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Abstract	<p>Natural disasters, climate change, war conflicts, unequal socio-economic growth, technological changes, and massive urban migrations continuously produce vulnerable conditions in local communities all over the world. The response to these situations, through design and physical planning, has in some cases solved the problems, while in others, only generated temporary relief. The paper examines a number of cases in different contexts, such as the new settlements after the Fukushima explosion, the war refugee cities of Za'atar in Jordan and Dadaab in Kenya, shrinking obsolete industrial cities in Poland, migrant farmers camps in Spain and Italy and urban-rural migration in India, in order to identify significant contemporary vulnerability issues and highlight the potential of design, imagining correct and durable solutions.</p>	
Keywords (separated by “ - ”)	Architecture - Urban design - Vulnerability - Vulnerable - Design - Contemporary history	

Chapter 4

A Pandemic of Vulnerability: Is Design a Painkiller or a Vaccine?

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4.1 Vulnerability Status

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Vulnerability is a negative aspect of the human condition that is permanent and recurrent throughout the millennia in all places in the world. Some of its characteristics have remained unchanged because they are linked to the difficult relationship between mankind and nature, while others have changed as a result of the relationship between human beings themselves. Vulnerability sometimes is linked to earthquakes, floods and profound climatic variations; at other times it depends directly on the behaviour of human beings, such as in the case of wars, certain forms of a pandemic, famine and the effect of economic and technological changes in societies. Of course, over the course of time, various responses to conditions of vulnerability have always been sought, obviously resorting not only to geographical choices and political, technological and social responses, but also to the design of ways of living, working and relating to others. Very clear examples of the importance attached to the design of new forms of settlement and ways of life are those found between the end of the eighteenth and the beginning of the nineteenth century, linked to the urbanisation processes generated by the rise of the industrial revolution.

Immigrants leaving the countryside of England, Belgium and Germany to settle on the fringes of historic cities lived in extremely vulnerable social, economic and health conditions. This gave rise to a complex system of technical solutions to improve housing conditions, make the places where people lived and worked hygienic, reduce the risk of fire, etc. The aim here was to reduce vulnerability in

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26 order to ensure a workforce capable of producing in a manner appropriate to the
 27 organisational needs of the emerging capitalist industry. In essence, then, design
 28 served to reduce the negative elements that could undermine a desire for new exploi-
 29 tation, which in turn would create new vulnerabilities over time. On the other hand,
 30 it is undeniable that the first English workers' settlements, imagined by Owen¹ and
 31 then developed by programmes carried out by the various corporations or public
 32 bodies, have deep roots in the idea of design as a positive factor in resolving physi-
 33 cal fragilities and social weaknesses. The same applies to the projects of the
 34 Mietskasernen in Berlin or the large-scale sanitary works in Paris.

35 This reference to a vulnerability created by a process of economic transforma-
 36 tion that needs to be resolved in order to avoid its more general negative effects, is
 37 one of the many aspects of vulnerability and the response to it. It is therefore worth
 38 examining a number of cases of vulnerability that contemporary society has to deal
 39 with in order to see which are the permanent and common elements of the responses
 40 to it and which are the innovative solutions that are produced for particular circum-
 41 stances. This will help us to understand the extent to which, in the face of natural
 42 disasters, the effects of wars, environmental crises, forms of economic exploitation
 43 and technological changes, the architectural and urban planning project is used and
 44 can have more or less positive results.

45 4.2 Vulnerability and Natural Phenomena

46 However, the problem of vulnerability to natural phenomena is not only to be seen
 47 in terms of responding to disasters, but also in anticipating and solving a priori
 48 problems that may arise in a given location. It should not be forgotten that human
 49 settlement often took place in areas that were already structurally vulnerable and
 50 that had been chosen because they were able to protect against aggression or some-
 51 how manage to survive in very difficult climatic conditions.²

52 From the point of view of the choice of a vulnerable environment precisely
 53 because it was capable of protecting against enemy incursions and destruction, the
 54 best known and most obvious example is that of Venice. The choice of the first
 55 nucleus of absolutely marginal islands made it possible, on the one hand, to prevent
 56 invaders from the Roman mainland territories from killing more of the population;
 57 but on the other hand, it forced the invention of ways of managing the very unstable
 58 natural environment in order to avoid the damage it could produce.

59 Venice has thus become a city which, having emerged in an extremely vulnerable
 60 environment, has taken this characteristic into account in the way it has been built
 61 and managed over the centuries, gradually introducing new solutions and

¹Prentoulis, Marina, *Owen and Cooperative Communities: Towards Revolutionary Trade-Unionism or Political Reformism*, Draft ECPR Conference 2004, <https://ecpr.eu/Filestore/PaperProposal/fea0429f-edee-4648-a7c4-aa37ef2106ab.pdf> (accessed: 20/04/21).

