# Application levels of urban transformation methods in zoning planning studies

## İmar planlama çalışmalarında kentsel dönüşüm metotlarının uygulanma düzeyleri

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**Abstract**

Urban transformation strategies should be included in zoning plans to take precautions against disasters caused by natural events such as floods and landslides and to identify building stocks that are not earthquake resistant. This study was conducted to determine the level of consideration of the need for urban transformation in development planning processes. Environment, Urbanization and Climate Change, and AFAD Provincial Directorates, all municipalities and universities in Adana province were determined as the population of this study. In this context, questions were asked to public personnel who urban transformation law enforcers and researchers through the expert opinion form are. Participant responses were analysed with frequency and percentage values, and responses regarding importance levels were analysed on a 5-point Likert scale. The data indicated that the issue of urban transformation is not sufficiently included in development planning practices and that the actions on this issue should be carried out. We suppose that making the necessary revisions in the relevant legislation, which is the basis of urban transformation, will ensure that urban transformation takes an important place in development planning studies.

**Keywords**: Zoning planning, Urban transformation, Expert opinion, Likert, Urban sustainability

**Öz**

Sel ve heyelan gibi doğa olayları kaynaklı afet durumlarına önlem almak, depreme dayanıklı olmayan yapı stoğunu belirlemek için kentsel dönüşüm stratejilerinin imar planlarında yer alması gerekir. Bu çalışma, kentsel dönüşüm ihtiyacının imar planlama süreçlerinde dikkate alınma düzeyini tespit etmek amacıyla gerçekleştirilmiştir. Adana ilinde bulunan Çevre, Şehircilik ve İklim Değişikliği ve AFAD İl Müdürlükleri, tüm belediyeler ve üniversiteler bu çalışmanın evrenini olarak belirlenmiştir. Bu kapsamda kentsel dönüşüm kanun uygulayıcıları ve araştırmacıları olan kamu personellerine uzman görüş formu vasıtasıyla sorular yöneltilmiştir. Katılımcı cevapları frekans ve yüzde değerleriyle, önem derecelerine yönelik cevaplar ise 5' li Likert ölçeğine göre analiz edilmiştir. Veriler imar planlama çalışmalarında kentsel dönüşüm konusunun yeterince yer almadığını ve bu konu üzerine çalışmalar yapılması gerektiğini ortaya koymaktadır. Kentsel dönüşümün dayanağı olan ilgili mevzuatlarda gerekli revizyonların yapılmasının, imar planlama çalışmalarında da kentsel dönüşümün önemle yer almasını sağlayacağı düşünmekteyiz.

**Anahtar kelimeler**: İmar planlama, Kentsel dönüşüm, Uzman görüşü, Likert, Kentsel sürdürülebilirlik

## 1 Introduction

Zoning is the mechanism of regulating land use policies with a total perspective throughout the city by identifying deficiencies from the past and land uses that are not suitable for the sustainable life of the city, ensuring planned urban growth and development in order for the society to have a regular and healthy daily urban life [1]. Changes in population, migration potential of the city, technological urban developments, search for solutions to needs, as well as strengthening economic development, realising urban renewal works by protecting the existing texture, local governments can develop strategies through zoning activities and implement them technically and legally [2]. With zoning planning, analytical data about the area to be zoned are processed into maps and these maps are turned into open data on digital usage platforms [3].

The goal of achieving a healthy, aesthetic, and sustainable daily urban life can only be achieved through zoning plans prepared with the right strategies and targets. The determination and implementation of land use policies are realised as a result of the transfer of land use regulations and spatial planning studies to zoning plans [4].

