“Our Plants are Slowly Dying here, Just Like us”: Coping with Pollution in Turkey’s “Cancer Valley”

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Abstract

The district of Dilovası, often called 'cancer valley' in the media, is a largely industrial neighborhood in the conurbation of Istanbul where residents are overwhelmingly second-generation migrants from the Black Sea, East, and South-East regions of Turkey who came to find work after the 1960s. They witnessed the industrial boom, the associated encircling of their neighborhoods with factories, and the resulting degradation of their environment. Those who can afford to continue to leave, while those who cannot continue to wait for solutions to the severe environmental problems they are forced to live with. Through an analysis of field notes, in-depth interviews, and participant observation, we examine local perceptions of pollution levels and impacts on their health, and how individuals make sense of their polluted environment. We also explore their strategies to cope with pollution, and their plans in the future. We find significant differences of perceptions and responses associated with age, gender, and income levels.

Key words: Economic migration, pollution, unregulated industry, environmental justice, low-income communities, health hazards, Dilovası, Istanbul, Turkey.

INTRODUCTION

"There were vineyards, cherry, plum, and peach orchards when I came here. This place was like a fruit paradise." This is how Ali, a Dilovası resident, remembers his neighborhood when he first arrived, about 40 years ago. Today, Dilovası is famously known in Turkey as a 'cancer valley' (CNN TÜRK, 2014; DW Türkçe, 2019), where pollution is omnipresent in the acrid smell that leaves a pungent taste, the gigantic, blackened factories and their chimneys spewing ever-rising clouds of toxic colors, the black dust that covers everything both inside residents' houses and outside in in their gardens and on the streets. Although the levels of pollution across Dilovası are worrying and residents continue to demand government action to deal with industrial pollution, the neighborhood remains infamous as one of the most polluted regions of greater Istanbul.

We explore how residents of this notoriously polluted neighborhood perceive their environment, evaluate the consequences of the pollution on their lives, and the various ways in which they cope with the environmental degradation. We first provide a background description of the study area and present a brief literature review. After describing our methods, we examine Dilovası as a growing community that has been undergoing radical transformations under the combined pressures of increasing migration and pollution. We then turn to perceptions of and coping strategies for pollution among Dilovası residents, including effects on health and the role of gender in people's responses. Finally, we address what we term the politics of pollution, and how power relations and divergent interests of the various actors involved lead to decisions (or lack thereof) relating to environmental degradation in Dilovası.

Background

Since the 1960s, Dilovası district in Kocaeli province has grown into one of the major industrial cities of the Marmara region, on the eastern edges of the metropolis of İstanbul. Today, Kocaeli is Turkey's second-biggest industrial area after Istanbul, accounting for approximately 15 percent of the Turkish manufacturing industry, and Kocaeli is home to 79 of Turkey's largest 500 companies (Türkiye'nin 500 Büyük Sanayi Kuruluşu İçerisinde Kocaeli'den 79 Firma | Kocaeli Sanayi Odası, 2020). Five of the 13 Organized Industrial Zones (OIZ) in Kocaeli and one industrial coal processing facility are located in Dilovası. The district is in high demand for industrial investments due to its location along the coast of the Izmit Bay and its immediate proximity to Istanbul and to major infrastructure including highways, railroads, and ports. The D100 highway and the TEM (Transit European Motorway) directly connect the district to both

Europe and the Middle East, while several container and bulk goods ports surrounding Dilovası put the area a few weeks away from any major world port and make it an ideal destination for industrial developments (Kanbak, 2011; Tezkızan, 2009).

The first factories in the area (İzocam and Marshall Paint) paved the way for other businesses from a large variety of sectors: iron, steel, machinery, coal distribution, paint, storage facilities, but above all chemical and metallurgic industries[1] (Kanbak, 2011; Marka, 2011; Tezkızan, 2009; TBMM (Testimony of Research Commission of the Grand National Assembly of Turkey Dilovası Report), 2006). This expansion in employment opportunities attracted migrants from other areas of Turkey who built opportunistically[2]so that unplanned urbanization alongside rapid industrialization play a central role in setting the scene for the environmental pollution problems the neighbourhood is facing today (Dinçer, 2007). Although the population increased sharply between 1960-1980s, that trend later slowed due to the negative representation of Dilovası in the media. Industrial sites, however, kept on expanding (Türkiye İstatistik Kurumu [Turkish Statistical Institute], 2022).

