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Article

The city of Sfax (Tunisia) and industries: Precarious cohabitation, vulnerability and difficult territorial resilience

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Abstract

The dynamics of urbanization and suburbanization animated by the city of Sfax continue to intensify as elements structuring a concentric radio organization of space within a radius of about 20 km. Tertiary activities and the various economic functions are instrumental in the growth and evolution of urban cohabitation patterns affecting production and appropriation of space. Sfax is a city that has suffered harm from a polluting chemical industry that has degraded the living conditions in most of the urban space and that has affected some of the surrounding agricultural area.

Today, pollution of the sea, strengthening port function in the city and the development of large industrial areas particularly on the seafront made of Sfax a city which faces a multiple industrial risks in the absence of a urban policy that ensures a coastal urban coherence and finds solutions to problems generated by a fragile coexistence and risks between the industrial area and residential space.

Keywords

Urbanization, risks, industries, agglomeration, cohabitation..

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The territorial planning politics in Tunisia and the various studies on the politics of the city continue to reinforce the choice of the state to a selective growth, oriented towards the metropolization of the three major coastal cities (Tunis, Sfax and Sousse). The guidelines of the different Director Schemes of the Nationally Territory planning (SDATN) have reinforced the role of SFAX as a regional

influence center by focusing on improving its competitiveness factors and mainly the industrial infrastructure equipments.

Today, the urban Sfaxian space is considered as one of the most exposed space to the industrial risks in Tunisia: it has more than 1,700 industrial plants in an agglomeration of

nearly 600,000 inhabitants¹. The urban growth forms and the spacial organization and nature of these industrial sites have an impact on the identity of the city and promote the proliferation of new vulnerabilities in the city. The urban territories are facing increasingly varied and complex scale and actors interactions especially with local policies that promote a risk management that's being exposed to growing uncertainties. In fact, since the early 1970s, the Tunisian industrial fabric has undergone deep mutations and subsequent restructurings which have often obeyed the constraints and requirements of an economy that has evolved from a state led-path to a market economy and its liberal logic. The environmental considerations and the preservation of the often fragile ecosystem balance and urban spaces are not always taken into account before the growth strategies and job creation. For many years the location of industries in Tunisia have given more importance to the coast especially that of large cities. Industrial activities in Sfax are relatively old, since 1953, phosphate fertilizer and phosphoric acid processing units were implanted near its southern coast and another industrial unit in the city center. Benefiting from existing port and transport infrastructure, these activities have increased over time thanks to a large employment area that has impelled its development especially in the Southern part of the city. Thus, several industrial units were set up and various industrial installations were erected in the absence of environmental concerns and often without planning regulations. The industrial growth of the city over the past forty years, has had many negative effects on the urban environment in terms of non-rational use of space, waste of farmland, pollution of water, air, soil, etc. Today, the south coastal area of the city, already isolated and poorly structured, is being occupied by large industrial equipments, particularly the most polluting company SIAPE². Other infrastructure equipments (a waste water

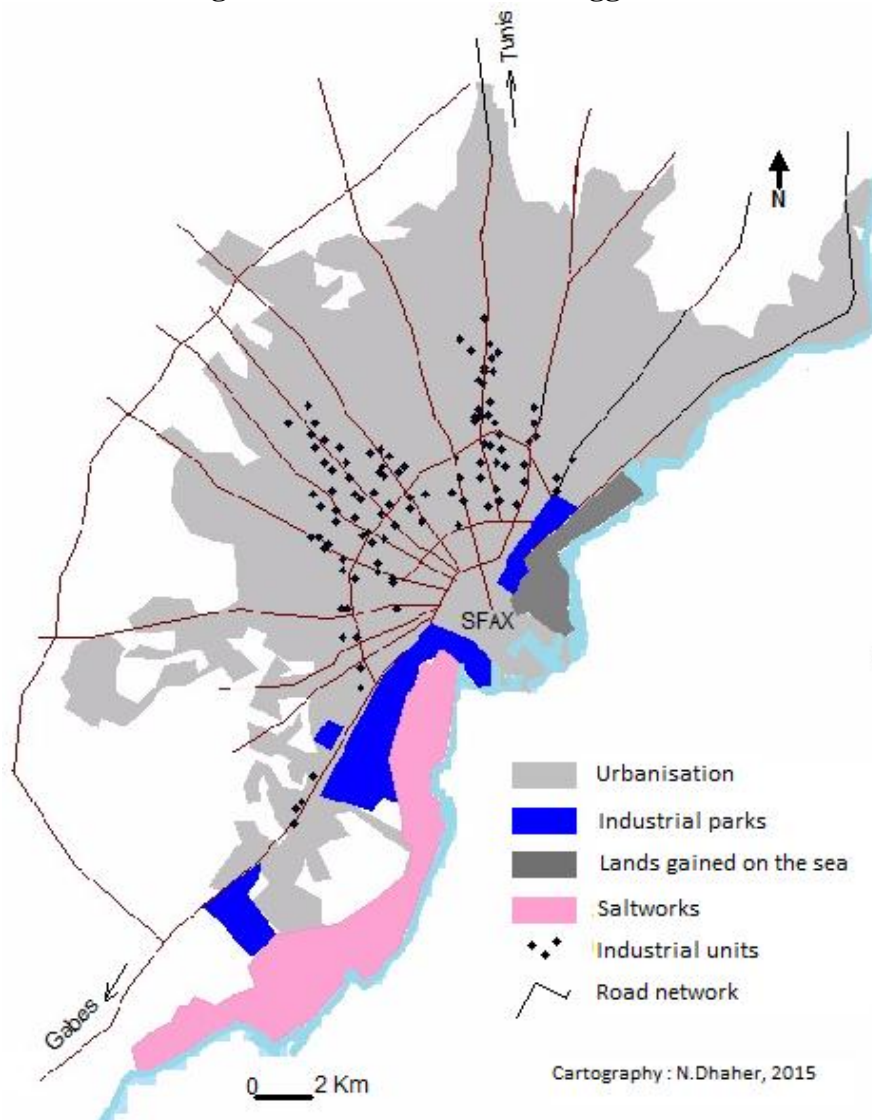
treatment plant³, storage basins of margins⁴ produced by the mills, a domestic waste landfill) occupy an important area. These equipments are an additional source of noise and damage to the environment. The cohabitation between the urban population and the industrial activities continues to generate risks conveying serious damages to the health and to the integrity of the inhabitants' life.