Establishing a living space in a region or solving the requirements, needs and problems in the existing living space is only possible with the correct definition of that region. Geographical location, topographical features, proximity to fault lines, being in the natural disaster impact area, distance to neighbouring cities and socio-economic life connection or needs such as renewal of the city are the main elements that should be considered in zoning planning studies that are the basis of urban planning [5,6]. In particular, buildings constructed in violation of the zoning legislation are the main factors to be taken into consideration in terms of building stock Structures that need to be made earthquake-resistant, building areas that may be exposed to disaster situations caused by natural events such as floods,

landslides and avalanches should be transformed and brought to healthy living conditions [7]. On the other hand, there is a need for transformation and revision for the relocation of industrial areas that have problems with their location and functionality within the city life, bringing historical and cultural assets that are left to decay out of use into daily socio-economic life, revising the transportation network according to the needs, and the development of green areas and social facilities depending on the population [8]. The solution for all of these transformations and revisions is to make the right urban regeneration planning strategies and practices and to reflect them in zoning planning [9].

In this study, it is aimed to select the appropriate urban regeneration methods that will enable the solutions of the problems of the cities and the necessary revisions to be made and to determine the level of reflectivity of urban regeneration studies to the zoning planning in terms of their current applications. In this context, questions were asked to public personnel who urban regeneration law implementers and researchers through an expert opinion form are. The answers received from the experts were analysed with frequency and percentage (%) values given in tables and the answers to the questions about the degree of importance were analysed according to the 5-point Likert scale and the degree of importance was determined [10].

The expert opinion form prepared with the ethics committee permission of Konya Technical University Scientific Research and Ethics Committee dated 27.07.2023 and numbered 2023/6 was shared with public personnel working in the position of law enforcement and / or researcher in urban transformation and zoning activities in Adana Province of Turkey, and according to the expert answers given, "The Level of Application of Urban Transformation Methods in Zoning Planning Studies" was analysed and conclusions were drawn.

## 2 Material and methods

The expert opinion form was applied to public personnel working in the Provincial Directorate of Environment, Urbanisation and Climate Change, Provincial Disaster and Emergency Directorate (AFAD), Metropolitan Municipality, District Municipalities and Universities in Adana Province of Turkey and answers were received. The questions in the expert opinion form were answered by 69 experts in total. Although the expert opinion was sufficient with 20 respondents, the number of participants was increased to 69 experts in order to increase the accuracy of the results due to the scarcity of precedent studies in the literature and the lack of similar studies in Turkey [11-14].

The answers were analysed with percentage/frequency data and evaluated according to the 5-point Likert Scale. The answers given by the public personnel to the questions were analysed in order to determine the degree of conformity or adequacy of the answers. In order to determine the degree of importance of the answers, the scale specified for each question weighted mean values, standard deviations and coefficients of variation of frequencies were calculated.

### 2.1 Likert scale

In Likert scale, evaluations are made with the points given to the options based on the sum of the ratings and indicating a degree in the scale [15]. Likert scaling was implemented by Rensis Likert in 1932 and has become the most widely used psychometric scale in research. Survey or expert opinion form respondents are asked to indicate their degree of agreement with the questions posed. For the 5-point Likert scale, the degree of agreement is ranked from 1 to 5, with the following degrees: least important (1), less important (2), important (3), more important (4) and most important (5). Depending on the form of the questions or the field of research, the degrees can also be shaped with the expression "agree" instead of "important" [16].

## 3 Results and discussions

The findings obtained according to the questions asked through the expert opinion form and the answers received from 69 experts are given below.

### 3.1 Public institution where respondents work

As seen in Figure 1, 30 (43.50%) of the experts who answered the questions in the expert opinion form work in universities, 22 (31.90%) in Adana Provincial Directorate of Environment, Urbanisation and Climate Change, 7 (10.10%) in Metropolitan Municipality, 6 (8.70%) in District Municipalities and 4 (5.80%) in AFAD.
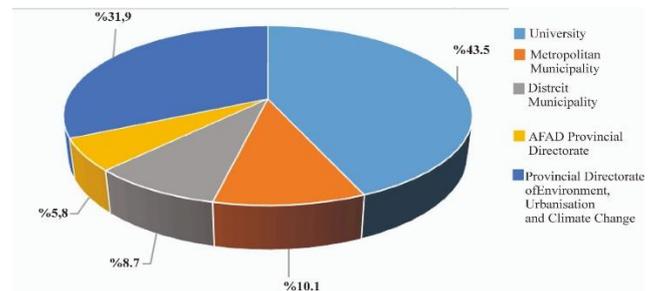