The level and density of industrial activities in Dilovası together with their proximity to residential neighborhoods have resulted in high levels of exposure to pollutants in soil, water and air (Uzun, 2020). Yılmaz et al., (2020) compared the hourly measurements of air quality for sulfur dioxide (SO_2), 10μm particulate matter (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3) of four air quality stations in Dilovası between 2014 and 2019. They found that at one of the stations located closer to residential areas NO_2 pollution, which is known to pose a risk to human health, had exceeded the hourly limit 73 times in 2018. They also identified PM_{10} as the most dangerous pollutant in one of the stations located within the organized industrial zone, and had similarly exceeded the allowed limit 35 times in the city center.

In 2019, a group of journalists concerned for the health of Dilovası residents reported on their increasing exposure to significant levels of pollution (Armstrong, 2019; Şentek & Shaw, 2019). Noting the difficulties of obtaining official regional health records, they wrote that many families, and especially the children, had been diagnosed with asthma, cancer, and leukaemia (Călinescu, 2019; Şentek & Shaw, 2019). Their independent research included the collection water

[1] Such as Olmuksan Paper, Solventaş Warehouse, Çolakoğlu Metallurgy, NASAŞ Aluminum Industry, Dyo Paint, Sedef Shipyard, and others

[2] The Turkish term for housing erected without appropriate planning permissions or in areas without access to municipal services, *gecekondu,* translates as "built overnight."

samples that scientific testing subsequently showed contained alarming levels of mercury, iron, and ammonia (Şentek & Shaw, 2019).

High levels of environmental contamination in Dilovası began to cause concern in in the early 1990s and has increased over the last two decades. While precise causation between illnesses and pollution is difficult to establish and beyond the scope of this study, past research points to a striking correlation between industrial pollution and ill-health (Altıntaş, 2020; Dökmeci, 2018; Karaçayır, 2009; Turker et al., 2006; Yavuz & Tanık, 2012; Yavuz, 2011; Yolal, 2014). The now well-established effects of industrial pollution range from irritation to respiratory diseases such as asthma and bronchitis. However, the proximity of the industrial facilities to the residential area of Dilovası has been associated with a strong prevalence of cancer among residents. According to the results of a much-debated epidemiological research, 33 of 100 deaths in the district are caused by cancer, and people who lived in Dilovası for more than ten years before 2000 were 4.4 times more likely to die from cancer than the rest of the population (Hamzaoğlu et al., 2011). Another study, comparing Dilovası and Kandıra (a near-by city with no industry), found that only in Dilovası are high particulate matter (PM_{10}) levels and heavy metals above the limits set by the World Health Organization found in mothers and newborns (Hamzaoğlu et al., 2014). This study was first released as a preliminary report in 2004 (Kocaeli University Medical School, 2004). Its publication and the ensuing debates eventually led the National Assembly to create a Dilovası Environmental Research Commission to investigate the problems in 2006 (Terzi et al., 2017; Tezkızan, 2009).

Scientists' efforts to show the immediate and long-term health effects of industrial facilities and toxic hazards in Dilovası are often regarded by the authorities and industry leaders as a threat to industrial development and economic growth (Yavuz & Tanık, 2012). Onur Hamzaoğlu, a public health professor in the Faculty of Medicine of Kocaeli University, who had exposed the public health issues related to pollution in Dilovası, was sued by the local mayor when he shared the preliminary results of his study on cancer rates. He was accused of imparting or conveying false information on cancer and of scaremongering, a clear indication of how sensitive this issue is, and highlights the contradictions between industrial priorities and public health priorities among policy-makers (Terzi et al., 2017). Similarly, environmental journalist Bülent Şık was prosecuted for publishing articles about the impacts of environmental degradation on human health in several Turkish provinces in the *Cumhuriyet* newspaper (Ilgaz, 2018). Like Onur Hamzaoğlu, he was accused of disseminating incomplete information about ongoing research and inciting fear and panic in the population.