²Pielke, Roger A., *Climate Vulnerability* (Academic Press, 2013) ISBN: 9780123847041.

adaptations according to changing technological, socio-economic and, of course, environmental situations. We should not forget, for example, the “floating” solution adopted to construct buildings on platforms made of vertical piles sunk into the mud and horizontal embankments to form the base of the buildings.

In terms of similar examples, we are spoilt for choice, with a huge variety of different situations. One thinks, for example, of the complex system of dwellings in the ice of the Inuit populations of North America and Greenland, and the problems they faced in ensuring adequate protection in a very difficult environment, which is now in crisis, becoming a source of different vulnerability due to the rise in temperature and the melting of the ice in many areas.

In contrast to this example, different types of settlements in the desert, in oases, or in caves have had situations that were already very fragile, made extremely vulnerable due to climate change, especially in recent years. In these settlements, the role of design and careful planning in the use of the various natural and artificial components of the settlement has always been a determining element in the life of the communities that lived there.

Another very particular case to reflect on is that of large communities aggregated in settlements on boats, especially in the deltas of important Asian rivers, such as those of the Mekong in Vietnam and the Ganges in eastern India. In this case, the choice of floating dwellings is due to the economic activities of the inhabitants, but also to the possibility of avoiding the disastrous effects of flooding.

In all these cases, it is clear that design played a role, often with very sophisticated solutions in terms of concept and implementation. In fact, it can be said that the vulnerability arising from a site has been controlled and greatly reduced precisely because of the complexity of the designs adopted. It is worth reflecting on this ambivalence of the relationship with vulnerability, which on the one hand is an issue that we have to suffer because of events beyond our control, while on the other hand it is seen as a challenge; sometimes in a very risky and subtle game between life and death. Needless to say, cultivating the slopes of volcanoes can often lead to abundant and high-quality harvests, but it can also mean the risk of total destruction.

In cases such as the ski slopes designed in the shopping centre in the desert area of Dubai, design has been pushed to the extreme, dangerously distorting the original nature of the territory.

4.3 Cases of Humanitarian-Economic Vulnerability

We will now consider cases involving particularly serious situations of vulnerability to which attempts have been made to find solutions, perhaps temporary, that would avoid the worsening of humanitarian crises and social and economic disasters. The first group of such situations is exemplified by the reconstruction of the region

100 destroyed by the Fukushima tsunami³ in Japan in 2011, but similar situations can
 101 also be found in the USA as a result of the Katrina tornado, and in other parts of the
 102 world following major earthquakes or violent weather disasters.

103 Obviously, in the case of the reconstruction of the settlements destroyed or aban-
 104 doned due to the reactor explosions in Japan, it was a question of creating com-
 105 pletely new settlements, even in areas far removed from the contaminated areas, for
 106 a relatively homogeneous population that had lost all reference to the physical con-
 107 text in which it had developed. This clearly gave design a considerable role, which,
 108 however, was not forced to include particularly significant innovative elements, but
 109 rather had to recompose contexts that had been destroyed and subsequently aban-
 110 doned, and had in any case become inaccessible for a very long time. In many cases,
 111 the construction of these new environments had to reproduce established situations
 112 and normal traditional ways of life, as well as reduce the traumas that the event had
 113 inflicted on many thousands of inhabitants. In this respect, the role played by par-
 114 ticipatory planning was very important, as in the *machizukuri* in the 1960s, as a way
 115 for local communities to actively engage in the improvement of their living
 116 environments.

117 “Japan commemorates the ten-year anniversary of the Fukushima triple disaster:
 118 the magnitude 9 earthquake, subsequent tsunami and radiation leakage from the
 119 nuclear power plant; a chain of events that killed more than 15,000 people. Ten
 120 years later, the northern part of the region, about 10 km from the Fukushima Daiichi
 121 nuclear power plant from which the radioactive material that compromised the area
 122 leaked, is still uninhabited, and access will be completely prohibited in more than
 123 12% of the entire territory until at least 2023”⁴

124 Ishinomaki was the city that suffered the greatest damage in the Great East Japan
 125 Earthquake, 2011. Immediately after the disaster, the process of reconstruction
 126 began, and a huge number of volunteers came to the town to work on cleaning up
 127 the damaged buildings. Support organisations and bases of operations were set up
 128 in the central urban area. In the aftermath of the earthquake, it was soon clear that
 129 in the process of recovery, “the urban areas affected by the disaster cannot be main-
 130 tained as a living environment merely by maintaining and preserving the original

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³*Il triplice disastro di Fukushima, 10 anni dopo. Una tragedia non ancora finita* in Huffpost Journal, 11/03/2021 https://www.huffingtonpost.it/entry/il-giappone-commemora-il-decennale--del-triplice-disastro-di-fukushima_it_6049bbb4c5b636ed33782615 (accessed 20/04/21).