**Figure 1.** Public institution where the respondents work

### 3.2 Duration of professional experience

As seen in Figure 2, 11 (15,90%) of the respondents answered 1-5 years, 12 (17,40%) 6-10 years, 18 (26,10%) 11-15 years, 7 (10,10%) 16-20 years and 21 (30,40%) 20 years and more.
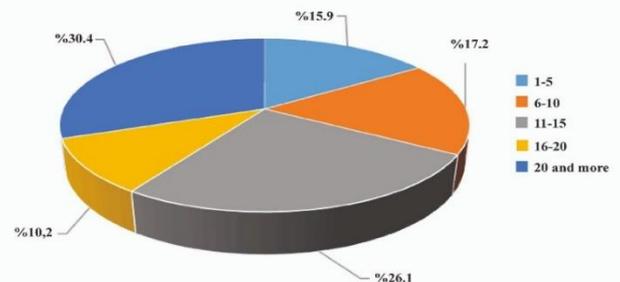


**Figure 2.** Duration of professional experience of the respondents

### 3.3 Importance assessment of urban regeneration methods

In Turkey, urban regeneration planning strategies and applications have been done depending on laws: 5393 (i.e., Municipal Law) or 6306 (i.e., the law of Transformation of Areas under Disaster Risk) [7]. According to the relevant laws, urban transformation processes are realised as building-based transformation and area-based transformation [17]. Building-based transformation can also be realised by the transformation of more than one building within a parcel. For these reasons, experts were asked about their importance rating preferences in the categories of building-based transformation, land-based transformation and area-based transformation in urban transformation and their answers were taken as shown in Table 1.

**Table 1**. Conversion type importance rating preferences

| Transformation Type | 1 Least Imp. | 2 Less Imp. | 3 Imp. | 4 More Imp. | 5 Most Imp. |
|---|---|---|---|---|---|
| Building based | 11 | 9 | 24 | 15 | 10 |
| Land based | 7 | 4 | 27 | 26 | 5 |
| Area based | - | - | 10 | 14 | 45 |

Imp: Important

#### 3.3.1 Transformation type importance scoring

As a result of the answers given by the respondents to the expert opinion form, Table 2 shows the importance scores of building-based transformation, parcel-based transformation and area-based transformation.

**Table 2**. Conversion type importance scores

| Transformation Type | 1 Least Imp. | 2 Less Imp. | 3 Imp. | 4 More Imp. | 5 Most Imp. | Total |
|---|---|---|---|---|---|---|
| Building based | 11 | 18 | 72 | 60 | 50 | 211 |
| Land based | 7 | 8 | 81 | 104 | 25 | 225 |
| Area based | - | - | 30 | 56 | 225 | 311 |

Imp: Important

#### 3.3.2 Transformation type importance ranking

In Table 3, according to the answers given by the experts, the importance percentage values were calculated and the importance rankings of urban regeneration types were made. According to the results obtained, experts state that area-based transformation is the most important type of urban regeneration, parcel-based transformation is the second most important and building-based transformation is the third most important. Importance level values were determined according to the size of the percentage level values.

**Table 3.** Conversion type degree of importance

| Transformation Type | 0-100 Importance score | Percentage Importance | Importance Level |
|---|---|---|---|
| Building based | 51.4 | 51.4% | 3 |
| Land based | 56.5 | 56.5% | 2 |
| Area based | 87.7 | 87.7% | 1 |

According to the frequency & percentage distribution, the results of the answers given by the experts are given in Table 4.

**Table 4**. Percentage (%) & frequency distribution of answers

| Transformation Type | (1- Least Important, 5-Most Important) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| | frq | % | frq | % | frq | % | frq | % | frq | % |
| Building based | 11 | 15.94 | 9 | 13.04 | 24 | 34.78 | 15 | 21.74 | 10 | 14.49 |
| Land based | 7 | 10.14 | 4 | 5.80 | 27 | 39.13 | 26 | 37.68 | 5 | 7.25 |
| Area based | 0 | 0.00 | 0 | 0.00 | 10 | 14.49 | 14 | 20.29 | 45 | 65.22 |

frq: Frequency

The mean (Xao), standard deviation (σ), coefficient of variation (V) values calculated according to the frequency values of the choices were calculated. According to these values, it has been ensured that the experts consider area-based transformation as the first most important urban transformation type, parcel-based transformation as the second most important and building-based transformation as the third most important. Table 5 shows these values and their importance degrees according to the results.

