

## **TDR Approach Employment in Dealing with Metropolitan Area's Sprawl; Isfahan Metropolitan Area, District 9**

*Sahar Nedae Tousi, Bahareh Hardani, Ehsan Ghorbani Gheshghae Nejjhad*

(Associate Professor, Sahar Nedae Tousi, Shahid Beheshti University, Tehran, Iran, s.n.tousi@gmail.com; s\_tousi@sbu.ac.ir )

(MS in Urban Planning, Bahareh Hardani, Shahid Beheshti University, Tehran, Iran, b.hardani69@gmail.com )

(MS in Urban Planning, Ehsan Ghorbani Gheshghae Nejjhad, Isfahan Art University, Isfahan, Iran, ehsan\_gh20@yahoo.com )

### **1 ABSTRACT**

Transfer of Development Rights (TDR), as a market-led mechanism, attempts to managing the urban growth and facing urban sprawl, with reference to the valuable lands, through balancing between public and private interests. This approach has been raised following the master plans inefficiencies in protecting valuable natural lands and zones. Due to the master plans failure in facing urban sprawl and managing the cities' growth in a smart way in Iran this concept has been put forward in academics and professional arenas in recent decades. But, due to the lack of institutional context and necessary soft perquisites, it has not been realized and moved beyond theoretical fields.

Similar to most of the Iran's' city districts, district no 9 in Isfahan Metropolitan Area- which is famous because of its orchards and landscaped lush and productive agriculture-has been exposed to the commercialization and mass unplanned constructions. As a result its valuable environmental assets, which act as a respiratory lung of the city, exposed to destruction. This is while many lands are abandoned within the city. These issues raised the necessity of TDR approaches employment for the aim of growth management. In this regard, the main question is that what the main institutional perquisites are and by which means a reliable institutional context would be provided for realization of this mechanism in the selected district as the research case study.

The following research, with the intention of answering this question, is up to identify those theoretical perquisites through literature reviews methods such as meta-synthesis and field research methods. Afterwards, due to the extracted conceptual frameworks, 4 main institutions' vision about TDR's soft perquisites, including citizens, developer, landowners and urban experts, would be analyzed by means of statistical methods such as Friedman and T tests, Multivariate regressions and SWOT analysis. Based on the results, this approach employment requires long term smart plans to achieve successful outputs, since variety of institutional barriers such as low regional consciousness, unwillingness to participate and not providing the necessary legal grounds.

Key words: Transfer of Developmental Rights (TDR), Urban Development Institutional Capacity, 9th District of Isfahan Municipality, urban sprawl, smart growth

### **2 INTRODUCTION: THE RESEARCH QUESTION AND CONCEPTUALIZATION OF THE TRANSFER OF DEVELOPMENTAL RIGHTS (TDR)**

The increasing urban population in recent decades has caused an unplanned expansion of the cities, with the highest pressure on the agricultural land inside and outside the cities. However, the protection of agricultural lands and gardens in 1950s and later, in particular with the discussion of sustainable development issues, has been specifically addressed and turned into operational agendas. Nevertheless, the experiences during the past decades have shown that urban development plans and current regulations to protect valuable natural assets have not been effective. In seeking operational and enforcement strategies for protection, new perspectives on urban and regional development planning have been presented which are market-oriented. Among these are the approaches presented in 1990s in the world leading to the production and delivery of efficient tools for market's capacity utilization in policymaking and planning for urban development. One of the most successful approaches among these is TDR. The concept of "transfer of the development rights" emerged for the first time in the 1960s as a tool for historical protection (Linkous, 2016: 162). In the 1980s and 1990s, followers of the society protection reported the dramatic environmental and economic potential of TDR programs, believing that these programs would provide permanent protection of land with an environmental or historical value. Following this claim, many TDR programs were developed in the United States (Messer, 2007: 47). The TDR by striking a balance between the public and private sector interests is trying to manage the city's growth and development. Depending on the circumstances and purpose of the application, related approaches have emerged: Transfer of Development Credit (TDC), Purchase of

Development Rights (PDR), Residential Density Transfer (RDT), Development Fee, Density Transfer Change or Density Transfer Fee (DTC or DTF), and Development Rights Certificate (DRC) among all. The main idea of the approach outlined above is to protect against development, yet they are different in details as summarized in Table 1 in a nutshell.

Definition	Approach	Definition	Approach
All construction is required to pay the development fee, and the proceeds belong to the owners who are volunteers to permanently protect their valuable assets (Pruetz, 2003: 83)	Development Fee	This program first emerged in the United Kingdom in 1990s to preserve agricultural lands. By purchasing development credits from public lands and transferring to postal areas, this mechanism provides permanent land protection using a public / private hybrid model (with direct state intervention) (Greenaway & Good, 2008: 10).	Transfer of Development Cost
Part of the surplus value obtained is absorbed through increased development potential and used to compensate for the loss of decreasing development potential elsewhere (in cash) (Fulton, 2004: 31)	Density Transfer Fee	This program was first introduced in 1980s in order to protect the agricultural lands. In this mechanism, development rights are purchased and permanently abandoned requiring funds from government and nonprofit organizations (Nelson, 2013: 22)	Purchase of Development Rights
A tool for government officials to access the lands needed for public use without requiring cash (CFSD, 2015: 14)	Development Rights Certificate	Part of the TDR program is aimed at transferring residential density (Oto, 2010: 4)	Residential Density Transfer

In general, the TDR is a legal mechanism that allows developers who have purchased the development rights from landowners in other areas, allowing development beyond the project's permitted density in the designated areas (Cowan, 2005: 404). In other words, the TDR is a law for the use of land, in which the rights related to development can be taken from the size and extent of the land and sold in the market (Taintor, 2001: 8) This approach is considered as a modern way of monitoring the development of the land, which has been used in developed and (in recent decades) some developing countries along with other methods of controlling and monitoring urban development. Regardless of its role in urban development, TDR is important in reducing the inequality and ensuring fair rights for individual owners (Azizi and Shahab, 2012: 3), so that Chan and Hu (2015) consider the TDR as a balance between protection, property rights and development.

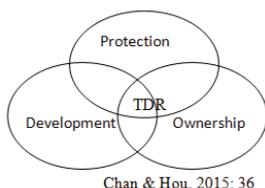


Chart 1: TDR – Balance between protection, development and property rights

In all societies, government actions have an inevitable impact on the value of land. Most planners, in accordance with the constitutional considerations, refrain from government actions that cause devaluation, unless the cost of damages to the people is determined and provided because compensation payment is a huge expense. TDR is a mechanism that convinces the landlords to voluntarily accept high-value rights that reduce their value of ownership (Ardestani, 2008: 21) because it provides conditions to compensate the owner with the property for the loss of their development rights. (Tavares, 2005: 4). In Iran, in spite of the laws (the law of preserving the use of agricultural lands and gardens and its amendment, the implementing regulations on the amendment of the law on the maintenance of agricultural lands and gardens, along with the related amendments), plans and projects, administrative authorities, and numerous commissions on protecting the natural surroundings inside and outside the cities, conservation objectives have not been properly implemented so far. Especially in metropolises or large cities, landowners tend to change the use of agricultural lands and gardens due to their added value.