Dilovası, one of the oldest and most visible examples of contaminated community in Turkey, is a striking case: it hosts a high concentration of heavily polluting industries in close proximity to residential areas, but neither State nor local officials have taken any significant action to remedy this situation. Instead, the majority of residents have stayed in Dilovası despite being aware of the situation. Although over the past decades both scholars and journalists have attempted to bring attention to this dangerous situation, the problem has only been exacerbated by the continuous expansion of industrial facilities in the area, while the unequal distribution of the costs and consequences of pollution to the detriment of low-income and minority groups become more apparent.

Literature Review

The literature on environmental justice generally focuses on relations between social inequalities and exposure to a degraded environment. A large body of interdisciplinary literature centered on the United States has shown that deprived populations, such as the poor, the working class, ethnic minorities, and immigrants are more likely to bear the varied consequences of environmental degradation than affluent and white populations (Bryant & Mohai, 1992; Bullard, 1983; Bullard et al., 1997; Hurley, 1995; Mohai & Saha, 2007; Pollock & Vittas, 1995). In the last 30 years, scholars, activists, and organizations have produced research emphasizing environmental injustice practices worldwide: (see, for example, Italy (Armiero & Fava, 2016), Ukraine, Nigeria, Mexico, and India (Adeola, 2012), Bangladesh (Dewan, 2020), Canada (Luginaah et al., 2010) Spain (Larrea-Killinger et al., 2017), Bosnia and Herzegovina (Broto, 2013), Greece (Skouloudis et al., 2017), Thailand (Sitthikriengkrai & Porath, 2017) and Sri Lanka (Senanayake, 2020)).

Communities have different first-hand experiences of and reactions to polluted environments, and scholars have examined how residents respond to environmental hazards in a variety of places (see, e.g., Armiero & Fava, 2016; Auyero & Swistun, 2009; DeCesare & Auyero, 2017; Hernandez, 2019; Lora-Wainwright, 2010, 2013; Mah & Wang, 2019). For instance, (Skouloudis and colleagues (2017) demonstrate how the issue of industrial waste disposal, which has been ongoing for more than four decades in the Asopos river basin in central Greece, has damaged public trust in the government. However, most research focuses on the impact of degraded environments on community relations and quality of life issues. While problems arising from industrial pollution may provoke opposition to industrial activities (Neumann, 2016), in some cases industrial development is encouraged and welcomed for economic reasons (Jerolmack & Walker, 2018) For example, Broto (2013) shows that people who depend on the

coal-energy production industry in the Bosnian city of Tuzla for their livelihoods and the future of their families are ready to overlook environmental consequences that have transformed the city over the last decades. These studies are striking for two reasons. First, they highlight the range of experiences and reactions of communities affected by degradation and pollution of their environment. Factors such as the socioeconomic status of the community seem crucial in determining why and how people prioritize economic well-being over environmental quality. Second, they emphasize the importance of community identity and cohesion in making a neighbourhood a good place to live, even if outsiders consider it too polluted to be habitable.

Dilovası has been the object of much research addressing various social, economic, and environmental problems. While some studies have examined industrial development and its effects on the environment (Başaran, 2009; Bozkurt et al., 2015; Demir, 2015; Dinçer, 2007; Kılınç, 2017; Tezkızan, 2009; Tuncel, 2016) and others have focused specifically on transport-induced air pollution (Arslantaş, 2019; Çetinyokuş, 2017; Yılmaz et al., 2020), too little attention has been paid to the experiences of contaminated communities. We argue that while it is widely recognized that air pollution reduces life expectancy, the impact of contamination on communities such as Dilovası remains understudied. Our research examines how residents of Dilovası experience and understand their toxic environment and its consequences, and how they relate to political and social action against pollution.