¹ According to the latest estimations by the National Statistics Institute in 2013

² Industrial Phosphoric Acids and Fertilizers Company (SIAPE)

³ Only 7% of wastewater generated by the industrial units in the South zone of Sfax are collected and processed by the services of the National Sanitation Office (ONAS -Sfax, 2012)

⁴ The six margin basins occupy an area equal to about 13 hectares

Figure 1 The land use of the agglomeration of Sfax**Urban and industrial dynamics in Sfax**

The city of Sfax is-after the capital Tunis-the second demographic and economic pole as well as an important production and consumption center. Metropolis in full expansion, the city occupies a strategic location in the Mediterranean and plays an important role in economic exchanges.

The urban system of the city is characterized by macrocephaly between a central town which has the largest part of the activities and more than half of the total population of the agglomeration and peripheral towns that are

almost residential (Ben Nasr, 2006). The Central area extends from the coast to the bypass road of 4 km and occupies nearly 6,000 hectares or almost 25% of the total area of the agglomeration that has tripled in the last thirty years, from 8000 ha in 1980 to 23,000 in 2013 according to the latest studies.

The industrial development that the city experienced since the early 1970s has generated a considerable growth and concentration all along the coastal areas (Figure 1).

The layout of the urban road network in a concentric pattern converging on the center and the port was required to serve a traffic travel and transportation exacerbated by industrial facilities increasingly intense. A radial network has expanded and a high density of houses emerged nearby (ring roads km4, km5, km6). The proximity to roads is related to the urbanization dynamics proper to the metropolitan area, that are characterized by a lengthening along the service roads and a link between urban peripheries and structural facilities (stations, ports, market, etc.)⁵.

The industrial plants' distribution responds to the logic of political and industrial actors. The industry development policies that have printed the urban space, reflect many location strategies that have weakened the city space⁶.

The urban organization model is as follows:

- The central coast gathers the biggest business companies generating noise (the area of the Powder (Poudrière), the area of Madagascar, the fishing port area, the area El Maou and the Thyna).
- The spaces of the first urban crown, welcome small light industries nearby homes.
- Throughout structuring roads, align SMEs and TPE seeking available cheap lands and abundant non-qualified workforce⁷.

The industrial activities delimitation in the area of the Sfaxian town remains problematic because of the complexity of the location landscape-extremely varied-and the location places dominated by the concentration of the biggest equipments in the central coastal areas, often disrespecting the planning regulations. The immediate and distant peripheries of the central space of the city and specifically the area around the small roads home small industrial units (Figure 2).

The variety of urban space development strategies affected by spatial organization and very often uncontrolled development of industrial activities has generated new forms of technological risks that continue to reach the sanitary, ecological, economic and human environment.

The Industrial development in Sfax and its impact on the vulnerability of the territory

The industrialization politics in Tunisia led to the concentration of risky activities in the large coastal cities, which has resulted in a serious threat today for the population. In Sfax, the industrial risk is omnipresent in much of the territory of the city. It is an essential parameter for the urbanization of the latter. Except flood risks which are related to the urban geography of the city and its spatial occupation, this risk category inherent to the presence of various industrial settlements threatens the city and its inhabitants and increases their vulnerability.