**Table 5**. Significance according to coefficient of variation value

| Transformation Type | Average (Xao) | Standard deviation (σ) | Coefficient of Variation (V) | Importance Level |
|---|---|---|---|---|
| Building based | 2.36 | 1.43 | 0.6055 | 3 |
| Land based | 2.48 | 1.29 | 0.5222 | 2 |
| Area based | 4.22 | 0.79 | 0.1873 | 1 |

### 3.4 Implementing institutions in urban transformation works

The institutions involved in urban regeneration works in Turkey are the Ministry of Environment, Urbanization and Climate Change, TOKİ, Municipalities and contractors. According to the answers received from 69 experts who responded to the expert opinion form, the importance preferences of the urban regeneration experts for the impact level in the studies are given in Table 6.

**Table 6.** Importance preferences of institutions related to urban transformation

| Institution Name | 1 Least Imp. | 2 Less Imp. | 3 Imp. | 4 More Imp. | 5 Most Imp. |
|---|---|---|---|---|---|
| TOKİ | 2 | 7 | 15 | 26 | 19 |
| Related ministry | 2 | 0 | 9 | 21 | 37 |
| Municipality | 5 | 0 | 13 | 25 | 26 |
| Contractors | 14 | 17 | 11 | 17 | 10 |

TOKİ: Public housing administration

#### 3.4.1 Relevant institution importance rating

As a result of the answers given by the respondents to the expert opinion form, Table 7 shows the importance scores of urban transformation related institutions.

**Table 7**. Related institution importance scores

| Institution Name | 1 Least Imp. | 2 Less Imp. | 3 Imp. | 4 More Imp. | 5 Most Imp. | Total |
|---|---|---|---|---|---|---|
| TOKİ | 2 | 14 | 45 | 104 | 95 | 260 |
| Related ministry | 2 | 0 | 27 | 84 | 185 | 298 |
| Municipality | 5 | 0 | 39 | 100 | 130 | 274 |
| Contractors | 14 | 34 | 33 | 68 | 50 | 199 |

TOKİ: Public housing administration

### 3.4.2 Relevant institution importance ranking

In Table 8, according to the answers given by the experts, the importance percentage values were calculated and the importance ranking of the related institutions of urban regeneration was made. According to the results obtained, the experts state that the most important institution in urban regeneration works is the relevant ministry, municipalities are in the second place, TOKİ is in the third place and contractors are in the last place. Importance level values were determined according to the size of the percentage level values.

**Table 8**. Relevant institution importance level

| Institution Name | 0-100 Importance score | Percentage Importance | Importance Level |
|---|---|---|---|
| TOKİ | 69.2 | 69.2% | 3 |
| Related ministry | 83.0 | 83.0% | 1 |
| Municipality | 74.3 | 74.3% | 2 |
| Contractors | 47.1 | 47.1% | 4 |

TOKİ: Public housing administration

According to the frequency & percentage distribution, the results of the answers given by the experts are given in Table 9.

**Table 9**. Percentage & frequency distributions of the answers

| Institution Name | (1- Least Important, 5-Most Important) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 3 | | 4 | | 5 | |
| | frq | % | frq | % | Frk | % | Frk | % | Frk | % |
| TOKİ | 2 | 2.90 | 7 | 10,14 | 15 | 21,74 | 26 | 37,68 | 19 | 27,54 |
| Related ministry | 2 | 2.90 | 0 | 0,00 | 9 | 13,04 | 21 | 30,43 | 37 | 53,62 |
| Municipality | 5 | 7.25 | 0 | 0,00 | 13 | 18,84 | 25 | 36,23 | 26 | 37,68 |
| Contractors | 14 | 20.29 | 17 | 24,64 | 11 | 15,94 | 17 | 24,64 | 10 | 14,49 |

frq: Frequency

Mean ($X_{ao}$), standard deviation ($\sigma$), coefficient of variation (V) values calculated according to the frequency values of the choices were calculated. According to these values, experts ranked the importance of urban transformation related institutions. Table 10 shows the ranking values and importance degrees according to the results.