METHODS

To understand the pollution problem from the perspectives of residents, the first author used ethnographic methods to gather information over a two-month period (June and July 2021) in nine different neighborhoods of Dilovası via semi-structured and open-ended interviews with 45 residents (25 women and 20 men), using participant observation, field notes, and in-depth interviews. Participants were recruited using snowball sampling based on recommendations of experts and key informants. Participants were also recruited informally in the field, primarily by introducing the project and the aim of the research. Interviews were conducted face-to-face in public areas, such as coffee houses and parks. The questionnaire included eight topics: the neighborhood, industrial activity, environment and pollution, health, daily life, socioeconomic aspect, relations with administrative authorities, and change and perspectives. Each interview lasted approximately between 40 minutes to one hour.

RESULTS

A Community under Transformation

Almost all the interviewees for this study had resided in Dilovası for at least five years, and most have been there for over 30 years. Residents often characterized Dilovası as one of the best places to live due to its 'close community relations' and village lifestyle. They feel a strong attachment to their community and take active roles in social gatherings such as funerals and weddings. One resident who believes Dilovası is one of the best places to live despite its pollution problems, commented: "As a resident of Dilovası, I am happy to live here and cannot picture myself adapting to a different place." Many emphasized how easy it is to leave doors unlocked and allow children to play outside until late at night because of the community's trust. However, the respondents viewed the lack of social activities in the neighborhood, such as youth centers, children's parks, and cultural centers, and being so close to industries as the worst aspects of the district.

During the initial industrialization phase, Dilovasi was populated largely by migrants from Eastern and Southeastern Anatolia, as well as the Black Sea Region due to push and pull factors such as political concerns and work opportunities in the area, chiefly the provision of cheap labor for factories (Kanbak 2011; Kolukırık 2012; Tezkızan 2009). This is confirmed by respondents, the majority of whom reported that they moved to Dilovası primarily because of limited employment opportunities in the Eastern and Black Sea regions they had left. These migrants shaped the demographics of Dilovası until the 1980s, when the industrial boom began to slow down:

> Our reason is the same as the most common reason: economic conditions. I came from Ağrı, where the economic opportunities were limited, and the land was barren. That's why we are here now. People migrate wherever they can support themselves. (Faruk, M, 60)

Another interviewee also noted soil infertility and lack of employment opportunities as impacting her family's decision to move to Dilovası:

> When sugar beet production was banned in Iğdır, my father moved our family here because of poor living conditions and high unemployment in Eastern regions. (Sevil, F, 40)

In addition to available job opportunities, many interviewees noted that relatives who had moved earlier reported back in favorable environmental conditions in the district. Indeed, some

respondents remembered the bucolic past of Dilovası as another of the other reasons they chose to move here:

> There were grape, cherry, plum, and peach vineyards when I came here. This place was like a fruit heaven. Dilovası was one of the closest places to Istanbul like this. With an increasing demand for both industry and employment, the population of Dilovası has also risen quickly. Many people from central Anatolia, Eastern Anatolia, and the Black Sea region came here to find a job. Now, Dilovası is like a small Turkey. Most importantly, the industry started growing as the industrialist knew it was a cheap, easy, and unregulated place to start a business. The industries took advantage of this opportunity, which caused an unplanned, unauthorized urbanization process. Later on, heavy industries were established without any criteria and control mechanism. The most polluting industries, heavy metal, iron-steel smelting plants, and chemical-paint companies squeezed into this small area. (Ali, M, 68)

A recurrent discussion in the literature is focused on whether polluting industries are brought into poor and disenfranchised neighborhoods or whether poorer people, attracted by job opportunities, settle close to industrial areas (Bryant & Mohai, 1992; Bullard, 1983; Pastor et al., 2001). Our participants fall on both sides of this argument: while many explained that they came here to work, others insist that they came before the industries moved in. These positions are not necessarily contradictory since the responses largely depend on when and where exactly the household settled, the distance of their residence from existing industries, and later industrial expansion. Whatever the timeline, the current situation is clear: the residential community is constantly exposed to high concentrations of industrial pollution.

Pollution: A Ubiquitous yet Elusive Problem: "Here, we feel the pollution through our five senses"

It is challenging for individuals to understand how (let alone prove that) they are being affected by pollution (Auyero & Swistun, 2008). As noted in other studies, residents assessments of their neighborhood pollution problems cover a wide spectrum (Neumann, 2016). In the early 2000s, respondents reported that cases of unexplained and sudden deaths of domestic animals led people to question the quality of their environment, particularly of their water. It is also clear from interviewees that at the outset health problems were predominantly related to animals' health. Necati, who moved to Dilovası with his four brothers to work in the construction of factories in the early 1960s, described his first experience with pollution:

> After 2004, my partridges started to die. They were born with crippled, crooked beaks and legs. Hundreds of fish were found dead in the Dil stream.