Also, the policies applied to preserve the greenness of the cities and their regionalization have had adverse physical and economic consequences. As a result of the decrease in land prices due to the restrictions for the construction on agricultural lands and gardens, unauthorized industrial activities, workshops and warehousing in the agricultural lands and gardens have been developed as well as illegal construction (sustainable development plan of Isfahan, 2009: 22). The growth in the price and value of land in these areas is not equal to other parts of the city which has contributed to the limitation of the decent development. The 9th district of Isfahan municipality, which has been formed from joining villages to the city, includes agricultural and horticultural lands along with natural assets such as valuable natural landscapes of Najvan (natural and urban tourism axis). However, despite many efforts to protect them, these assets are still in danger of being destroyed. According to the management of district 9 of the Isfahan municipality, "changing the land use is one of the main demands of citizens in the area from the municipality"(Beautiful Esfahan,

2017). On the other hand, the urban management approach and that of the institutions responsible for protecting the valuable land of Najvan (land acquisition by the municipality started in the 1980s, with the motive of creating an impassable recreational axis) has led to the implementation of disruptive tourism plans that are not in harmony with the principles of sustainable development and have doubled the air pollution of Isfahan while damaging the natural ecosystem in this area. In addition, horticulture and maintenance costs of gardens are not cost-effective for gardeners in Najvan area, and these lands are gradually become dry and deserted, while construction is stepping into this area (detailed overview plan, 2003: 115).

Accordingly, in order to protect the agricultural and horticultural lands of the region, it is felt that there is a need for effective plans, which can both help to protect agricultural and horticultural lands, as well as the rights of citizens. Considering the issues raised, the TDR approach is important in terms of its instrumental capabilities in reducing inequalities and ensuring the fairness of individual property rights of the landowners in the possibility of land development in order to create equilibrium and equity in the interests and losses caused by different situations which is due to the implementation of urban planning rules for various lands.

### **3 CONCEPTS AND VIEWS, THEORETICAL AND EMPIRICAL BACKGROUND OF THE TDR APPROACH**

TDR programs can be divided into three periods in their evolution. The concept of TDR was first introduced by Gerald Lloyd (1961). After its introduction, the TDR implementation plans soon were offered and scientists tried to examine the effectiveness of the "first generation" TDR programs. Some of these first programs were performed in places like New York City, Collier (Florida) and Calvert (Maryland). The programs focused on the practical aspects of TDR programming while providing suggestions for the "second generation" of the programs. The second wave of the TDR program began in the 1980s. These programs include Montgomery (Maryland), Pinelands in New Jersey, Boulder (Colorado), Tahoe Regional Planning Agency (CA), etc., focusing on the importance of stakeholders and their involvement in design and implementation of programs. In the "third generation" TDR programs like the Triston program (Washington), which still continuing, has been a simultaneous emphasis on participation in programs and incentives (Kaplowitz et al., 2008: 379-380).

The key to the realization of any TDR program is the concept of "sending area" and "receiving area". The sending areas are those introduces through the zoning with environmental or historical values (sensitive sites) that send their developmental rights to the areas that are suitable for development (Triedman et al., 2014: 6-7).

TDR mechanism (Transaction Mechanisms): TDR is an innovative land use tool that can help communities implement growth management policies and plans and, as a voluntary and market-based mechanism, exceeds the regular zoning process (Bratton, 2008: 1). In the TDR approach, it is assumed that the development right of a piece of land as part of the transferable rights can be sold and used in other pieces (Tavares, 2005: 3). As a result, the right to develop the land is separated from the property without changing the ownership, the owner can then continue to use the land based on the contract (Bratton, 2008: 3). A Transfer Development Certificate is transferable in the market, and when the right market is a competitive one, development rights can be redeemed, which causes the price of the protected land to be updated while earning more profit. (Tavares, 2005: 5). The TDR exchange mechanisms are widely variable, which are used depending on the circumstances and the context of each system and country. Some of these include private market exchanges, including buyer-seller exchanges, private sector exchanges with public sector support, intermediary exchanges, TDR banks and private funding firms (Bratton, 2008: 3).

TDR Actors; Bratton (2008) believes that there must be at least three separate actors in order to complete a transfer of development right. These actors include: the development rights vendors (property owner), development rights buyers (builder or developer), and supporting public community that ensures the rules and regulations of the program and guarantees fair play. Triedman et al. (2014) also refer to the effective role of the community and the local government in addition to the mentioned actors, so TDR actors can be considered as four groups: development rights vendors, development rights buyers, trade support (Bratton, 2008: 3 -4) and the general public (Triedman et al, 2014: 19).

The Institutional Ground and Capacity: Institutions are the rules of the game in society, or in other words, they are more scrupulous constrains by humanity that forms the interactions of human beings with each

other. As a result, institutions organize the hidden motives for human exchanges (Farajirad and Kazemian, 2012: 139). In other words, institutions make the world simpler and make people more logical and social. The rules only develop if the community recognizes its ultimate goals. However, determining the goals depends on how the society thinks in interpreting the world. Therefore, institutions develop only in an institutional context. In this institutional framework, people are turning to their daily routine, and they can regulate their behavior if their experiences go well beyond what they expect. Keizer, 2008: 13).

An institutional context includes a set of policies, legal frameworks, resources, incentives and mechanisms governing relations (IFAD: 1). In other words, an institutional context is a set of institutions. Institutions are the rules of the game in a society, and the institutional framework points to how the rules of the game are combined and arranged (Zamanzadeh and Al-Husseini, 2016). Without a full understanding of the context and institutional framework, many factors that are likely to have a great impact on how changes occur, are considered as "axioms" or hazards that are unchangeable, and actors are unable to change them (IFAD: 1). For this reason, the recognition and comprehension of the institutional framework is of the necessities for any change in a society. For example, the institutional context of the developed countries is completely different from developing countries, and obviously institutional capacity must be different accordingly (Robin & Stephen, 2004: 18-19).

Institutional capacity is one of the main concepts, but also the major concept in institutional approach (Farajirad and Kazemian, 2012: 103). Evans and colleagues considered capital or institutional capacity as a key element of local government and referred to three main dimensions as organizational resources, knowledge and leadership of local governments. They pointed out that having this capacity can be a trigger for change (Mohammadi, 2014: 45). Institutional capacity, due to its broad concept and its high importance, has been studied and evaluated by various individuals and institutions in recent years in various fields of study. It has also been presented while the dimensions and indicators for its evaluation have been presented depending on the conditions of the field of analysis. In the table below, the views of some experts are observed (Table 2).