**Table 10**. Significance levels according to coefficients of variation

| Institution Name | Average ($X_{ao}$) | Standard deviation ($\sigma$) | Coefficient of Variation (V) | Importance Level |
|---|---|---|---|---|
| TOKİ | 3,33 | 1,14 | 0,3414 | 3 |
| Related ministry | 4,06 | 0,95 | 0,2330 | 1 |
| Municipality | 3,59 | 1,17 | 0,3243 | 2 |
| Contractors | 2,57 | 1,40 | 0,5475 | 4 |

TOKİ: Public housing administration

### 3.5 Urban transformation needs in zoning plans studies

In Turkey, zoning plan studies and revisions are carried out in accordance with the provisions of the Municipal Law No. 5393, Zoning Law No. 3194 and related legislation [4]. The reflection of urban regeneration planning strategies in zoning plans will be a factor in the realisation of urban regeneration practices. For this reason, through the expert opinion form, the importance of the need for urban regeneration in zoning plans was asked. 68,1% of the experts stated that this need was not considered sufficiently important in the zoning planning process, 29% stated that it was not considered important at all, and 2,9% stated that they considered the level of importance sufficient. According to the answers given by the experts, Figure 3 shows the preference status of the importance of urban regeneration need in zoning planning studies.

## 4  Conclusions

As a result of the increase in industrialisation all over the world since the 1950s, there has been a great migration from rural areas to cities. As a result of these migrations, rapid construction has formed the building stock of metropolises as uncontrolled, inadequate engineering and architectural services and illegal construction [18]. On the other hand, countries like Turkey, which are constantly exposed to earthquake-induced disasters, have made some legal arrangements as a precaution against negative situations such as earthquake resistance in the building stock and have initiated transformation practices in this way [19]. Law No. 775 on Slums, which entered into force in 1966, was the first legal regulation in the context of urban transformation and the fight against slums in Turkey [20]. Law No. 5393 on Municipalities, which entered into force in 2005, and Law No. 6306 on the Transformation of Areas Under Disaster Risk, which entered into force in 2012, have accelerated the clearest interventions in urban transformation planning strategies and practices in Turkey [21].

In Turkey, zoning plans and zoning plan revisions are made by municipalities in accordance with the provisions of the Zoning Law No. 3194, Municipal Law No. 5393 and related legislation. 1/5000 scale master zoning plans are prepared by metropolitan municipalities and zoning and construction applications are made according to 1/1000 scale implementation zoning plans prepared by district municipalities. Therefore, the main factor in giving direction to the cities with the correct zoning is the preparation of
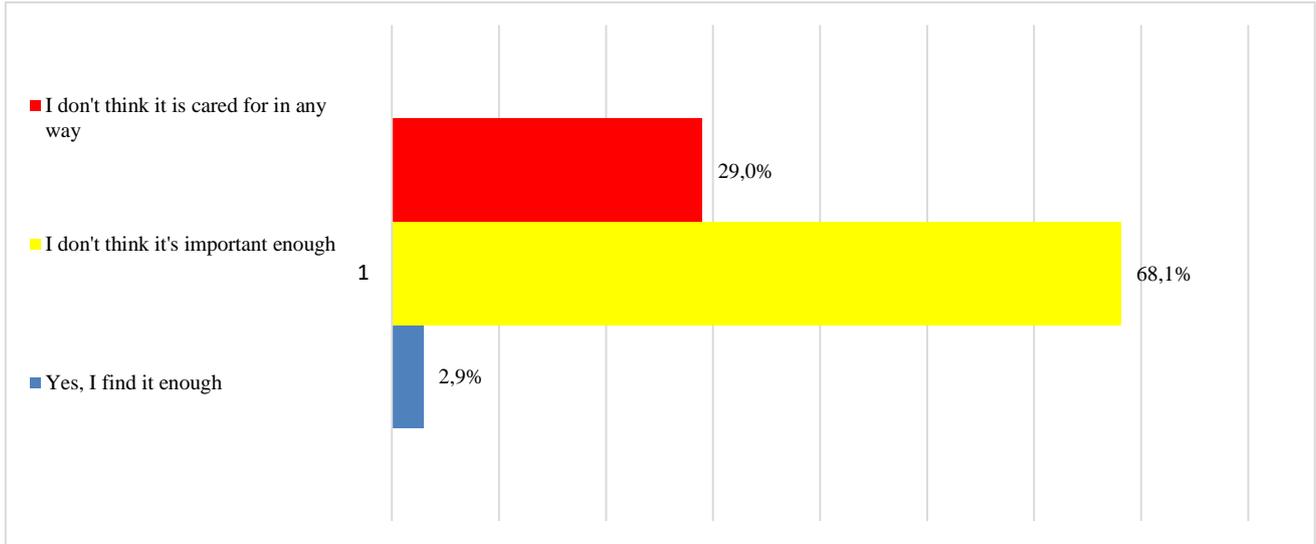
**Figure 3**. Respondents' views on need fulfilment