⁴“Il Giappone commemora l’anniversario dei dieci anni dalla triplice catastrofe di Fukushima: il terremoto di magnitudo 9, il successivo tsunami e la dispersione delle radiazioni dalla centrale nucleare, una serie concatenata di eventi che hanno causato la morte di oltre 15.000 persone. Dieci anni dopo, la zona nord della regione, a circa 10 km dalla centrale nucleare di Fukushima Daiichi, da cui è fuoriuscito il materiale radioattivo che ha compromesso la zona, è ancora inabitabile e l’accesso sarà vietato completamente in oltre il 12% dell’intero territorio almeno fino al 2023”, see articles: n. 15: “Post disaster Reconstruction of central Ishinomaki through the formation of local initiatives” and n. 17 “Community Empowerment after the Chichi Earthquake: The Case of Taomi Ecovillage, Puli” in Satoh, Shigeru, *The First generation. Japanese Machizukuri and Community Engagement: History, Method and Practice* (London: Routledge, 2020).

buildings and architectural environment”,⁵ but by taking up new technologies, programmes, businesses and services. As well as the diverse, functional and participatory *machizukuri* forms of design, it was necessary to engender the active involvement of the community in decision making, including internal and external organisations, and community empowerment strategies.

A historical case that has some similarities with Fukushima, is the Messina earthquake⁶ and tidal wave in Italy in 1908. The event was very serious, the city was largely destroyed and almost 100,000 people died. In this case too, the reconstruction project played a very important role in the social and economic recovery of the city. However, the events in Messina also highlight the risk of producing new forms of vulnerability by reconstruction processes that focused on certain aspects. In Messina, the richest and most representative part of the city was adequately reconstructed with buildings that rebuilt its environmental quality, but at the same time, the settlement quality of the most popular and dense areas of the city was neglected; in fact, the population were housed in shacks designed for a short duration, but in reality, they still existed and were used after more than a century. In fact, the reconstruction work was limited to solving only some of the vulnerability problems of the Messina area. This type of approach is found almost systematically in all the post-earthquake reconstruction plans of recent decades in Italy, which has obviously led to situations of serious local discomfort and often processes of abandonment of the areas affected by the earthquake. One exception is Friuli: after the 1976 earthquake, many of the buildings where refugees from the destroyed areas were temporarily housed were replaced by well-designed urban developments, complete with all the necessary functional elements.

The problems posed by the Katrina tornado, with the flooding and destruction it caused, were certainly also of a planning nature: reconstruction of safer contexts, demolished buildings to be rebuilt, etc., but also, and above all, related to protection by means of engineering infrastructures against the risk of flooding caused by the worsening climate. The fact remains, however, that in areas at high risk from natural phenomena, such as regions subject to strong earthquakes, tsunamis, tornadoes, etc., measures to reduce vulnerability are always relative. Japan’s history, which is the longest and most complex in the fight against disasters caused by earthquakes, often resulting in terrible fires, still displays some very fragile situations. All the engineering measures introduced through very careful building design and very conscientious town planning, are often undermined, as in the case of Fukushima, by events that are extremely difficult to anticipate with certainty and to control

⁵Chapter n. 15: “Post disaster Reconstruction of central Ishinomaki through the formation of local initiatives” in Satoh, Shigeru, *The First generation. Japanese Machizukuri and Community Engagement: History, Method and Practice* (London: Routledge, 2020), p. 183.

⁶*The 1908 Messina Earthquake: 100-year Retrospective*, Report by Risk Management Solutions, 2008 https://forms2.rms.com/rs/729-DJX-565/images/eq_1908_messina_eq.pdf (accessed: 20/04/21).