Components and indicators	Perspective on institutional capacity	Writer
The ability of institutions (human capital, resource availability, purposefulness, incentive system, inter-institutional relationships, and flexibility), the integrity of institutions (inter-sectoral relationships of institutions, collective capacity of institutions), knowledge of institutions (formal knowledge and indigenous knowledge), learning the institutions (interactive learning, experiential learning, continuous learning) and appropriate legal arrangements (legibility, legal ground)	Regional institutional capacity	Farajirad & Kazemian (2012) Kazemian et al. (2013)
Inter-sectoral integration (integration between policies, laws, regulations, organizations and methods), balance bottom-up and up-bottom approaches (corporation of the two levels, utilizing low level participation of people for better understanding of needs and solutions to problems, high level participation of managers taking into account the national needs and interests), the credibility or legitimacy of policies	Development institutional capacity	Michel(1994)
Flexible structures, Incentive system, Assistance mechanisms, Coordination, Leadership, Internal relations quality, Networking, Objectives, Clear missions	Institutional Capacity in the Form of Organizational Capacity	European Commission(2005)
Committed employees, political will, education, common practice and creating networks for taking measures	Sustainable institutional capacity	Evans et al.(2005)
Human capital (knowledge, skill, experience), social capital (mutual trust, values, attitudes and behaviors, commitment, motivation, sense of belonging, networks, relationships), institutional capital (governing arrangements), economic capital (infrastructure, Financial resources)	Institutional Capacity Measurement and Capacity Building Measures	Ruims(2008)
Individual capacity (technical skill and knowledge of individuals), internal and organizational capacity (organizational strengthening including policy development, methodology, structure, network and participation, including formal and informal relationships, constructive interaction with other stakeholders, open and transparent inter-organizational relations, Regular and continuous information exchange, Support for organizational learning, Organizational paths and perspectives, Periodic evaluation of resources), External rules and incentive arrangements (support for regulations, transparency of regulations and responsibilities, community support for participation in decision making, access to technical and financial resources required)	Institutional Capacity in Organizational Content and Public Management	Dimen(2008)

Source: Writers, Adopted from the sources mentioned

Theoretical and empirical background to the research on TDR: According to the studies, the United States has been a pioneer in the use of TDR programs and has so far gained much success in protecting the TDR mechanism. For example, in Pinelands (New Jersey), an ecologically valuable area in southern New Jersey, in 1980, with the purpose of land management, the Pinelands Commission formed and decided to use the TDR program to protect the lands.

The commission managed to protect at least 16,000 acres of land by 2014 and achieve a high level of success (Triedman et al, 2014: 22). On the path to success in this program, the institutional indicators of "knowledge, commitment, professional staff, internal and inter-organizational integration, a prominent organizational vision, flexible structures, regular exchange of information, mutual trust among all stakeholders, participation, the existence of financial resources, economic incentives, the existence of infrastructures, the

legal framework and the transparency of laws" had a significant impact in this program (Bratton, 2008: 11-12; Triedman et al, 2014: 21-24).

The TDR in Montgomery (Maryland) developed with the aim of protecting agricultural lands and natural resources between cities as well as increasing the density of residential development by increasing the commercial base of existing centers. This one has been another successful program in the United States that has so far been able to result in the protection of 49,000 acres of agricultural lands (Otto, 2010: 35). In this program, in order to achieve maximum protection, both TDR and PDR mechanisms are used simultaneously (Bratton, 2008: 14-15). Owners who want to preserve their natural resources and agricultural lands are attracted to the PDR program, and landlords who are willing to reduce the density of residential development in their property will tend to the TDR program (Otto, 2010: 3). The success of the program depends on institutional contexts such as knowledge, specialized staff, internal and inter-organizational integration, specific organizational vision, regular exchange of information, mutual trust among all stakeholders, networks, financial resources, economic incentives, legal and regulatory contexts" (Walls & McConnell, 2007: 38-45; Bratton, 2008: 14-15; Otto, 2010: 3-35).

King County (Washington) approved the TDR program in an effort to limit the urban dispersion. The state legislature passed the Growth Management Act in 1990. Then, in 1999, the King County Council allocated \$ 1.5 million to create the TDR Bank in order to purchase development rights from rural and natural areas (SGA, 2008: 3). The focus of the program has been on the preservation of rural lands and the separation of urban lands in order to prevent the invasion of Seattle's suburbs (Huang, 2011: 40). Based on the studies, "knowledge, commitment, interconnectivity, interagency, specific organizational vision, trust, partnership, financial resources, economic incentives" are indicators of the institutional capacity to achieve success in this program.

China sought to find a way to deal with urbanization problems, including the destruction of historic areas, agricultural areas and urban dispersal until it started getting information about the TDR in 1990s and, despite the different social, cultural and land ownership systems, has so far been able to implement this mechanism in several provinces (Huang, 2011: 9). In the socialist system of China, development rights are considered as individual rights, which are valid as much as land ownership. In China, these rights are relocated as the person relocates, that is they are not transferred individually. The majority of TDR programs in China have been implemented in rural areas aimed at transferring the development of agricultural land to residential areas. One of China's successful plans is the Zhejiang Province Trial Program, which was implemented in 2000 and succeeded in protecting 50% of the natural and agricultural lands of 13 villages and towns (Ibid: 49-55). To achieve success in this program, indicators of "inner and inter-organizational integration, specific organizational vision, trust, partnership, availability of financial resources, economic incentives, legal ground and transparency of laws" have been considered.

The Indian state of Karnataka in the 200s saw the rapid growth of immigration and, as a result, the demand for basic facilities such as housing, water resources, health, transportation, schools and hospitals, which resulted in massive pressure on the state regarding the land and the financial resources needed. In 2005, Karnataka introduced the TDR tool to explore new infrastructure facilitators. In this system, offering the DRC instead of cash led to the possibility of providing the required infrastructure by the authorities. Based on this, 2186 DRC certificates were issued (CFSD, 2015: 14). This TDR program aimed at providing a win-win situation for the city as well as the owners along with the access to urban land for public use without conflict. Although information indicates that, given the development rights granted, land owners are resisting DRC admission, and the program has failed to achieve all its goals (Ibid: 24-32). An evaluation of the implementation of the program demonstrates shortcomings in the implementation of the TDR; the lack of transparency of the program (the lack of transparency of construction projects), the lack of information for the buyers and owners of the TDR, the incompleteness of the information and documents related to the transactions and their non-digitization, being influenced by TDR incentives of planning policies and administrative processes for economic benefits (Ibid: 40-45).

In Iran, several studies have also been carried out on the mechanism for the TDR to protect valuable lands and the possibility of its implementation in the context of Iran and in various dimensions. Mohsenzadeh (2010) concluded in his research that the TDR program aimed to protect the agricultural lands of Babolsar and other northern cities of the country was appropriate because, if successful and correct, they would lead to

more profit to farmers, urban clever development and the improvement of agricultural land degradation. Also, Mohebbi and Zakir Haghighi (2015) in their study in 2015 found that the TDR program, due to its more profitability for farmers in case of monitoring its proper implementation, has the ability to be executed in Tonekabon and protect the agricultural lands. In the research carried out by Rafiyan et al. (2011), the use of the TDR mechanism is appropriate to protect Qazvin gardens. In this regard, the Arezou Zare (2015) in her research entitled "The capacity measurement of the TDR method in the realization of urban development plans, Ghasr al-Dasht gardens, Shiraz" concluded that the use of the TDR mechanism for the protection of Shiraz gardens is appropriate because of the balance it maintains between the public and private interests and, thus, the willingness of the owners to participate in the protection.

From another perspective, Azizi and Shahab (2012) studied the use of the TDR mechanism as complementary to urban development plans, and found that using this mechanism contributes to the implementation of the plans helping the interaction between properties and planning rights. Mozafaripour and Soltani, in their study in 2014, stated that in general, the success of TDR's mechanism, apart from the purpose of its application, is dependent on the supervision of local governments. Also, they stated that in order for the landowners to welcome the program, transactions must be mediated by a general institution (Mozaffaripour and Soltani, 2014).

