stake holders' proposals developed during game sessions

## 5. Conclusion

Citylabs can be conceptualized as “an autonomous platform where both formal and informal parties can meet for exchanging knowledge and ideas and plan the future of their city”. They create a relatively neutral, collaborative and open-ground platforms outside existing formal institutions. Being the smallest planning unit in cities; neighborhood-level development and regeneration processes are complex urban problems, which necessitate long-term and participatory decision-making process to achieve environmental, social, cultural and economic pillars of sustainable development goals. In this sense, Urban Living Labs and City Labs provide a co-creative planning and design process with contributions of its residents, multi-disciplinary professionals, and responsible authorities. Testing an idea, displaying alternative scenarios are possible before large scale urban interventions are implemented. In this sense, it supports flexible and reversible decision-making process which also makes it more resilient and adaptive against unpredictable changing conditions.

Since Mersin CityLab experience has a research-based target rather than real-life or institutionalized Urban Living Lab or Citylab establishment; its main purpose is to evaluate its participatory impact on citizens. Therefore, the game sessions and workshops organized during Mersin CityLab process have provided to monitor stakeholders' participation levels into game sessions and workshops (Table 1) and to understand variety, motivation and collaborative capacity of city actors.

The Mersin CityLab experience has shown that participants are open to share their knowledge with others while they also welcome new ideas in such inclusive and collaborative platforms. The scope for reaching ‘common goods’ by the consensus of multiple stakeholders increase motivation of individuals to be a part of solution as well. Secondly, managing multi-facet discussions needs transformation of complex and technical data into an understandable platform by all participants and moderation of discussions by experts so that concrete and applicable results can be achieved in the final. In this sense; city-gaming method which has been prepared and moderated on real data gathered from the case-study area increased motivation of participants and efficiency of results gained in the result (Table 2). Besides, hand-on activities provide participants “learning by doing” opportunities, which accelerates spread of new information, techniques or skills amongst people. For this purpose; defining appropriate methodological approaches in City Laboratories are so important as increasing number of these platforms in cities.

Table 2 Feedbacks from participants in Game Session # 1

<p><i>"Provides interactive information sharing, arouses new and different ideas"</i> (Environmental Engineer)</p> <p><i>"visual and catchy, experimental so it is easy to see gaps and revise proposals"</i> (City Planner)</p> <p><i>"Efficient method, especially local municipalities should use this method in urban design processes"</i> (member of Mersin Chamber of Commerce and Industry)</p> <p><i>"Helps to visualize different urban issues altogether"</i> (Expert from Toroslar Municipality)</p> <p><i>"unites all participants and their ideas"</i> (Expert from Water Affairs of Mersin Metropolitan Municipality)</p> <p><i>"increases participation"</i> (Agriculture Engineer, Flowerist)</p> <p><i>"fast and useful flow of information"</i> (City Planner, Toroslar Municipality)</p> <p><i>"enjoyful, we could develop common solutions without knowing each other before"</i> (Architect)</p> <p><i>"interdisciplinary medium, easily exchange ideas with others"</i> (Landscape Designer)</p> <p><i>"generation of tangible and collective ideas"</i> (Manager in Agency Company)</p>
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## Resume

Prof. Dr. Nida Naycı graduated from Department of Architecture in Middle East Technical University (METU) in 2001. She completed her M.Arch and Phd degrees in Restoration and Conservation Program of METU. Her field of interests are cultural heritage site management practices, participatory planning approaches, involvement of local communities and history of architecture. She has been involved in a number of national and international projects regarding conservation and management plans of heritage sites. She teaches in Architectural Department and Graduate Program in Conservation of Cultural assets in Mersin University.

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