167 completely. In many cases, therefore, the design of difficult and risky areas has only
168 the role of containing and partly reducing vulnerability and its worst
169 consequences.⁷

170 4.4 Conflict Zones

171 Another group of interesting vulnerable situations is that caused by wars and the
172 destruction of entire cities, with thousands of people fleeing to safer areas. This has
173 led to attempts at partial reconstruction once the war has ended, and the construction
174 of new settlements consisting mainly of tents and temporary structures to house
175 tens of thousands of refugees. Similar results have been produced by effects such as
176 water shortages and widespread droughts which, often combined with situations of
177 political instability, have driven millions of people from their places of residence.
178 Wars have led to extremely serious situations in the Middle East and Yemen, and
179 climate change has displaced large populations in parts of Africa and Asia. Many of
180 these situations, such as scarcity of water and food resources, changing relationships
181 with the use of territories where people have lived for millennia, have been
182 produced by economic policies linked to the construction of large infrastructures—
183 think of the system of dams on the Yangtze or the capture of water upstream of
184 agricultural regions by countries crossed by major rivers in Africa. In this case,
185 vulnerability could not be combated by action at a local level, but only by the forced
186 displacement of a territory's inhabitants.

187 One type of vulnerable community, now home to millions of people worldwide,
188 is that of temporary camps for refugees due to war, drought and destruction of natural
189 resources, and migration in search of better living conditions. These cities, which
190 often house tens or hundreds of thousands of people, are made up of tents which are
191 not set up spontaneously but are the product of international assistance programmes,
192 and bring together communities that are ethnically, socially and culturally totally
193 different. These are undoubtedly vulnerable communities, officially intended to live
194 temporarily in these conditions but, in reality, they have often been living in these
195 camps for many decades. In these cases, the role of design and physical planning in
196 trying to achieve a minimum of acceptable living conditions is clear, but so is the
197 inadequacy of design to provide an acceptable response to the problems they pose.

198 However, two specific characteristics of these places, which differentiate them
199 significantly from other vulnerable communities, should be borne in mind. The first
200 is the fact that they are made up of inhabitants from very different cultural, linguistic
201 and social backgrounds. Refugees often come from quite distant regions and are

⁷Deryugina, Tatyana, *The Economic impact of Hurricane Katrina on its Victims: Evidence from Individual Tax Returns*, October 2014: American Economic Journal Applied Economics 10(2), DOI: <https://doi.org/10.1257/app.20160307>, Ewing, Bradley T.; Jamie Brown Kruse; Daniel Sutter, *An overview of Hurricane Katrina and Economic Loss*, January 2009: Journal of Business Valuation and Economic Loss Analysis 4(2):1–1, DOI: <https://doi.org/10.2202/1932-9156.1075>.

often of different ethnicities, suddenly forced to live together without a common history. Even in less fragmented situations, mixing between refugees from large, half-destroyed cities and small, isolated villages in the same region is common. This implies the need to find solutions that meet often very different and unbalanced needs.

The design of settlements, which tends to be, as mentioned above, the result of standard models of international aid agencies, actually shows more or less relevant adjustments of various kinds to take into account these different needs and expectations.

A second characteristic is instead represented by the evolution of the initial models over time, as the temporary settlement inevitably becomes consolidated with its own history of responses to problems arising over time and its own culture. Certainly, refugee camps such as Dadaab in Kenya, which have existed for several decades now, do not resemble normal cities, but they have also developed original functional and spatial organisation solutions that are in any case, quite adequate for the normal functioning of the communities they host.

As is well known, Dadaab, which was launched in 1991 as a temporary haven for some refugees, has reached the dimensions of a large city with its 400,000 inhabitants, divided into three main settlements with service centres, schools, and meeting places that perform the functions of a large urban system, even though they have very unusual spatial and architectural characteristics. In this sense, Dagahaley, Ifo and Hagadera, and the most recent additions, Ifo II and Kambioos, are particularly noteworthy because they offer some practical examples of how camp-based communities can play a positive role in the management of their own affairs. All are in practical terms run by democratically elected community volunteers.⁸ The camp has become a cluster of facilities and services: “healthcare and hospitals, schools and vocational training centers, communication and transport facilities, sports and entertainment, food and markets, social protection and empowerment programs, and so on, can be understood as public services, which may even exceed the local equivalent in their host regions”.⁹ These camps transcend from emergency measures and temporary shelters into much more ambiguous spaces, developing as humanitarian urbanism.

Another very interesting situation with respect to the physical organisation of the settlement and the different solutions given to some of its functions, is that of the Zaatari camp of Syrian refugees in Jordan, itself of very considerable size, both in terms of space and population gathered. In this case, there was also a lot of conceptual work behind the camp project, linked to the experience of Kilian Kleinschmidt,

⁸ IRIN News: The refugee camp that became a city, <https://www.un.org/africarenewal/news/refugee-camp-became-city> (accessed: 20/04/2021); Perouse De Montclos, Marc-Antoine; Peter Mwangi Kagwanja, Refugee Camps or Cities? The Socio-economic Dynamics of the Dadaab and Kakuma Camps in Northern Kenya, *Journal of Refugee Studies*, Volume 13, Issue 2, June 2000, Pages 205–222, <https://doi.org/10.1093/jrs/13.2.205>

⁹ Jansen, Bram J., *Cities in the making: Contours of the Urbanizing Refugee Camp*, 20/04/2020, <https://www.bpb.de/gesellschaft/migration/kurz dossiers/307980/urbanizing> (accessed: 20/04/20).