Tousi and Bagheri in summarizing their research on explaining the sprawl phenomenon in the metropolitan city of Shiraz (Tousi & Bagheri, 2017) introduced the TDR along with policies and approaches such as smart growth, as an effective approach for confronting the sprawl phenomenon in metropolises. In a study in 2017 titled "Feasibility of the TDR Implementation in Providing Urban Services in Shiraz", this mechanism was considered necessary for the provision of needed land for proper urban services (Farsi Farashbandi et al., 2017). In the studies conducted by Zare in 2015, the use of the TDR mechanism for sustainable urban renewal was addressed while it was pointed out that in pursuit of the desired goals, this approach should take the process of localization according to Iran's conditions (Mohammad Zare, 2015). In the end, Mohammadi et al. (2017), regarding the evaluation of the TDR implementation in the 9th district of Isfahan in legal, social, economic and physical dimensions, found that the area enjoys the capacities for the implementation of this mechanism such as the tendency of the urban management towards the protection of agricultural and horticultural lands as well as the existence of suitable sending and receiving areas.

Apart from the academic fields, many research projects have been conducted or currently under conduct regarding TDR implementation. Among them are Isfahan regional study aiming to guide the development and conservation of the agricultural and horticultural lands along with the emphasis of the master plan of Tehran, Mashhad and Shiraz on the protection of the Qasr al-Dasht gardens. However, despite the fact that this approach has been considered as a proper protecting approach in Iran, due to the lack of adequate institutional framework, no plans have been put in place yet and the TDR mechanism has failed to take action. Also, most studies have less focused on the need to provide institutional frameworks, and addressing this issue has often been briefly discussed during other topics. Assessing the existing institutional conditions for implementation is one of the most important prerequisites for entering the implementation phase of the TDR mechanism in Iran, which is the focus of this research.

#### 4 INFERENCE OF CONCEPTUAL FRAMEWORK AND METHODOLOGY OF RESEARCH

Reviewing the theoretical foundations, domestic and foreign experiences and research, the theoretical / conceptual model of the research is deduced presented as the following figure. Achieving this model is possible through step-by-step actions; (1) reviewing research and projects related to the institutional capacity of urban development and extracting indicators of institutional capacity assessment from different sources; (2) evaluating the validity and reliability of the indicators based on their frequency of use in different texts through meta-synthesis, selecting more reliable theoretical indicators and categorizing them into five groups: individual capacity, organizational capacity, social capacity, economic capacity and legal arrangements according to the purpose of the research; (3) evaluation of the indicators for measuring institutional capacity, in domestic and foreign projects and research to achieve the most important indicators of institutional capacity which are effective on the TDR implementation (based on the frequency of use and reference to indicators in the experiences and research); and finally (4) the presentation of the conceptual framework of the research is described in Fig. 2. Theoretical model of research has tried to illustrate effective actors in

realizing the TDR policies and the capacities needed to successfully implement TDR programs in terms of theoretical relationships and indicators.

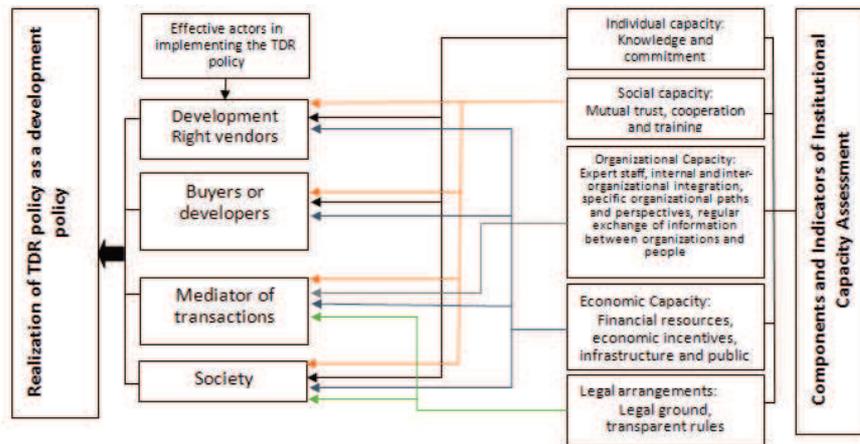


Chart 2: The conceptual/theoretical framework of the research

The present research is based on the purpose of applied research type as well as the nature of the descriptive-analytic type. Based on the methodology of research which is a combination of qualitative and quantitative methods, several basic steps have been taken: First, based on documental studies, theoretical components of the research are extracted and indexed through meta-synthesis and then, using a social survey method, structured and semi-structured questionnaires (in order to determine the main categories and design of the final and structural questionnaire), the 9th district of Isfahan has been evaluated from regarding these components. The completed questionnaires included information on the effective components of TDR implementation, which was developed in four groups (1) people, (2) owners, (3) developers, and (4) experts and specialists. Then it was distributed among groups of respondents with different sample sizes.

The sample size of the group of owners and people was determined using Cochran's formula with a 90% confidence index because the size of the population was relatively obvious. The sample size in these two groups was 89 and 96, respectively. In order to determine the sample size of the developers and specialists, a targeted sampling method was used based on the researcher's judgment and the sample size was 50 and 30, respectively. Finally, the results of the questionnaire were summarized and analyzed using descriptive and inferential statistical methods (such as regression, Friedman test, T-test, etc.) in Excel software and SPSS. In the final step, using the SWOT matrix and the Quantitative Strategic Planning Matrix (QSPM) analytical methodology, appropriate strategies have been formulated and prioritized. In the following, after the introduction of the selected research, the results of the methodology will be explained.

## 5 THE SCOPE OF RESEARCH

The 9th district of Isfahan municipality with an area of 2025 hectares is located on the western border of Isfahan and north of Zayandehrud River (Statistics of Isfahan, 2011: 20). As shown in the picture below, this peripheral area formed by the joining of several villages is rich in plentiful land, as well as fertile agricultural lands and extensive gardens (detailed review plan, 2002: 11).

The poor supervision of the urban development planners on these lands and the high level of greenery has led to a tendency towards construction in this area, and on the other hand, the profitability resulted from the conversion of agricultural and horticultural lands to other inappropriate uses as well as the policies to maintain greenery (the reduction of land prices due to the restrictions on the construction in agricultural and horticultural lands and, consequently, the establishment of illegal industrial activities, workshops and storage) has led to the destruction of more and more valuable natural areas of the region (Sustainable Development Plan Isfahan, 1388: 22).

In addition to the agricultural and horticultural lands, in this area the valuable lands of Najvan natural park are located in the north of Zayandehrud River which due to the western winds and most pollutant industries in western Isfahan has led to the urban management taking actions for protecting these lands. One of the most prominent of these measures is acquiring the ownership of horticultural and agricultural lands and the

implementation of tourism projects, although this policy has caused more destruction of these lands due to the presence of tourists (and in the absence of proper protection planning) (Same: 115).