Although he contacted the media, no one showed interest at the time. Over the years, however, he says that his animals' health improved but still he remains skeptical since his wife has been diagnosed with cancer and many of his neighbors suffer from chronic obstructive pulmonary diseases. As in other cases of environmental contamination in residential neighborhoods (e.g., Armiero and Fava 2016), respondents compare their and their family members' health to that of non-humans:

> It is almost impossible to grow flowers here. Here, we all have our gardens, we plant flowers and vegetables, but an oily layer sticks to the surface. They do not flower because they are showered with ash from chimneys. Our plants are slowly dying here, just like us. (Aysu, F, 50)

For Aysu, taking care of their health and seeking medical help seem pointless as long as they continue to live near these chimneys constantly spewing dark clouds of smoke. Another respondent who believes that the pollution has a detrimental impact on plants stopped gardening altogether:

> Our trees are dying. We try to save our dying trees with medicines like us. I don't plant anymore because it is a waste of time when you know that they will not bloom. (Ali, M, 68)

Many respondents explained that they are fully cognizant of the pollution problems:

> There's probably no need to experiment with environmental pollution here. We live in an area surrounded by industry. Of course, we will be affected. Here, we feel the pollution with our five senses. Sometimes we feel that our nose is burning. We can't breathe when there are strong odors. I'm not even talking about visual pollution; it is obvious. Noise pollution as well; it is not possible to stay outside when some of the factories operate - it is that loud. (Ragıp, M 37).

To illustrate his observations, he suggested we take pictures in the morning and evening, as a means of comparison, and make a note of the changing noises and smells. Other respondents

said they dry laundry indoors and always leave their windows and doors closed to keep out air pollution.[3]

The effects of the pollution remain elusive

One of the most significant effects of a polluted environment is related to health risks. The causal relation between repeated exposure to environmental harm and the poor quality of life among low-income groups have been demonstrated in previous community studies (see e.g., Evans & Kantrowitz, 2002). In this regard, residents of Dilovası are at extreme risk: in addition to the presence of four OIZ, one coal processing plant, several ports, and two key highways, they have no communal green spaces, low quality housing, and low income levels. Nevertheless, despite the clearly visible and ubiquitous presence of pollution, most respondents reported that they took no precautions since they do not notice pollution, and many commented that pollution is no longer a topic of local discussions. While many people recognize pollution as an ongoing problem, others say they are becoming accustomed to it and sometimes dot not notice it. Hamza underlines the local perspective on pollution:

> We are used to living in polluted air; we got used to it one way or another. We remember when you ask, but other than that, it's something normal to us. No one thinks about air pollution in our daily lives. Our daily hassles are enough for us. Sometimes it smells of gas, but it passes. (Hamza, M,47)

This form of denial is not unusual in highly polluted communities. As noted by Adams and colleagues (2018), residents often declare being used to smells and other signs of pollution and accepting them as normal. Similarly, residents of Dilovası often emphasize that pollution used to be worse, and is therefore a thing of the past, a tendency also noted in other research, such as Neumann's (2016) study in a community with high levels of lead contamination.

It is challenging to establish causal links between levels of pollution and individuals' health, and perceptions of the effects of pollution vary widely among residents: while some were

[3] The prominence of the role of senses in environmental awareness has been extensively discussed in the literature. For example, Armiero and De Rosa's (2016) case study of Naples, illustrates the connections between smell, place, and environmental justice activism.

certain that their poor health was linked to air pollution, others, like Onur, did not see a clear relation:

> Most people here live with asthma, bronchitis, and chronic obstructive pulmonary disease. These diseases are widespread. My son is 14 years old and has asthma. [… But] in the East too people die of cancer. The air there is as clean as it gets. There are no factories, they eat only natural products. So, I have trouble making the connection with the industries. (Onur, M, 44)