239 who later became responsible for running the camp. Kilian Kleinschmidt has a lot
 240 of experience in working in this area and has succeeded in stimulating many groups
 241 and institutions to also study types of accommodation and temporary service facili-
 242 ties to be used to house refugees.¹⁰

243 Here too, however, temporary solutions have inevitably become permanent out-
 244 comes, often shaped by the habits and cultural patterns of different immigrant
 245 groups. It is undeniable that in these situations, more or less formal design solutions
 246 have a considerable weight in reducing the precariousness of living conditions and
 247 contributing positively to alleviating vulnerability.

248 A particular case, interesting in many ways in terms of how it works, is that of
 249 the Sahrawi camps¹¹ between Algeria and Morocco. Here, the refugees correspond to
 250 a homogeneous cultural group of landless people who have nevertheless reproduced
 251 ecosystems that function relatively well despite being in extremely difficult envi-
 252 ronmental and economic conditions. 173,600 Sahrawi refugees are living in five
 253 camps located in the Tindouf province. Most refugees arrived after the conflict in
 254 Western Sahara in 1975 or were born in the camps. 90,000 of them are considered
 255 particularly vulnerable due to their heavy reliance on humanitarian assistance to
 256 access food, water, education, and other necessities.¹²

257 Nevertheless, these camps are particularly interesting from a design point of
 258 view: “The Sahrawi camps are spaces in which inhabitants are in charge of their
 259 own lives—at least to the extent possible with the continuing occupation of their
 260 home country. It is a space that has given rise to a novel system of administration
 261 and new social structures, where nomadic traditions have transformed into modern
 262 concepts of family structures and new identities have been created. In stark contrast
 263 to the common conception that these camps are usually spaces where politics are
 264 prohibited, within the Sahrawi camps, politics are both facilitated and promoted.
 265 Not only is the Sahrawi population encouraged to engage themselves in political
 266 matters, but the camps themselves are seen and used as political projects in their
 267 anticipation of the Sahrawi nation state of the Western Sahara. The Sahrawi camps,
 268 therefore, give us proof of “the camp” as a form of urban space. At a time when
 269 places of control and surveillance are multiplying in our cities, where gated com-
 270 munities and corporate compounds withdraw ever more space from public and
 271 political interaction, the opposition of the urban condition to camp spaces becomes
 272 less and less valid. Maybe the Sahrawi camps represent a spatial quality that is in
 273 fact more urban than many of our cities”.¹³

¹⁰See IPA Innovation and Planning Agency: Global Networking and Humanitarian Expertise, founded by Kleinschmidt, which helps us to connect the world’s capacity with the world’s needs through an advanced database specialized in connecting global technological, social ecological and economic solutions around the globe (see <https://switxboard.org/>).

¹¹Dawn Chatty, *Deterritorialized Youth: Sahrawi and Afghan Refugees at the Margins of the Middle East* (New York-Oxford: Berghahn, 2010).

¹²<https://www.acaps.org/country/algeria/crisis/sahrawi-refugees> (accessed: 20/04/2021).

¹³See Herz, Manuel, *From Camp to City: Permanent is not the opposite of temporary*, in “Architectural Review”, 16 May 2017, <https://www.architectural-review.com/essays/from-camp->

4.5 Workers Camps

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Similar characteristics to the temporary settlements associated with war-related migration are those hosting migrants in areas where they hope to find work and hope to reside permanently. The migrant camps along the Mediterranean coast indicate a situation that tends to fester instead of being resolved positively; often places designed as temporary reception solutions have become permanent, veritable cities with entire families who already have two generations of inhabitants behind them.

The temporary camps for agricultural workers are a different matter however, these are settlements of only young males from Africa and Asia, of different ethnicities, seeking entry into Europe and who partly work in agriculture and often partly have links to illegal drug-related activities. In several cases, these settlements have also become permanent settlements that are very vulnerable from both a social and a health point of view, but which do not have the possibility to evolve into forms of community typical of urban life. These settlements are almost always made by the landowners where the labourers work, and they often have links to organised crime that runs drug trafficking, prostitution, etc., in these areas. They are found in various southern European countries, such as Italy, Spain and Greece.