correct zoning plans and reflecting the transformation needs of the cities to the zoning plans prepared correctly [22].

Expert opinion form was applied to the technical personnel working in the institutions carrying out zoning plans and urban transformation studies and researches in Turkey. According to the answers received, it is seen that the most important application among urban transformation applications is "area-based transformation". As a matter of fact, Turkey is constantly exposed to disasters as a result of natural events such as earthquakes, floods, landslides and avalanches, and suffers loss of life and property [23]. For this reason, there is a need for urban regeneration practices that are not single based but area based (multiple) and that solve problems rapidly.

The most legally powerful institutions in urban regeneration planning and implementation are the Ministry of Environment, Urbanisation and Climate Change and municipalities. The answers received from the experts show that these are the two most important institutions in urban regeneration practices.

The most questionable issue that was asked to the experts and their answers were received is the importance of the need for urban transformation in Turkey in zoning planning studies. The most striking result of this study is that 97.1% (i.e., total percentage of answers to questions 1 and 2 indicated in Figure 3) of the experts working in relevant public institutions stated that they do not attach any importance to this need. Therefore, it is concluded that there is a need for additional legal regulations in order to take into account the reflection in the zoning plans, which play a key role in meeting the need for urban transformation, and to make municipalities take it into consideration compulsorily. Accordingly, we suggest that the need for urban transformation in the mentioned issues above will be taken into account in zoning planning applications by the revisions to be made in the relevant legislative provisions (Municipal Law No. 5393 and Zoning Law No. 3194) which are the legal basis for zoning planning and revision practices.

**Conflict of interest**

The authors have no conflict of interest with each other or with the authors themselves.

**Similarity rate (iThenticate):** 9%

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**Appendix 1**

**Uzman Görüş Formu**

**Değerli katılımcı,**

"Kentsel Dönüşümde Sürdürülebilir İndikatörlerle Alan Belirlenmesi" başlıklı doktora tez çalışmasında uzman görüşlerine ihtiyaç duyulmaktadır. Bu hedefle, çalışma için değerlendirme indikatörleri belirlenmiştir.

Çalışmadaki amaç; belirlenen indikatörler ile kentsel dönüşüm riskli alan tespiti konusunda etkili olabilecek bir ölçme aracı oluşturmaktır.

Uzman görüş formu 1. bölümde demografik bilgiler, mesleki özellikler ve kentsel dönüşüm hakkındaki görüşler, 2. bölümde ise değerlendirme ifadeleri yer almaktadır.

Cevaplar bilimsel araştırma dışında asla başka bir amaçla kullanılmayacaktır.

Lütfen formda yer alan hiçbir soruyu boş bırakmadan size en uygun gelen seçeneği (x) işaretleyerek cevaplandırınız.

Katkılarınız için teşekkür eder, çalışmalarınızda başarılar dileriz.