On the other hand, many report anecdotal evidence that living near factories caused chronic health problems for babies and asthma even in young children. Some, like Sevil, a mother greatly concerned for the health of her family who worries about the negative impacts of pollution on her children's development:

> Our relatives' children are growing up faster because they live in Darıca. My children are not growing at the normal rate for their age ..... It must be related to all those factories and their pollution …. My husband's lungs are affected by dust. We are not sure whether it is an occupational disease or if it is related to living next to factories; it might be both. Because of his poor health, he is having trouble finding a new job. He believes that living in Dilovası affects his health negatively. That's why he is looking for jobs far from here. He wants to work in cleaner, healthier air. (Sevil, F, 40)

This uncertainty in the attribution of health risks to industries was noted by Luginaah and colleagues (2002) in the study of a community in proximity to a petroleum refinery in Ontario, Canada, who found that being close to dangerous substances both at work and at home makes it difficult for people to identify the root cause of health problems. Nevertheless, people are by and large cognizant of the risks. However, it can be costly to live a healthy life when protection against pollution is treated as a matter of individual responsibility:

> The doctors here say to drink bottled water. I live on minimum wage. There are five members in my family. It is almost impossible for me to buy bottled water. Should I spend my money on water or food? They do not understand the conditions we live in. (Celal, M, 41)

> When we see doctors, they mostly recommend moving somewhere else or buying an air purifier and bottled water. They also advise us not to smoke, but it is pointless since we breathe polluted air every day. (Hatice, F, 43)

It is likely that the high levels of environmental pollution in Dilovası present an economic burden to many households in terms of increased health expenditures for both preventive and palliative care.

Women on the frontline

While pollution affects all residents, women are on the frontline of maintaining the household spaces. Almost every interview or conversation with women centered on their duty to cope with pollution in daily life. While men mostly complain about the dust on their cars or in their working area, women complain about how hard it was to keep the home clean. Many mop their entire house daily, but some have decided the problem is insurmountable:

> We always clean the house. Even if we clean, the windows at once look dirty again because of coal dust. […] In Dilovası, having a clean house is just a dream. (Halime, F, 31)

This constant exposure to pollution and the associated depression they feel at their inability to remove it from their homes and protect their families have a further detrimental impact on women's health (Evans & Kantrowitz, 2002):

> I spend almost more than a five-hours each day cleaning. I am not sure how it gets dirty so quickly. I dust and mop the floor every day. I became obsessed with cleaning because it never stays clean when you live next to factories. I do not even open the windows and doors, so it doesn't get dirty again- but it still does. This also has psychological effects. (Belgin, F, 29)

Politics of Pollution: Perceived Causes of and Solutions to Pollution Exposure

Dilovası residents' understanding of how and why the current high levels of pollution they have to live with were reached, as well as what solutions they envision and hope for can be summarized in two broad arguments: first, the current situation results from the lack of regulation, and second, the only solution consists in relocation. Improving and enforcement of environmental regulations and is considered mainstream environmental policy literature and particularly in ecological modernization theory (Mol 2003) to be key to a successful transition towards a sustainable economy. While we found that residents of Dilovası often mention this argument, they do not in fact regard it as a solution but rather as an explanation of the current situation. The only solution they contemplate is moving out of the area, something that is beyond

their current resources. They therefore place their hopes in the State to organize a long-discussed but never implemented relocation program.

Weak Regulation

Although new factories in Dilovası implement new technologies and tend to be "cleaner," environmental regulations are difficult to enforce (Sanayi Kaynaklı Hava Kirliliğinin Kontrolü Yönetmeliğinde Değişiklik Yapılmasına Dair Yönetmelik, 2014 [Regulation Amending the Regulation on Control of Industrial Air Pollution]) leading many residents to doubt the State's capacity or willingness to protect their fundamental rights to live in a clean environment. Most respondents provided a similar explanation of why the State seems unable to enforce environmental regulations on industries: state employees turn a blind eye in exchange for bribes, and this perception of collusion has been triggering conflicts with residents.