Many migrant workers gain rural employment through informal networks headed by *caporali*, which they join through various migration patterns. In the province of Foggia, for example, the vast majority of migrant agricultural workers are North African, sub-Saharan African and Eastern European, between 20 and 40 years of age.

The exploitation of migrant workers in Italian tomato production is a particularly crucial issue.¹⁴ In fact, foreign agricultural labourers live in isolated rural ruins or shanty towns in Sicily and Calabria after being selected by agents who recruit seasonal workers to work as much as possible for a lower salary. This occurs not just for tomato pickers, but also for pepper, orange and kiwi cultivations. Shanty towns like San Ferdinando or Borgo Mezzanone, with leaking mobile homes, black walls, old freezers, tents, shacks and mud paths, are just two of dozens more slums in southern Italy.¹⁵ It's a situation that has been described by NGO's as a "modern form of slavery", where vulnerability is both mental and physical. Similar issues can be found in rural Andalusia, which is well explained in the "Research on the Vulnerability of Human Rights in Andalusian Rural Areas: Migration, Labour

[to-city-permanent-is-not-the-opposite-of-temporary](#) (accessed: 20/04/21). In addition, here, design experiments in renewable energy have improved living conditions, such as in Taten Lehibb, where they used recycled plastic bottles filled with sand to make local homes able to resist floods and reduce the camp's overall recycling issues.

¹⁴Praticò, Giulia and Ole Henning Sommerfelt, *Counteracting exploitation of migrant workers in Italian Tomato Production*, a report by Ethical Trading initiative Norway, 2015, https://www.ethicaltrade.org/sites/default/files/shared_resources/italian_tomato_production_report.pdf (accessed: 20/03/21).

¹⁵Jones, Tobias, Ayo Awokoya, *Are your tinned tomatoes picked by slave labour?* In "The Guardian", 20/04/2021, <https://www.theguardian.com/world/2019/jun/20/tomatoes-italy-mafia-migrant-labour-modern-slavery> (accessed: 20/04/21).

306 Treatment, and other Forms of Exploitation for the Strengthening of Andalusian
 307 Development Agents” (Waldimeiry Correa da Silva e Carla Cingolani, 2019).¹⁶

308 Similar forms of settlements with a very specialised demographic and social
 309 structure, which makes them very different from the spontaneous slum formations
 310 on the fringes of large cities, are the communities of young immigrants that have
 311 developed over the last decades in various countries of the world: settlements of
 312 male immigrants in “urban villages” in China, communities of male immigrants
 313 from rural areas in Indian metropolises, different forms of temporary labour settle-
 314 ments in various countries of South-East Asia, as well as some African and Latin
 315 American regions. These communities are sometimes on the fringes of cities, as
 316 they are linked to agriculture, in others they are in the fabric of the metropolis as
 317 temporary labour camps, isolated from the social context of the cities in which they
 318 are located.

319 4.6 Urban Migrants

320 In the Chinese case, the legal situation that makes a considerable part of migration
 321 to the big cities illegal has favoured the formation of very high-density settlements
 322 with very poor housing conditions in areas of rural villages that have been incorpo-
 323 rated into the rapidly expanding urban fabric. The relative autonomy of the govern-
 324 ment in these villages, often located in areas that have become central to the cities,
 325 has prompted the creation of housing that can accommodate a marginal and semi-
 326 legal workforce operating in the service sector or construction industry, etc. For
 327 these inevitably single immigrants, the conditions of very high vulnerability were
 328 balanced by the proximity of the place of residence to the places of work, with an
 329 undoubted economic advantage for a workforce with very low wages. In these set-
 330 tlements, services are obviously reduced to a minimum and very often different
 331 forms of crime and social unrest flourish, creating security problems.

332 This Chinese model, which has obviously taken on different forms over time,
 333 highlights the exchange between the risks and benefits of vulnerability, an exchange
 334 that should not be underestimated and which to a large extent explains the continual
 335 recurrence of new situations of vulnerability even in contexts where it could be
 336 largely resolved through more articulate and careful planning policies.