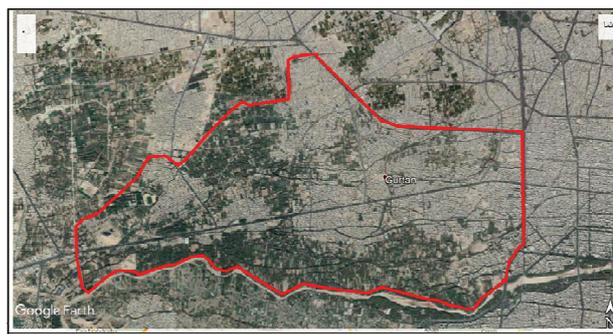


Figure 1: District 9 of Isfahan

To date, many plans and projects have been put in place to protect the horticultural and agricultural lands, yet they have not been able to achieve their conservation goals due to the lack of executive solutions. There are also several laws on the protection of agricultural and horticultural lands: Article 19 of the Land Reform Act adopted in 1961, Article 12 of the Law on Agricultural Extensions in Agricultural Regions adopted in 1975, the Bill on Agricultural and Livestock Damage adopted in 1979, Article 10 of the Executive Code The Law of Utilized and Arid Land (which after the Revolution has been provided to farmers as temporary cultivation) adopted in 1986, Article 1 of the Executive Order on Amendments to the Law on the Conservation and Development of Green Space in the Cities, 2009, Article 1 of the Law on the Maintenance of Agricultural and Horticultural Land Use and its amendment adopted in 1995, etc. Some law, with a positive attitude and encouragement of gardeners and farmers to protect the land, permits for the construction of compatible uses, limited construction and wall-mounted to 80 cm height for productive gardens. However, economic interest, neglect of laws and regulations, lack of enforcement of guarantees, etc. in the country resulted in the ineffectiveness of the said laws.

Based on surveys and interviews conducted in district 9, it was noted that gardens and landslides of Najvan are considered as part of the green belt of Isfahan. It should be noted that the green belt of Isfahan with a total of 1700 hectares has not been approved (there is no legal basis), but the municipality of the district 9 taking into account the Najvan as a green belt, enforces laws that raise owners' dissatisfaction who own the horticultural and agricultural lands which has led to their reluctance towards the land protection.

In the following, the chosen methodology of research in this area and the description of its results and findings are discussed.

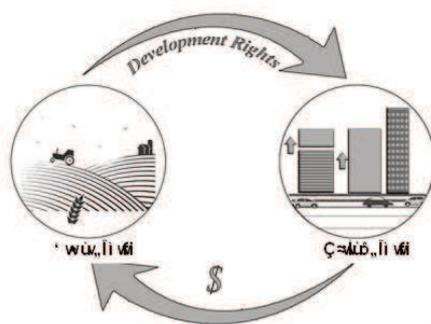


Figure 2: Sending and receiving area in TDR approach

## 6 APPLICATION OF SELECTED METHODOLOGY FOR RESEARCH IN ISFAHAN, DISTRICT 9 AND PRESENTATION OF FINDINGS

Based on the above methodology, first, based on documental studies, the conceptual model of research, as it was discussed earlier, was developed in the form of influential actors and institutional capacities required. Then the sending areas (including two categories of agricultural land and horticultural land within the area and the Najvan area which were determined based on the theoretical foundations and urban plans) and receiving areas (including areas with development capabilities, including urban areas worn out which were determined based on the theoretical foundations and urban plans) were identified (Figure 2) and the

questionnaire was developed based on theoretical model of research. Then it was distributed among the members of the target community.

In this study, the owners included the owners of horticultural and agricultural lands in district 9, the people included a group of residents of the district 9, who were not included in one of the three categories of owners, developers and intermediaries; experts and specialists included the experts of the municipality of the region, the Agricultural Jihad Organization and the Organization for the Environmental Protection. Finally, the developers, who have not been specifically identified, have been chosen from the residents in the receiving area and the buyers in the region.

Table 3: Results from T-test

Developers' Questionnaire						People's Questionnaire							
90% confidence interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item	90% confidence interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item
High degree	Low degree						High degree	Low degree					
1.97	1.73	1.860	0.000	49	29.08	Significance of horticultural protection	1.91	1.99	1.948	0.000	95	85.44	Significance of horticultural protection
-1.71	-1.97	-1.840	0.000	49	-23.73	Familiarization with the legal remedies for protecting horticultural lands	0.83	0.98	0.802	0.000	95	7.613	Mutual trust
1.01	0.51	0.760	0.000	49	5.161	The tendency to protect the horticultural and agricultural land	1.25	0.83	1.032	0.000	95	-8.656	Financial contribution
-0.71	-1.25	-0.980	0.000	49	-6.11	The tendency to buy the agricultural and agricultural land in order to change their use	1.06	0.87	0.865	0.000	95	-7.263	Contributing to the cost of water
-0.77	-1.19	-0.980	0.000	49	-7.76	The tendency to participate in workshops	0.91	0.52	0.719	0.000	95	-6.129	Physical contribution
-0.34	-0.78	-0.560	0.000	49	-4.36	The tendency to cooperate with the municipality	0.76	0.30	0.531	0.000	95	-3.782	Participation in workshops
-0.40	-0.92	-0.660	0.000	49	-4.31	tendency to cooperate with the agencies	0.13	0.64	0.385	0.000	95	2.489	Agreement with the TDR mechanism
1.59	1.17	1.380	0.000	49	11.13	tendency to cooperate with banks	1.51	1.24	1.375	0.000	95	16.61	Trusting the municipality
1.19	0.73	0.960	0.000	49	6.86	Participation in the conservation plan in case of tax exemption	0.37	0.82	0.594	0.000	95	4.360	Trusting the owners of the gardens
1.62	1.14	1.380	0.000	49	49.9	Participation in the conservation plan in case of receiving over-accumulation points	1.50	1.18	1.333	0.000	95	12.90	Trusting the regulations
1.54	1.10	1.320	0.000	49	9.97	Participation in the conservation plan in case of gaining a higher level of occupancy	0.72	1.18	0.948	0.000	95	6.771	Agree to increase the density in case of providing the infrastructures

Owners' questionnaire						Experts' questionnaire							
90% reliability interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item	90% reliability interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item
High degree	Low degree						High degree	Low degree					
2.01	1.97	1.989	0.000	88	177.000	Significance of horticultural protection	2.02	1.91	1.967	0.000	29	59.000	Significance of horticultural protection
-1.64	-1.84	-1.742	0.000	88	-28.593	Familiarization with legal and official strategies	-0.91	-1.43	-1.167	0.000	29	-7.663	Familiarization with TDR
0.66	0.24	0.449	0.001	88	3.488	tendency to protect the agricultural and horticultural lands	-0.30	-0.70	-0.500	0.000	29	-4.349	ability of the municipality to educate and inform
0.17	-0.26	-0.045	0.724	88	-0.355	tendency to attend workshops	0.93	0.40	0.667	0.000	29	4.325	tendency to attend workshops to get acquainted
1.51	1.14	1.326	0.000	88	12.131	tendency to protect in case of having a solution and cost recovery	1.06	0.67	0.867	0.000	29	7.549	tendency to participate in workshops in case of gaining a higher level of occupancy
0.26	-0.15	0.056	0.644	88	0.464	ability to protect the horticultural and agricultural land in the present situation	-1.16	-1.47	-1.315	0.000	88	-14.153	Trusting the municipality for protection