For over half a century, industrial facilities have greatly been more complex and the urban tissue has strongly thickened in its surroundings. Therefore, the industrial risk now covers a large number of people as the biggest equipments and the most dangerous are implanted in the central urban space near the sea where the stakes are the highest with the presence of the port and a saline area. Today, the port area surrounded by the largest and most pollutant industries, is facing difficulties in service and internal and external accessibility. The absence of an efficient management of the technological risks upon the Sfaxian territory, did not allow the evaluation of the conjunctions hazards / vulnerabilities so as to characterize the various risk situations and their evolution.

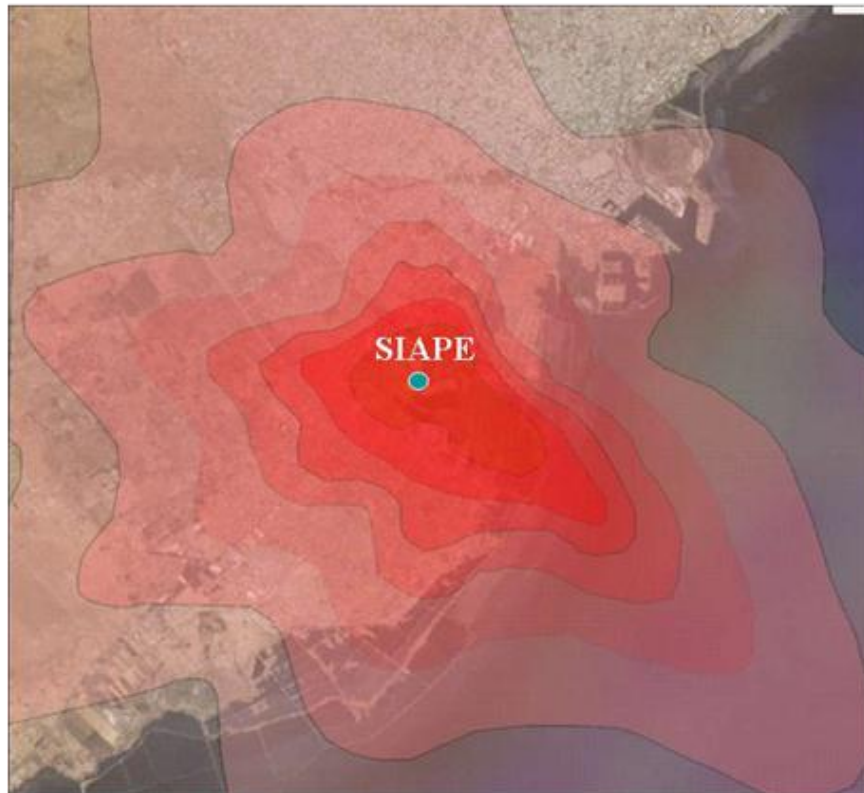
The industrial concentration⁸ has had multiple effects on the spatial structure of the city and its urban morphology. The location of phosphates' processing units near residential areas and the omnipresent character of their pollution, threaten the population and challenge the actors (Figure 3).

⁵Gasmi M, 2006.

⁶Ridha S, 2013.

⁷Gasmi M, 2006.

⁸ In 2013, the agglomeration of Sfax contains nearly 1,700 industrial establishments (A study by the Office :COMETE Engineering Study 2008).

Figure 2 SO2 dispersion around chimneys of SIAPE

Source: COMETE Engineering, 2007

The site is located in an area known for a complex urban fabric, where the boundaries between industrial and residential cities are not readable. On the other hand, releases cleared by the production of phosphate and coming from the SIAPE are discharged into two huge phosphogypsum⁹ deposits (Figure 4), located on the coastal fringe of the urban area and spread into the sea, the solid particles transported by the wind, as well as acid and leached particles. Right next to these deposits, the six basins that are used for storage of margins are still contributing to the contamination of the groundwater table and the south¹⁰ coast of the city. The messy dumping of the solid waste situated in Thyna and near the sea-although backfilled in 2008-

remains a vulnerable zone. All the area is transformed into a garbage dump. These sites now require rehabilitation and reconversion in a logic of revalorization and landscape planning. The air, sea and ports' pollution, degradation of biodiversity, the different diseases caused to humans, are some perverse effects of the presence of industries in the urban space of the city of Sfax. This situation is made worse by a obvious defect in terms of green development and especially development of road networks and transport which is asphyxiating the mobility and affecting the social and human development.

⁹The first deposit is 30m high and covers an area of 60 hectares, the second from a height of 12 m spreads on an area of 40 ha.

¹⁰According to the study of the schema of development and enhancement of the south coastal area of Grand Sfax conducted by AUDEC, COMETE Engineering, 2008.