337 Similar problems are found in India, where younger generations migrate towards
 338 the bigger megacities to find better job opportunities. The move towards cities has
 339 many push and pull factors away from rural life; people think that the city will pro-
 340 vide lots of opportunities, such as social services (better housing, healthcare and
 341 education), economic opportunities (more jobs and higher wages), and enhanced

¹⁶Correa da Silva, Waldimeiry and Claudia Cingolani, *Labour Trafficking and Exploitation in Rural Andalusia*, (Intechopen, 2020, DOI: <https://doi.org/10.5772/intechopen.90090>, <https://www.intechopen.com/books/modern-slavery-and-human-trafficking/labour-trafficking-and-exploitation-in-rural-andalusia> (accessed: 20/03/21).

environmental conditions (better living conditions with a safer environment, e.g. drinking water and sanitation), but these perceptions are not always correct. “Every minute 25–30 people are migrating to Indian cities from rural areas in search for a better livelihood and lifestyle.”¹⁷ The Indian urban population is likely to reach 600 million by 2030. Such an influx presents a huge challenge for the cities and, at the same time, is creating a series of issues related to the abandonment of rural areas and villages. These migrants are becoming a vulnerable part of urban suburbs and generating vulnerable rural areas without any skilled young artisans to preserve lively ancient Indian art and craft traditions.

4.7 Tech Vulnerability

The expansion of vulnerability is also linked to technological development and the transformations it brings about in territories and urban settlements. This is the case for many areas that were originally mining areas or first industrial settlements. Not only is vulnerability evident from the changing economic geography and the role that certain places have played in the different phases of development, but it is the inevitable result of a process of continuous productive, distributive and organisational transformation. As has happened in the past with regions such as the Ruhr in Germany or the mining and industrial areas of Poland in Europe, the Rust Belt in the USA, or the crisis of the diamond mining areas in South Africa, it is inevitably that this will happen with the realisation of profound transformations in economic geography, such as those generated by the construction of the two main routes of the Chinese Silk Road. It is already clear that seaside cities that lived on a continuous flow of trade will be in crisis as a result of profound changes in the routes of goods, such as the cutting off of the Malacca peninsula and the relative marginalisation of Singapore. New landmarks will emerge and places that have long lived in prosperity will inevitably go into crisis.

A case that raised a lot of debate in this regard was, for example, the Three Gorges Dam project on the Yangtze River, which led to the displacement of 1.3 million people from some agricultural areas and the flooding of almost 650 km² to create the new hydropower reservoirs. People who were not vulnerable suddenly became so; they had to leave the territories where they had lived for centuries and settle in new places, often with great economic and social difficulties, thus becoming vulnerable.

¹⁷Pranav, Divay, *India preparing for the biggest human migration on the planet*, in “Invest India”, January 02, 2018, <https://www.investindia.gov.in/team-india-blogs/india-preparing-biggest-human-migration-planet> (accessed: 20/04/21), see also Mehrotra, Santosh, *Mega Challenge of rural-urban migration*, in “Business Line”, October 03, 2019, <https://www.thehindubusinessline.com/opinion/mega-challenges-of-rural-urban-migration/article29577159.ece>, (accessed: 20/04/21).

375 Other areas where there was industrial and mining development in the early
 376 stages of the last century were subsequently marginalised by profound technologi-
 377 cal changes, depletion of ore deposits, and the relocation of production chains to
 378 other regions of the world. Phenomena of this kind have produced pockets of social
 379 marginality in places that initially, and for fairly long periods, had enjoyed prosper-
 380 ity and significant social dynamics. Marginalisation and decadence have gradually
 381 taken root and it has been extremely difficult to overcome them, despite their prox-
 382 imity to areas and regions that are still developing.

383 Examples of this situation are numerous in industrial centres in Europe and the
 384 United States, which have gradually lost their population, partly becoming aban-
 385 doned places or ghost towns.

386 A case in point is Detroit in the United States. Until the 1950s, Detroit was the
 387 undisputed world capital of automobile production. The Ford Motor Plant, the
 388 famous auto industry, opened in 1927, drawing a million new residents to the city.
 389 With the entry of Japanese production onto the world market, a progressive crisis
 390 began which, over the course of a few decades, marginalised this important city, a
 391 symbol of modernity, and transformed it into an urban settlement that was increas-
 392 ingly vulnerable and incapable of emerging from a demographic, economic and
 393 social crisis. The population of the city has fallen from a high of 1,850,000 in 1950
 394 to 680,000 in 2015; vast areas of the city are in a state of severe urban decay and
 395 vulnerability.

396 A similar decline process happened in the Rust Belt area, once a powerful indus-
 397 trial area, formerly known as the “Breadbasket of America“. Since the mid-twentieth
 398 century, heavy industry has declined in the region, bringing economic distress and
 399 poverty, and resulting in a decline in the population.¹⁸

400 Urban shrinkage is currently a problem of urbanisation processes in Poland, and
 401 also in the rest of Europe. The reasons behind the shrinking of cities are various and
 402 numerous. It is assumed that the basic issue is the crisis of the local economy, which
 403 began in 1990. When Poland opened to global processes, economic backwardness
 404 in many cities was disclosed and, consequently, it was necessary to restructure their
 405 economies. Adjusting to new market conditions was particularly difficult in cities
 406 with monofunctional production. The collapse of the previous economic base of the
 407 city was the reason behind increased unemployment, the impoverishment of society,
 408 social segregation and marginalisation, which in turn has led to the depopulation of
 409 cities and a significant process of urban shrinking.¹⁹ The consequences of shrinking
 410 cities are many, such as demographic, social, economic, spatial, infrastructural and
 411 political. Urban shrinkage has a strong impact in many areas in the city.