Developers' Questionnaire						People's Questionnaire							
90% confidence interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item	90% confidence interval		Difference of average	Level of significance	Degree of freedom	t-statistics	Item
High degree	Low degree						High degree	Low degree					
1.23	0.88	1.056	0.000	88	9.924	Trusting the banks for protection	-0.29	-0.91	-0.600	0.003	29	-3.275	the agricultural and horticultural lands
-1.65	-1.85	-1.753	0.000	88	-29.025	Trusting the agencies for protection	-0.99	-1.61	-1.300	0.000	29	-7.208	tendency of the municipality to implement TDR approach
1.03	0.68	0.854	0.000	88	8.006	tendency to protect in the absence of the construction by others	-0.82	-1.31	-1.067	0.000	29	-7.443	Presence of expert staff
0.59	0.17	0.382	0.004	88	3.000	Financial ability to protect	-0.44	-0.96	-0.700	0.000	29	-4.583	Proper relationship of the municipality with other organization
2.01	1.90	1.955	0.000	88	61.871	tendency to protect in case of gaining a reasonable profit	0.90	0.37	0.633	0.000	29	4.080	inter-organizational integrity in the municipality
1.69	1.39	1.539	0.000	88	17.014	tendency to protect in case of over-accumulation	2.02	1.91	-0.133	0.502	29	-0.680	Ability to provide quick and easy access to information
0.82	0.37	0.596	0.000	88	4.400	tendency to protect in case of tax exemption	-0.91	-1.43	-0.567	0.001	29	-3.798	Access to sufficient funds
0.13	-0.26	-0.067	0.570	88	-0.570	tendency to protect in case of receiving loans	-0.30	-0.70	-0.500	0.000	29	8.515	Having legal authority
-0.92	-1.32	-1.124	0.000	88	-9.328	tendency to protect in case of receiving money from government							The ability to provide infrastructure and public services
0.88	0.40	0.640	0.000	88	4.474	tendency to protect in case of receiving a permission to convert to other uses							
0.41	-0.10	0.157	0.310	88	1.021	tendency to protect in case of obtaining permission to convert to livestock and greenhouse							
1.96	1.82	1.888	0.000	88	43.312	tendency to protect in case of providing the needed amount of water							
0.82	0.58	0.697	0.000	88	9.651	tendency to protect in case of receiving support from the Agricultural Jihad Organization and the Municipality							

The next step was to identify the barriers and institutional requirements for the realization of TDR in district 9 and prioritize them. First, using the T-test, the institutional barriers to the realization of TDR were investigated in District 9 of Isfahan Municipality. Based on the results obtained (as seen in the tables showing the results of the T-test below), the institutional barriers in each of the four groups of institutions involved in the realization of TDR were obtained from the following table.

**Table 4: The institutional barriers to the realization of TDR policy in Isfahan, district 9**

Indicators	Institutional barriers (items)	Effective actors in the realization of TDR
Economic incentives	Unwillingness to protect in case of receiving money from government	Owners
	Unwillingness to protect in case of receiving loans	
Mutual trust	lack of trust in agencies to conduct transactions	
	lack of trust in municipality to conduct transactions	
knowledge	Non-familiarization with TDR	
Contribution	Unwillingness to attend the TDR workshops	Developers
Mutual trust	lack of trust in agencies to conduct transactions	
	lack of trust in municipality to conduct transactions	
Knowledge	Non-familiarization with TDR	
Contribution	Unwillingness to attend the TDR workshops	Intermediaries for transactions (municipality)
Legal grounds	not-having the required authority	
Internal and inter-organizational integrity	Lack of internal integrity	
	Lack of proper relationships between the municipality and other organizations	
Expert staff	Lack of sufficient expert staff	
Specific path and vision	Unwillingness of the municipality to implement TDR	People
Education	Inability of the municipality to educate	
Knowledge	Non-familiarization with TDR mechanism	
Mutual trust	Lack of trust in municipality to protect	
Contribution	Unwillingness to attend the TDR workshops	
	Unwillingness to contribute financially	
	Unwillingness to contribute in providing water	
	Unwillingness to contribute physically	
Transparent laws	Non-transparent laws	

Source: researchers

In the next step, using a multivariable regression method, we measured the relationship between variables and determining institutional requirements in each of the actors involved in the realization of TDR. First, in order to assess the regression significance, the coefficient of correlation between variables was measured in each group. Based on the results of the statistical summary of the regression model of each questionnaire (as described in the table below), there is a strong correlation between independent and dependent variables in the questionnaire of each of the actors and as a result, the use of regression is significant.

**Table 5: of Factors Affecting TDR in the Questionnaire of the Four Groups as the Institutions Involved in the Realization of TDR**

Developers	Owners	Experts and specialists	People	Questionnaire for each of the groups of actors
0.889	0.901	0.792	0.969	Correlation Coefficient

The results of the multivariate linear regression test are shown in the following tables. Based on the results, the requirements for the realization of TDR in each group of actors in District 9 of Isfahan are represented in Table 6. One of the main objectives of this research is to prioritize and determine the most effective dimensions identified in the concept of TDR in a sample of studies so that it could be possible to compare the severity of the impact caused by these dimensions with respect to the standard regression coefficients (Beta). Regarding the Beta coefficients, providing the social context in district 9 is the most important factor in the realization of TDR in the region. Then stands the economic capacity (which here is merely the infrastructure capacity assessed in the questionnaire) as the TDR pre-requisites in this region.

According to the experts and specialists of District 9, the existence of a legal framework is one of the most important requirements for the realization of the TDR mechanism, and in the present circumstances, due to the lack of legal authority, the municipality has no ability to take any protective measures. Also, with regard to Beta, individual capacity is the most important in realizing the TDR among owners. According to interviews and statements by owners of the horticultural and agricultural lands, the most important reason for protection is their personal motivation and commitment, while they have stated that although economic motivation is important to them, but more important is their personal desire.

Table 6: Multivariate linear regression test results

Experts' questionnaire						People's questionnaire							
t-statistics	Level of significance	Standard coefficients		Non-standard coefficients		Model	t-statistics	Level of significance	Standard coefficients		Non-standard coefficients		Model
		Beta	Standard error	B	Standard error				Beta	Standard error	B	Standard error	
0.807	-0.247		0.814	-0.201	Constant value							Constant value	
0.148	1.906	0.258	0.087	0.130	Individual capacity	0.005	2.871		0.552	1.565		Individual capacity	
0.108	1.671	0.228	0.092	0.154	Social capacity	0.567	-0.575	-0.018	0.119	-0.068		Social capacity	
0.051	2.055	0.283	0.086	0.177	Organizational capacity	0.000	0.000	0.721	0.067	0.522		Organizational capacity	
0.027	2.362	0.409	0.094	0.221	Legal capacity	0.459	0.459	-0.043	0.049	-0.036		Legal capacity	
0.069	1.906	0.273	0.194	0.370	Economic capacity	0.000	0.000	0.323	0.041	0.203		Economic capacity	

