

A Humanitarian Logistics Case Study for the Intermediary Phase Accommodation Center for Refugees and Other Humanitarian Disaster Victims



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Abstract The growing and uncontrollable stream of refugees from Middle East and North Africa has created considerable pressure to governments and societies all over Europe. To establish the theoretical framework, the concept of humanitarian logistics is briefly examined in this paper. Historical data from the nineteenth century onwards illuminates the fact that this influx is not a novelty in the European continent and the interpretation of statistical data highlights the characteristics and particularities of the current refugee wave, as well as the possible repercussions these could inflict both to hosting societies and to displaced populations. Finally, a

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review of European and national legislation and policies shows that measures taken so far are disjointed and that no complete but at the same time fair and humanitarian management strategy exists.

Within this context, the paper elaborates on the development of a compact accommodation center made of shipping containers, to function as one of the initial stages in adaptation before full social integration of the displaced populations. It aims at maximizing the respect for human rights and values while minimizing the impact on society and on the environment. Some of the humanitarian and ecological issues discussed are: integration of medical, educational, religious and social functions within the unit, optimal land utilization, renewable energy use, and waste management infrastructures. Creating added value for the “raw” material (shipping containers) and prolonging the unit’s life span by enabling transformation and change of use, transportation and reuse, and finally end-of-life dismantlement and recycling also lie within the scope of the project.

The overall goal is not only to address the current needs stemming from the refugee crisis, but also to develop a project versatile enough to be adapted for implementation on further social groups in need of support. The paper’s results could serve as a useful tool for governments and organizations to better plan ahead and respond fast and efficiently not only in regard to the present humanitarian emergency, but also in any possible similar major disaster situation, including the potential consequences of climate change.

Introduction

Today, the total number of forcibly displaced persons globally has reached over 65 million (Figure 1). In situations like these, the most important thing in every step of the way is the existence of basic support structures within the frame of humanitarian logistics [2].

The refugee crisis experienced today in Europe is by no means a novelty. The nineteenth and twentieth century have seen a number of significant migration waves,

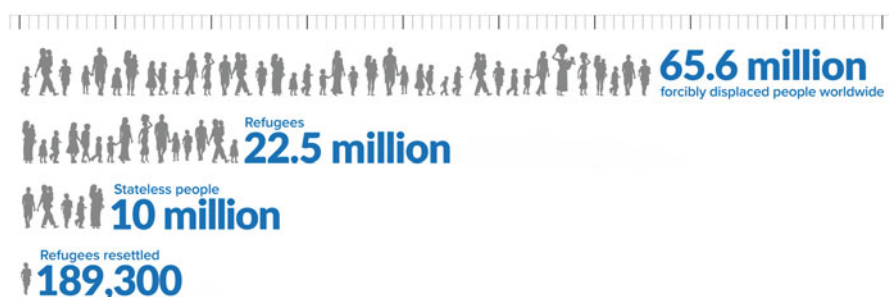


Fig. 1 Current numbers of forcibly displaced people, refugees, and stateless people worldwide [1]

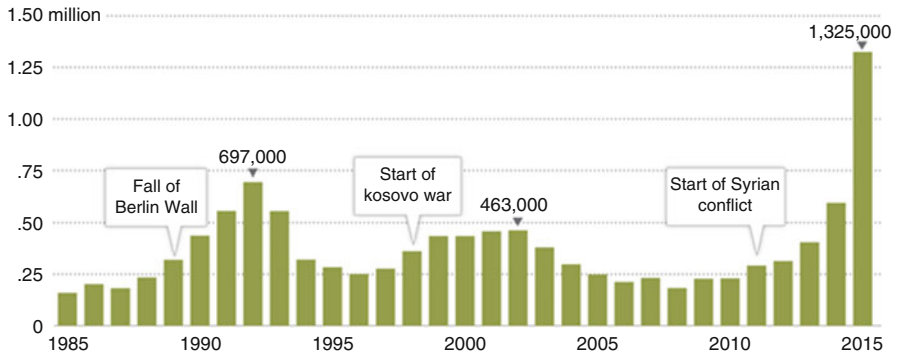


Fig. 2 Number of asylum seekers in Europe from 1985 until 2015 [6]

both from and towards Europe [3, 4]. The fact that discriminates the twenty-first century from the past is the simultaneous existence of several conflict areas. In the European “neighbourhood” alone, there are armed struggles in the Middle East, in North Africa, and in some parts of sub-Saharan Africa as well [5]. These conflicts have caused the vulnerable populations to flee their countries and seek a better future in the supposedly more stable Europe. According to the predictions, war and destruction of all infrastructure in those parts of the world will not come to an end anytime soon. Only during 2015, over one million people came to the European Union to find safety, increasing the total number of refugees in this region to almost 4.4 million (Figure 2). The majority of them is originating from Syria, Afghanistan, and Eritrea [7, 8], almost one in five are adult women and at least one in four are children, many of whom unaccompanied [9]. They follow travel routes well established by human-trafficking groups and yet anything but safe and secure.