Some respondents reported that they considered that not only residents, but industrialists as well are victims of the State's failure to design and enforce policies and regulations. On the one hand, residents of Dilovası built houses without permissions in the 1960s and 1970s, and to this day, most residents are still trying to obtain their house or lands deeds. Residents therefore broke the zoning laws and regulations, and the State has been unwilling or unable to enforce them, inspite of the evident exposure to environmental harm this entailed. On the other hand, industrialists bought land and obtained permits from the government to set up factories in the neighbourhood even after the establishment of residential settlements. Then they persistently violated environmental regulations but the state did not intervene. Therefore, not only have residents and industrialists failed to follow regulations, but the State itself failed to enforce them. However, pointing to the strong connections between powerful industrialists and the State, residents argue that local struggles and developments usually fail rapidly because no one is on their side. As respondent Onur pointed out: "Bribes allow them to do their own businesses and we are the only ones who do not get any benefit from living in Dilovası."

The unequal power relations among local residents, the state, and the industries on the one hand and between the interests of the state and the industries on the other are evident to the residents as they witness the continual expansion of industrial infrastructure:

> They built chemical tanks in one of our neighborhoods. It is supposed to be illegal to build so close to housing, but no one cares about the laws here. Here, the rules, laws only apply

> to people. If you do something illegal here as a citizen, they will surely notice. But when industrialists built those tanks right next to us, no one stopped them. (Hakan, M, 57)

Between May and July 2021, a spectacular algae bloom (likely resulting from agricultural and industrial activities around the shoreline) led to the accumulation of dead organic matter at the surface of the Marmara Sea. The issue dominated the news cycle for a few weeks as scientists feared that it could lead to the rapid eutrophication, and consequent "death" of the whole sea. This crisis is regularly referred as a watershed in the rise of ecological consciousness in Turkey, having an impact even on people who never showed interest in environmental issues, and many residents mentioned they hoped that it would contribute to a wider recognition of its extent throughout the country and lead to strengthening and more effective enforcement of environmental regulations. Like other respondents, he made a connection between the environmental issues and "the dirty games of politicians brought us to that situation. That's really all about Turkey's dirty politics" (Faruk, M, 60). He described the tension between the state and industry where both try to dominate each other may lead to the death of the sea:

> [The algae bloom] is not only an environmental problem. It is also the problem of our democracy, local governments, and autonomous structures like the organized industrial zones that can dump into the sea. We need to tackle the roots of those problems to solve the problem [……..] in the Marmara Sea. (Faruk, M, 60)

Although he said that he enjoys living in Dilovası, he was now planning to move away at the insistence of his children, since he did not expect any improvement to materialize in the foreseeable future.

Relocation: A Solution of Last Resort

In the 1960s, moving to Dilovası was an enticing solution for many facing unemployment in the Eastern and the Black Sea regions of Turkey. Today, however, not only have environmental conditions radically changed, but residents are not satisfied with the factory jobs offered: almost all respondents agree that the industries and other businesses in Dilovası fail to provide adequate jobs to the locals. In the old days, households had at least one family member or a friend working in one of the local factories. Respondents noted that although they live near five OIZs:

> Dilovası people can work only in blue-collar jobs, which are short term. They are primarily contingent workers, such as operators, and drivers. Most of my relatives and my husband also work in construction. Industries do not provide long-term and good-paying employment opportunities for people living here. (Ayşe, F, 29)

They complain about having to take work in distant factories because of lack of available local jobs. Many residents consider this an injustice and believe that they are being denied local jobs because industrial employers consider them to be uneducated, untrustworthy, or unskilled. To most, employment, not pollution, is their primary problem. Their children who are now educated believe they deserve to work in high-paying jobs nearby, and that the pollution they continue to endure should give them priority access to what they believe they deserve anyway. Living in close proximity to factories may not be a advantage for employment anymore, as many factories now offer personnel shuttle services to surrounding towns and cities such as Düzce, Yalova, and some districts of Istanbul. This, combined with the stigma associated with living in Dilovası, makes it difficult to compete with other workers for positions such as foreman or line manager.