Developers' questionnaire						Owners' questionnaire							
t-statistics	Level of significance	Standard coefficients		Non-standard coefficients		Model	t-statistics	Level of significance	Standard coefficients		Non-standard coefficients		Model
		Beta	Standard error	B	Standard error				Beta	Standard error	B	Standard error	
0.000	-5.446		0.814	-4.435	Constant value	0.387	-0.870		0.258	-0.225		Constant value	
0.000	5.309	0.387	0.134	0.712	Individual capacity	0.000	13.766	0.739	0.053	0.731		Individual capacity	
0.000	4.896	0.334	0.173	0.849	Social capacity	0.000	4.348	0.233	0.048	0.210		Social capacity	
0.000	12.748	0.933	0.057	0.726	Economic capacity	0.025	2.279	0.109	0.060	0.138		Economic capacity	

Factors	Effective actors in realization of TDR
social capacity, economic capacity	People
legal capacity, organizational capacity, economic capacity	Experts and specialists
personal capacity, social capacity, economic capacity	Owners
Personal capacity, social capacity, economic capacity	Developers

Source: researchers

In the final step, using the Friedman test, indicators and the items for institutional capacities that have been effective in implementing the TDR mechanism in the region (based on the multivariate linear regression test) were ranked aiming to prioritize the strategies through the QSPM analysis based on which it will be possible to take the steps required to provide an appropriate institutional framework for the implementation of the TDR approach in Isfahan, district 9.

In the final step, based on the reviewed theoretical and empirical functions, interviews with the authorities and the results of the questionnaires (see Chart 3), along with the use of SWOT analytical matrix, the optimal strategies for removing institutional barriers and providing a solid institutional framework for realizing TDR policy in district 9 were identified. Then, using Quantitative Planning of Strategic Matrix (QSPM), these strategies were prioritized.

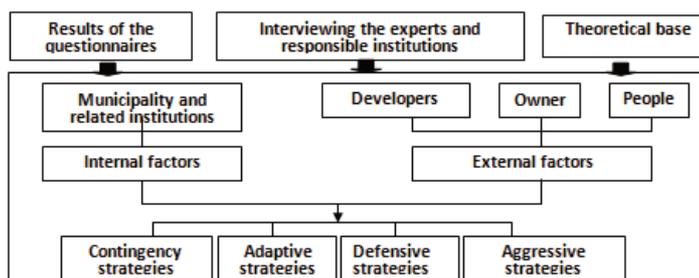


Figure 3: The process of compilation the strategies

Finally, the collected and prioritized strategies were categorized based on each group of actors in order to provide an appropriate institutional framework for the implementation of TDR policy in Isfahan, district 9 as proposed in Table 9. In formulating strategies, urban management is considered as the intermediary of transactions and the internal factor responsible for leading the actions, while other involved entities (people, owners and developers) are considered as external factors.

## 7 CONCLUSION

According to the studies carried out on theoretical foundations, domestic and foreign experiences and researches, the implementation of TDR policy in any region requires the some institutional bases and capacities in order to achieve its goals. As shown in Chart 2 (conceptual framework of research), some capacities such as individual, social, organizational, economic and legal capacities are among the

prerequisites for the success of the TDR policy. Therefore, due to capacity gaps (institutional barriers) and efforts to eliminate them on the one hand, and strengthening the existing capacities, especially those that have the greatest impact on the realization of the TDR mechanism in the studied area, on the other hand, provided a solid institutional foundation in the region.

<b>Table 9: SWOT Analysis Strategies for Implementation of TDR Policy in Isfahan, district 9</b>	
<b>prioritization</b>	<b>Strategy</b>
<b>Prioritization of strategies (external factor: owners)</b>	
1	Creating added value for the gardens through the granting of permits for conversion to compatible uses such as livestock and greenhouses, or the garden of catering and teahouse (with temporary structures) for the profitability of the garden for conservation
2	Cooperating with Agricultural Jihad Organization and Environmental Protection Organizations to carry out land reform and assist in setting up irrigation methods.
3	Using the Planning Team to introduce and teach the TDR mechanism
4	Forming the Ownership Leading Committee to Build Trust and Motivation between Owners
5	Holding workshops for staff members of the TDR implementation group (planners, bank staff, executives, etc.) in coherence as well as the transparency of workshops for other stakeholders in order to win trust.
6	Creating an Internet website to inform about actions and build trust among beneficiary organizations
7	Allocating part of the people's development expense (renovation costs, construction costs, etc.) to the establishment and launch of the TDR Bank
8	Establishing TDR bank affiliated with the Shahr Bank for conducting transactions
9	Gaming taxes from tourism and recreational uses created in gardens after TDR (sustainable source of revenue for the municipality)
<b>Prioritization of strategies (external factor: developers)</b>	
1	Prohibition of accumulated sales outside the TDR plan
2	Creating a Leadership Committee for the developers in order to Build Trust and Motivation Between Developers and the Municipality
3	Establishing TDR bank affiliated with the Shahr Bank for conducting transactions
4	Allocating part of the people's development expense (renovation costs, construction costs, etc.) to the establishment and launch of the TDR Bank
5	Creating incentives for investors through the creation of specific uses in receiving areas
6	Increasing the cost of providing services and urban infrastructure in areas other than receiving areas
7	Involvement of urban management in the construction and operation of residential and commercial projects in the receiving areas while monetizing for the municipality
8	Using the Planning Team to introduce and teach the TDR mechanism and its functions
9	Creating an Internet website to inform about actions and build trust among beneficiary organizations
<b>Prioritization of strategies (external factor: people)</b>	
1	Forming NGOs focusing on the protection of horticultural lands
2	Providing required infrastructure as well as the transparency of measures and work processes through the municipality's website and holding meetings
3	Utilizing the intellectual participation of people and other stakeholders (the TDR planning Committee, consisting of representatives of owners, developers, people and environmental organizations) in selecting scenarios developed by the planning group
4	Allocating part of the people's development expense (renovation costs, construction costs, etc.) to the establishment and launch of the TDR Bank
5	Making sustainable urban revenues by paying tax on clean air for residents of the horticultural area

Based on the studies carried out, the measures taken so far along with the conducted plans and projects have not been able to protect the horticultural and agricultural lands of the region; hence, in order to achieve this, a new approach has to be taken. Studies have shown that the TDR mechanism, based on the market and the balance between the interests of all groups, could be effective for protecting the horticultural and agricultural lands in the region. Based on the remarks made by the four groups involved in the TDR implementation and the collected questionnaires, all stakeholders are aware of the importance of protecting horticultural and agricultural lands, and each one, if interested, would like to protect these valuable properties. However, despite the acknowledged tendency of the municipality to protect these lands, due to the lack of sustainable income, familiarity with this approach as well as the knowledge about its advantages, it considers the implementation of this mechanism as an obstacle to the achievement of its interests damping its willingness to implement this mechanism.

Studies also suggest that no capacity building has been done to implement this approach in district 9, and its implementation, given the existence of institutional barriers, requires a long-term and targeted program while its success depends on the establishment and provision of institutional infrastructures prior to the implementation of TDR programs. In order to achieve this, the need for education is felt among all stakeholders. The municipality as well as the implementer of this policy should take responsibility for the establishment and take the necessary measures based on the developed strategies.