Even after reaching the perceived safety of Europe, refugees still have to face significant integration issues [4], while being at the same time the trigger to xenophobia and political extremism. Europe has only recently managed to slow down the inflow of refugees, due to increased border control and mostly sporadic, unilateral actions and unfortunately not because of a comprehensive common strategic framework actually resolving all aspects of this crisis [10]. One of the most significant issues stemming from this crisis, and the main focus of this paper, is the problem of shelter as an essential human need for the refugees.

Definition of Migration

Migration is and always has been a fact of life for all living organisms. Whenever the living conditions become intolerable, a mass movement of populations occurs [11]. Human migration causes are varied and complex and include, among other things, economic or educational opportunities, wars or civil unrest, human rights

abuse, as well as environmental reasons [12, 13]. Although quite often migration is caused simply by the quest for better work, yet in many cases it is a central part of complex humanitarian emergencies.

Included within the general framework term of migration and migrants, the refugees form their own distinct category. They are characterized as victims, dependent on others, and in need of humanitarian assistance [14]. These are people who were forced to flee their own country and seek international protection, due to human rights abuse and the inability of their governments to protect them [12]. Within this context, an asylum seeker is defined as a person who has left their country and has requested international protection but has not yet been granted refugee status [12, 14]. The definition coined by the International Organization of Migration [15] is considered at present the most successful in integrating all aspects of migration; according to it, a migrant is: "...any person who is moving or has moved across an international border or within a State away from his/her habitual place of residence, regardless of (1) the person's legal status; (2) whether the movement is voluntary or involuntary; (3) what the causes for the movement are; or (4) what the length of the stay is."

The Concept of Humanitarian Logistics

It was during the Indian Ocean tsunami relief operation in 2004 that logistics became for the first time the epicenter of attention as an integral part of any humanitarian relief operation [2, 16]. In fact, humanitarian relief operations are becoming increasingly demanded, since basic everyday goods, such as water and food, safety and shelter, health and education are in scarcity in many parts of the world. At the same time, natural and man-made disasters are occurring nowadays with alarming frequency [7]. As presented in Figure 3, disasters are divided into four distinct categories according to their cause and speed of occurrence [2]: (1) calamities: earthquakes, tornadoes, hurricanes, (2) destructive actions: industrial accidents, terrorist attacks, (3) plagues: poverty, famine, draught, and (4) crises: political or refugee crises.

Even though the relevance of logistics effort might vary depending on the type of disaster, its importance is by no means debated [2]. As a result, it has by now been established that at the core of an effective and efficient response to any humanitarian emergency lies an intertwined range of activities best known as humanitarian logistics. It becomes clear that this concept includes much more than simple material goods and their transport and distribution. Advance preparation, coordination of human resources, collection and processing of data, and extensive use of expert knowledge should all form an integral part of this process, in order to achieve—beyond logistic performance—a holistic supply chain management as well [2, 17]. In that respect, out of the four phases comprising a disaster management cycle—mitigation, preparation, response, and reconstruction—humanitarian logistics and supply chain management can and should be integrated in three, with mitigation the

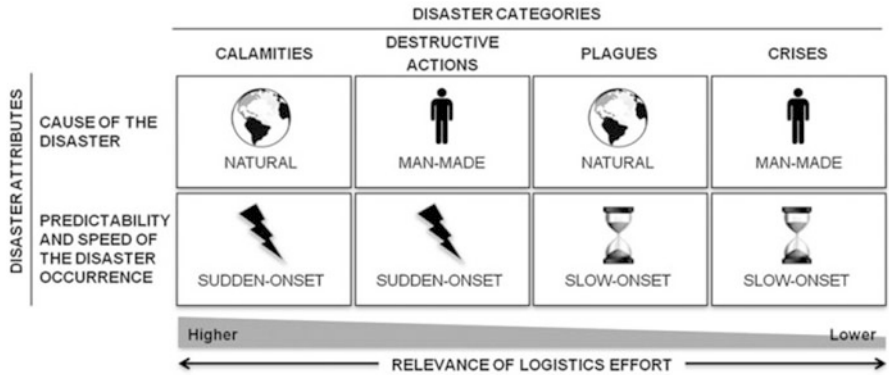


Fig. 3 Types of disasters [2]



Fig. 4 Disaster management and the humanitarian logistics stream [2]

only exclusion. In fact, as depicted in Figure 4, the actual disaster occurrence is by no means the beginning of the cycle [2].

When addressing refugee crises similar to the one Europe is confronted with, humanitarian logistics can prove to be essential, both in the transition stage—providing the displaced people with the means for their safe and uninterrupted transport to safe areas—and in the initial accommodation stage—ensuring that the

refugees' basic needs for food, water, sanitation, and shelter can be satisfied with adequacy and dignity [16, 18].

Unfortunately, the demand for humanitarian disaster relief will continue to grow. According to the predictions, for the next 50 years and due to political, social, economical, environmental, and health causes, disaster situations are expected to quintuple [16], thus making humanitarian logistics an absolute necessity.