Figure 3 Phosphogypsum deposit next pools of storage of margins and near homes



Source: Municipality of Sfax

Following the presence of these installations, the agricultural area AIN al Fallet in the south of Thyna was invaded by spontaneous settlements. The decommissioning of surrounding farmlands paved the way for an intense uncontrolled urbanization that has led-for its proximity to industrial facilities- to dysfunctions and big crises, both social and environmental. The whole area which turned with urban character, spread over a southern coastline of twenty kilometers all along the National Highway 1 and the railway line between Sfax and Gabes. The neighborhoods, like those of the road of Gabes or East Sfax, are agglomerated in areas where land prices is very low, because of the proximity of a multitude of environmental pollution: air pollution, noise, smell, flood areas¹¹.

The difficult territorial resilience between logics of actors and territorial logics

The industrial risks happening on the Sfaxian territory are known as the theory of resilience

could understand in a relevant way. However, the choices and strategies of the risk management that both political and industrial actors decide on the ground, show a contradiction between risk management policies that should be adapted and an urban development that does not consider the potential defects of the territory, its occupation and its reaction to threats. In fact, the Tunisian territory has not developed yet real consultation structures that allow the study of information, understanding and dialogue dynamics.

For some years, and in front of an urban reality characterized by an inability to manage urban disturbances, begin to emerge some attempts to question the contradictions and the actual urbanization logics. The orientations of the last Development Master plan of Sfax include: improving the service in the agglomeration by public transport and the coherence of planned strategic projects (the light rail of the Grand Sfax, Taparura the project, the integrated management of the south coastal of the city, the logistics platform and the redesigning of the port). However, the participatory approach which considers the information to the population and the role of consultation still remain marginalized

¹¹ The revolution led to formal and informal negotiations, and a real evolution linked to the spreading of information concerning the risks that lead to progressive participation of the population to making decisions.

dimensions in planning policies and territorial development.

Currently, the few prevention strategies and risk management in the industrial city of Sfax, evolve but remain reactive-rather than proactive-even in the most exposed areas to risks. Moreover, the new project of Taparura that is a part of the remediation strategy of the city, created major constraints for the service area and integration with the city center and its urban tissue (the train station, the neighboring industrial fringe, the popular housing areas)¹².

In reality, and in respect of all major Tunisian cities, towns and industries are not yet taken together in the whole urban project. The territorial fracture that has marginalized the Tunisian hinterland, also provides the most of the peri-urban extensions around major cities. The districts of Thyna, and EttoutaBadrani that have developed around industrial equipments, are today experiencing impoverishment worsened steadily as migrant populations and those fleeing the center looking for a more accessible habitat crowded them, despite the dangerous impacts of the industrial activities on the environment and health.

Today, it is urgent to think an urban planning that may evolve according temporalities adapted to the context of the city and by matching economic development rhythms and industrial hazards with urban dynamics. A resilient urbanism to industrial risks may be considered. Thus, "Plans and drawings were intended to control the future, reduce the uncertainty, to achieve an overall project" (Ascher, 2001). Economic actors and citizens must also change their daily behavior towards their environment. Isn't the resilience of the actors also required to deal with the industrial risks?

Participatory processes that develop in the political and associative areas need to mobilize more and more actors around risk management. Among the issues raised, the urban planning near industrial sites is one of the most prominent. Urbanization choices turn out to be key variables in reduction politics and of social and environmental impact of the industrial settlements. The main

challenge is the reduction of vulnerability to preserve human life and reduce the exposure of persons, goods and activities. Mastering the urbanization around industrial areas is important neither to worsen the current situation nor to increase the exposed issues. Public or private concerned players must also reduce the vulnerability of existing facilities.

Finally, the city of Sfax, characterized by the entanglement of risky factories, continues its rapid growth, in a disorderly and anarchic way. The current situation is marked by the absence of a real urban and architectural politic, adapted to the local socio-economic context, and this, despite all laws regarding planning and development.

The factors contributing and exacerbating the effects of industrial hazards on the city are diverse and problematic. The risks and pollutions of industrial origin are perceived but are not yet sufficiently supervised and advised which did not facilitate the establishment of a collective governance capable of helping the actors to develop a risk management politic. Today, the deteriorated urban landscape of the city requires a new thinking and actions that deeply alter the existing strategies.

Today, the revolution brought about formal and informal negotiations and a real evolution related to the dissemination of the information concerning the risk leading to a progressive and increasingly built participation of the population in making decisions. Some attempts are emerging to question the contradictions and implemented urbanization logics in accordance with the new constitution which provides tools and new devices that facilitate this territorial resilience (decentralization, actors' coordination, scales' articulation, etc.). Thus, rethinking the corporate governance, organizational territorial resilience, as well as a territorial and urban development of the city which incorporates the concept of territorial resilience, may help the city deal with disturbances due to industrial activities. The new politics of the revolution are required to implement new features and tools that facilitate this resilience.

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