412 The role of design in relation to the vulnerability generated by technological
 413 change and the consequent economic and social crises is undoubtedly important,
 414 but its characteristics vary profoundly from case to case. The Ruhr has been

¹⁸ LeDuff, Charlie, *Detroit: An American Autopsy* (New York: Penguin, 2013).

¹⁹ Musial-Malago, Monika, *The Process of Urban Shrinking in Poland*, in *STUDIA MIEJSKIE* tom 24 (2016) http://www.studiamiejskie.uni.opole.pl/wp-content/uploads/2017/03/S_Miejskie_24_2016-Musial.pdf (accessed: 20/03/21).

profoundly transformed from a mining and industrial region in serious crisis into an area of tourist and cultural attraction, as well as a new location for advanced industrial activities. This has allowed a profound regeneration of the area compared to the previous situation, and the creation of a new role and a new social and cultural base.

Some of the interventions carried out have become a reference model for other regions in the world, also a highly innovative key. In the case of industrial and mining cities in crisis in Poland, however, the interventions have often been aimed at partially adjusting situations containing the most negative effects and reducing situations of abandonment and depression. There have been interesting examples of small-scale interventions to contain the breakdowns, but not so as to guarantee real reversals. The situation in the Rust Belt in the USA is fragmented into different types of local responses that have not in fact contributed significantly to countering the crisis situation. Depressed cities and territories have often become even more vulnerable, as demonstrated by the economic and social crisis that continues to affect states such as Pennsylvania and Ohio, and which are confirmed by the voting patterns in the last presidential elections. An extreme case of an attempt to redesign the role of a city, such as that attempted in Detroit, making it an alternative to a major industrial centre emptied of its functions, a settlement based partly on urban agriculture and partly on the development of artistic activities requiring the use of empty spaces or the reuse of abandoned building structures, has not produced particularly significant results. In this case, the role of design, which has sometimes been very original, has had very little effect in reducing the vulnerability of the urban settlement.

4.8 Which Role Does Design Play?

What can be drawn from the cases we have examined? Design has certainly played a positive role in the recovery and reorganisation of certain parts of urban settlements, but without doubt, the possibility of recovery and the reduction of vulnerability lies first and foremost in the capacity for integrated strategic planning between the economy and the organisation of the territory.

What we have seen provides a series of images in different sectors and regions of the world; cases that could, however, be further enriched with many other references. For example, we did not want to touch on the problems of the very large-scale vulnerability of informal settlements, especially in Africa, Asia, and Latin America, because they have already been considered. Similarly, another area of design that will play an extremely important role with respect to vulnerable communities has been avoided, that of climate change with all the problems that will bring.

Despite the choice of particular cases in this study, it is clear that the problem of vulnerability, with its infinite different forms, is a structural and foundational element of the condition of mankind on the planet. A condition that has become increasingly complex and fragile as human domination of the earth has progressed;

456 a domination that has been able to positively control certain aspects, creating situa-
 457 tions of relative stability and equilibrium, but which, in other areas, has instead
 458 increased the fragility of the human habitat, clearly entailing a continuous search for
 459 answers to the natural or man-made crisis processes that continue to occur. In this
 460 sense, it is evident that the project, the specific technical solution and local planning
 461 intervention, are indispensable and contribute in some way to avoiding the exces-
 462 sive worsening of crises, but it is also evident that in many cases, punctual and
 463 specific actions only partially and temporarily resolve the crisis situations.

464 Basically, what has happened and is happening once again points to the need to
 465 redefine the very concept of design, its role and its methods. As with many other
 466 aspects of culture, design only plays a positive role in some respects and is const-
 467 antly changing. It probably only has the role of a painkiller rather than a vaccine
 468 that cures permanently, but this is already an absolutely extraordinary role in the
 469 present context.

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Author Queries

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Queries	Details Required	Author's Response
AU1	Please check if the edit made in sentence "In the aftermath of the earthquake..." is appropriate.	
AU2	Ref. "Waldimeiry Correa da Silva e Carla Cingolani, 2019" is cited in the text not in the list. Please check and provide in the list or delete the citation.	

Uncorrected Proof