Nevertheless, a few respondents still regard Dilovası as an important work destination. One pointed out that job shortages in eastern regions of Turkey remain a significant problem and that many people continue to move to Dilovası in the hope of finding work. But as another respondent notes, the most important drivers for moving to Dilovası in recent years have been low land prices and low rents in comparison with other districts around Istanbul, likely because of the long-term pollution problems and stigmatization of the area that at the same time make it difficult for residents to move out (see Checker, 2007). Thus, some respondents indicated that they had decided to move to a polluted area known for its health risks in return for reasonable housing prices and job opportunities requiring low-skilled workers. In Dilovası, long-term residents expressed regret that they did not settle elsewhere instead; while most young people who grew up in the neighborhood simply want to leave.

The district still attracts new industries as well as new residents seeking lower real estate prices, but younger residents have been leaving for an array of reasons: the stigma associated with the residential neighorhoods and the relative lack of nearby job opportunities, the blatant lack of public services (including transportation), and above all the lack of social activities in the region: "I do not want to live here because there is nothing to do with your friends. You can't even find a cafe to sit down" (Cansu, F, 25). The State has for a long time presented relocation plans have long been presented as the central solution but they never materialized, and in any event met

resistance of some residents who believe that relocating would mean giving in to the interests of the industries, which could expand even more. However, most remain resigned, hoping without much conviction that the State can finally come up with a workable solution.

DISCUSSION AND CONCLUSIONS

The results of our study illustrate for more than three decades how residents of Dilovası have been and continue to be subject to long-term exposure to high levels of pollution. Our results reflect those of similar studies of such cases elsewhere in identifying these neighborhoods as generally poor and inhabited by ethnic minorities. However, Dilovası is further characterized by poor city planning and the failure of political and administrative authorities to offer alternative settlements away from polluted areas, in addition to a lack of environmental regulation and enforcement over industrial activities. Residents have consequently found themselves as it were in limbo – unlike other *gecekondu* neighborhoods in Istanbul and elsewhere, they have not been provided with access to good public services over time because the area was deemed inappropriate for residential development, but at the same time neither have they been offered any relocation plans. This has led to a wide range of perceptions among our respondents as to the consequences of the poor environmental conditions of their neighborhood and their future prospects as lack as continued inaction on the part of the authorities compounds the scale of the political and administrative failure. It is important to note that we found a clear gender-based difference in levels of concern and actions to combat pollution, which are generally undertaken by women attempting to keep their homes clean and free of polluted air and their families safe. Additionally, we observed a strong generational disjuncture between older people, who remember the earlier, better days of the neighborhood and mostly wish to stay and younger people frustrated by the lack of social and professional opportunities and plan to leave.

Whether or not they wish to leave, the low-income families of Dilovası cannot afford to move out as they are entirely dependent on income from local low-wage temporary jobs. Meanwhile, ongoing industrial expansion poses a continuing and growing threat to both residents and the environment. Despite being well aware of the potential health costs they incur from the high levels of environmental pollution in Dilovası, and rapidly diminishing economic returns offered by nearby industrial activities, they prefer to stay in the hope that they, or their children, can one day benefit from increasing availability of industrial employment opportunities.

Our study points to new avenues for further research at the crossroads of environmental justice theory and political sociology, particularly on the potential link between the inaction of the

state and the nature of its relationship with powerful industrial interests in Dilovası, and the reasons for the ever-delayed plans for relocation of the residents. In addition, further investigation of the the striking absence of organization and mobilization by residents of Dilovası, despite the widespread knowledge of the risks they are being exposed to would prove useful in designing strategies for mitigation of damaging pollution levels and provision of appropriate utilities and services to the community and others with similar problems in other regions of Turkey and around the world.

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Compliance with Ethical Standards

This research has received the approval of the Human Subjects Ethics Committee of Middle East Technical University on 21/05/2021 (Protocol number: 171-ODTU-2021).

Informed Consent

All respondents provided oral consent to their participation in the study. Their names have been replaced with pseudonyms.

Conflict of Interest

Authors declare they have no conflict of interests.

Authors' contributions

MDK conducted the ethnographic research and wrote the rough draft of the paper. AD structured the paper, and edited and revised the initial draft.

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Availability of data and materials

Data will be made available upon request.

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