## 8 REFERENCES

- Ardestani, Zahra Sadat (2008). Investigating Mechanisms for Improving the Improvement and Modernization Processes of Urban Context Using the TDR Approach (Case Study: Sirous District). Master's Thesis. Tarbiat Modares University. Tehran.
- Rafiyani, Mojtaba. Saeidi Rezvani, Naveed. Mohsian, Zohreh (2001). Feasibility of Measuring Environmental Conservation of Traditional Gardens in Qazvin using TDR. First Conference on Urban Economics of Iran.
- Zare, Arezou (2014). Capacitance Measurement of the TDR Method in Realization of Urban Development Plans (Case Study: Qasr-Al-Dasht Gardens of Shiraz). Master's Thesis. Shahid Beheshti University. Tehran.

- Zare, Mohammad, 2005, Use of the TDR for Sustainable Urban Regeneration, National Symposium on Architecture and Urban Development of Iran, Yazd, Architectural and Urban Design Institute of Safiran Mehrazi, Yazd University of Science and Technology.
- Detailed Review Plan of Isfahan, Districts 2, 9 and 11. (2003). Consulting Engineers and Architects of Saravand.
- The Sustainable Development Plan of the City of Isfahan (2009) Jahan Pars Consulting Engineers
- Azizi, Mohammad Mehdi. Shahab, Sina. (2012) Application of the TDR as an Implementation Mechanism for Urban Development Plans (Case Study: Kashan City). Quarterly Journal of Urban Studies. 41-54.
- Farsi Farashandi, Hamid Reza. Azadeh, Seyed Reza, Malekian Behabadi, Mojtaba (2017). Feasibility Study on the TDR Implementation to Provide Lands for Urban Services in Shiraz. Quarterly Journal of Urban Studies. 3-14.
- Faraji Rad, Khedr. Kazemian, Gholamreza (2012). Local and Regional Development Through Institutional Approach. Jahad University Press. First Edition.
- Mohebbi, Mahyar, Zaker Haghighi, Kianoush (2015). The Application of the TDR Program in Order to Protect the Agricultural Lands in Tonekabon. Quarterly Journal of Regional Planning, 139-202.
- Mohsenzadeh, Sina. (2010). The Feasibility of Using the TDR Model in Order to Protect the Agricultural Lands and Farms in the Urban District of Babolsar. Tarbiat Modares University. Tehran.
- Mohammadi Balini, Zahra (2014). Planning of Sari Urban Area Based on Regional Institutionalization. Master's Thesis. Shahid Beheshti University. Tehran.
- Mohammadi, Mahmoud. Shahiwandi, Ahmad. Moradi, Dariush. Moinpour, Samaneh (2017). Evaluation of the Implementation of the TDR Mechanism in Various Dimensions. Third Annual International Civil, Architectural and Urban Development Conference. 49-55.
- Mozaffaripour, Najmeh. Soltani, Samaneh (2014). Efficient Management of Urban Lands with a Systemic Attitude Towards TDR Relying on Global Experiences. Quarterly Journal of Urban Management Studies. 16-33
- Nedae Tousi, Sahar. Bagheri, Bagher (2017). Explaining the Dispersion Phenomenon in Metropolitan Regions (Case Study: Shiraz Metropolitan Area). Geography and Development Quarterly. 185-212.
- Beautiful Isfahan, 2017. Land Use Change as the Most Important Demand of Citizens. No. 2938.
- Bratton, N., Eckert, J., Fox, N., & Conservancy, C. L. (2008). Alternative Transfer of Development Rights (TDR) Transaction Mechanisms.
- Center For Sustainable Development (CFSD). (2015). Evaluation of Transfer of Development Rights (TDR) Scheme in BBMP. Study Conducted for Karnataka Evaluation Authority and Bruhat Bangalore Mahanagara Palike (BBMP) and Urban Development Ministry, Government of Karnataka.
- Chan, E. H., & Hou, J. (2015). Developing a framework to appraise the critical success factors of transfer development rights (TDRs) for built heritage conservation. Habitat International, 46, 35-43
- Cowan, R. (2005). The dictionary of urbanism. Streetwise press.
- European Commission. (2005). Institutional Assessment and Capacity Development Why, What and How?. Reference document No 1.
- Evans, B., Joas, M., Sundback, S., & Theobald, K. (2013). Governing sustainable cities. Taylor & Francis.
- Fulton, W., Mazurek, J., Pruetz, R., & Williamson, C. (2004). TDRs and other market-based land mechanisms: How they work and their role in shaping metropolitan growth. Washington, DC: The Brookings Institution.
- Greenaway, G., & Good, K. (2008). Transfer of Development Credits in Alberta: A Feasibility Review. <https://www.ifad.org/documents/10180/fbeb4aad-a617-4de8-9f7f-502ca9ca9fc5>. [https://www.smartgrowthamerica.org/app/legacy/documents/transfer-development-rightspolicy toolkit.pdf](https://www.smartgrowthamerica.org/app/legacy/documents/transfer-development-rightspolicy%20toolkit.pdf).
- Huang, T. (2011). Research on Sinicized Transferrable Development Right (TDR) Inspired by TDR Programs in the United States (Doctoral dissertation, University of Florida).
- IFAD (The International Fund for Agricultural Development). Understanding the institutional context.
- Kaplowitz, M. D., Machemer, P., & Pruetz, R. (2008). Planners' experiences in managing growth using transferable development rights (TDR) in the United States. Land Use Policy, 25(3), 378-387.
- Keizer, P. (2008). The concept of institution: Context and meaning (No. 08-22).
- Linkous, E. R. (2016). Transfer of development rights in theory and practice: The restructuring of TDR to incentivize development. Land Use Policy, 51, 162-171.
- Messer, K. D. (2007). Transferable development rights programs: An economic framework for success. Journal of Conservation Planning, 3(47), 47-56.
- Mitchell, B. (1995). Institutional obstacles to sustainable development in Bali, Indonesia. Singapore Journal of Tropical Geography, 15(2), 145-156.
- Nelson, A. C., Pruetz, R., & Woodruff, D. (2013). The TDR handbook: Designing and implementing transfer of development rights programs. Island Press.
- Otto, Katharine. (2010). Smart Growth through the Transfer of Development Rights (A selection of TDR case studies with relevance for the preservation of farmland, open space and other natural resources in New Jersey).
- Pruetz, R. (2003). Beyond Takings and Givings: Saving Natural Areas, Farmland and Historic Landmarks with Transfer of Development Rights and Density Transfer Charges (Arjepress, Burbank, CA).
- Robin, C., & Stephen, D. (2004). Institutional Change for Sustainable Development. Journal of Environmental Law, 17(3), 458-460.
- Robins, L. (2008). Perspectives on capacity building to guide policy and program development and delivery. environmental science & policy, 11(8), 687-701.
- Smart Growth American (SGA). Transfer of development Right.
- Taintor, R. (2001). Transfer of Development Rights: South County Watersheds Technical Planning Assistance Project.
- Tavares, A. F. (2005). Can the market be used to preserve land? the case for transfer of development rights.
- Triedman, L., Caldwell, C., Sangree, E., & McCauley, M. (2014). A Study of the Feasibility of a Transfer of Development Rights Program in Lewiston, Maine.
- van de Meene, S. (2008). Institutional capacity attributes of sustainable urban water management: the case of Sydney, Australia. In 11th International Conference on Urban Drainage, Edinburgh, Scotland.
- Walls, M., & McConnell, V. (2007). Transfer of development rights in US communities. Washington DC, Resources for the Future.