**A. Demografik Özellikler, Mesleki Özellikler ve Kentsel Dönüşüm Hakkındaki Görüşler**

**1. Cinsiyetiniz**
( ) Erkek        ( ) Kadın
**2. Medeni durumunuz**
( ) Bekâr        ( ) Evli
**3. Yaş aralığınız**
( ) 20-30        ( ) 31-40        ( ) 41-50        ( ) 51-60        ( ) 61 ve üstü
**4. Eğitim düzeyiniz**
( )Önlisans  ( ) Lisans  ( ) Yüksek Lisans    ( ) Doktora
**5. Mesleki unvanınız**
( ) İnşaat Mühendisi ( ) Mimar ( ) Şehir Plancısı ( ) Harita Mühendisi ( ) Jeoloji Mühendisi ( ) Avukat
( ) Jeofizik Mühendisi  ( ) Tekniker
**6. Çalıştığınız kamu kurumu**
( )Üniversite ( )Büyükşehir Belediyesi ( )İlçe Belediyesi ( )AFAD ( )Çevre, Şehircilik ve İklim Değ. İl Müdürlüğü
**7. Mesleki deneyim süreniz ( Yıl )**
( ) 1-5  ( ) 6-10  ( ) 11-15  ( ) 16-20  ( ) 20 ve üstü
**8. Çalışma bölgenizdeki mesleki deneyiminiz ( Yıl )**
( ) 1-5  ( ) 6-10  ( ) 11-15  ( ) 16-20  ( ) 20 ve üstü
**9. Kentsel dönüşüm çalışmalarında görev aldınız mı?**
   **(Birden çok seçenek işaretlenebilir)**
( ) Kentsel dönüşüm projelendirmelerinde görev aldım
( ) Riskli Alan tespiti, dosya hazırlanması ve ilgili çalışmalarda görev aldım
( ) Rezerv Alan tespiti, dosya hazırlanması ve ilgili çalışmalarda görev aldım
( ) Riskli Bina tespiti, dosya hazırlanması ve ilgili çalışmalarda görev aldım
( ) Herhangi bir kentsel dönüşüm çalışmasında yer almadım

**10. Sürdürülebilir şehirlerin oluşturulmasında kullanılan kentsel dönüşüm metotlarının önem derecelerini 1 ile 5 arasında puanlayarak değerlendiriniz.**

| **Dönüşüm Türü** | 1 En az önemli | 2 Az önemli | 3 Önemli | 4 Daha önemli | 5 En önemli |
|---|---|---|---|---|---|
| Bina bazlı dönüşüm | | | | | |
| Arsa bazlı dönüşüm | | | | | |
| Alan bazlı dönüşüm | | | | | |

**11. Kentsel dönüşüm planlama ve uygulama çalışmalarında size göre en etkili ve avantajlı yasa hangisidir?**
( ) 5393 Sayılı Belediye Kanunu 73. madde ve ilgili maddeler
( ) 6306 Sayılı Afet Riski Altındaki Alanlarında Dönüştürülmesi Hakkında Kanun

( ) Mevcut kanunları yetersiz buluyorum

**12. İmar revizyon planları yapılırken kentsel dönüşüm ihtiyacının önemsenerek yapıldığını düşünüyor musunuz?**

( ) Evet, yeterli buluyorum.

( ) Yeterince önemsendiğini düşünmüyorum

( ) Hiçbir şekilde önemsendiğini düşünmüyorum

**13. Kentsel dönüşüm çalışmalarında (riskli alan/rezerv alan ilanı, projelendirme ve yapım) uygulayıcı olan kurumların bu çalışmalardaki önem derecesi ne olmalıdır? 1 ile 5 arasında puanlayınız.**

| **Kurum Adı** | 1<br>En az önemli | 2<br>Az önemli | 3<br>Önemli | 4<br>Daha önemli | 5<br>En önemli |
|---|---|---|---|---|---|
| TOKİ | | | | | |
| İlgili bakanlık | | | | | |
| Yerel idareler (Belediyeler) | | | | | |
| Müteahhitler | | | | | |