Historical and Political Background of the Refugee Crisis in Europe

Push and Pull Factors

The images of hundreds of thousands of refugees desperately seeking shelter and being dismissed are not a novelty in recent history. Throughout the nineteenth and twentieth century, Europe has experienced six significant migration waves with diverse characteristics [3], outlined in Table 1.

The two main types of push factors observed in the last two decades of the twentieth century continue to influence the present migration waves and force people out of their home countries [19] are (a) extreme poverty in several countries of North-Central Africa and South-Central Asia and (b) the armed conflicts in Eritrea, Iraq, Afghanistan, and more recently Syria. Moreover, the perceived safety and prosperity of Europe acts as a very strong pull factor; especially countries, like Germany and Sweden, distinguished for their high levels of social services and support [20].

Future Predictions

Due to the complexity of this issue, reliable predictions regarding future refugee flows to Europe are extremely difficult to make [7]. In strictly numerical terms, the present rate of refugee arrivals is not unparalleled. However, refugee flows from previous occasions were either large but progressive, or rapid but moderate and therefore in both cases easily controllable. Such an extensive and at the same time sudden and unanticipated tide of war refugees is unprecedented. Moreover, there are several other factors that need to be taken into consideration.

The continuing war in Syria leaves no room for optimism. The projection for future refugee flows is theoretically ten times larger than the number of already departed persons. The situation in Afghanistan and Iraq is still anything but stable. In fact, the whole Middle East region has been historically suffering from territorial disputes that seem unable to be resolved in the near future, thus increasing the risk for new refugee flows [21]. The current refugee trend has the potential to influence further displaced populations so far uninterested to move away from their regions

Table 1 Main phases of migration in Europe in the nineteenth and twentieth century (based on data from [3])

Phase	1 Nineteenth century	2 1880s on	3 1914 on	4 1945–1950s	5 1960s–1970s	6(a) 1980s	6(b) 1990s
Source of refugees	• Europe	• Europe	• Europe	• Europe	• LDCs • East Europe	• LDCs	• Europe
Destination of refugees	• Europe	• Outside Europe	• Outside Europe • Europe	• Outside Europe • Europe	• Europe by invitation	• Europe	• Europe • outside Europe
Numbers average/annum (in thousands)	• Small	• 71	• 380	• 2500	• 13	• 70	• 600
Characteristics of refugees	• European • Exiles • Well-to-do	• Europeans • Jews • Impoverished	• Europeans • Jews • Impoverished	• Europeans • Jew/Russian • Cross-section	• Non-European • Impoverished	• Non-European • Impoverished	• Europeans • Impoverished • Skilled
Cause of flight	• Political	• Ethnic • Economic	• Genocide • Political	• Aftermath of war	• Decolonization • Ethnic • Political	• Political • War • Famine • Ethnic • economic	• Political • War • Ethnic
Organizational structure	• No	• Community based NGOs	• Ad hoc • Eurocentric • International	• Eurocentric • International	• Ad hoc • governmental • UN mediating	• Pan-European • NGOs	• Pan-European • NGOs
Government response	• No	• Legislation	• Intervention • restriction	• Active • recruitment	• Intervention • restriction	• Exclusion	• Panic • Exclusion

into seeking asylum in Europe, as indicated by the recent flair in asylum claims from Palestinians [7].

Concept Development and Key Research Questions

Key Research Questions

The present crisis is considered to be more complex than others, because it incorporates humanitarian, political, religious, financial, and social parameters in both source and host countries alike. After analyzing and evaluating the profile of the situation, one of the most significant issues to be identified is the problem of shelter as an essential human need for the refugees. The paper elaborates on the development of a compact accommodation center made of shipping containers, to function as one of the initial stages in adaptation before full social integration of the displaced populations. It aims at maximizing the respect for human rights and values while minimizing the impact on society and on the environment. Some of the humanitarian and ecological issues discussed are: integration of medical, educational, religious and social functions within the unit, optimal land utilization, renewable energy use, and waste management infrastructures. Creating added value for the “raw” material (shipping containers) and prolonging the unit’s life span by enabling transformation and change of use, transportation and reuse, and finally end-of-life dismantlement and recycling also lie within the scope of the project. Within this context, the key research questions that this paper attempts to negotiate with are the following:

- (a) Examine the common strategies and practice adopted in similar circumstances on a global scale in general and in Europe in particular.
- (b) Determine the key issues that need to be incorporated in any housing development attempt.
- (c) Discuss the possibility of improving the current situation by featuring these key prerequisites in a more targeted approach to accommodation.

The basic aim of this paper is the creation of a module that can address the current situation and at the same time be adaptable to any further future humanitarian disaster, thus contributing to an essential level of preparedness.

Research Methodology

In order to address these research topics, an extensive literature review has been conducted; more specifically, a critical analysis of the available literature that has been found in Elsevier, Science Direct, Springer, The Lancet, as well as reports from EU Agencies (including Frontex and Europol), US Agencies, and organizations such as UNHCR, International Organization of Migration, Amnesty International,

Médecins Sans Frontières, Asylum in Europe, Forced Migration Review, International Institute for Strategic Studies, Center for Strategic and International Studies, PEW Research Center, and International Monetary Fund, focusing in the following areas of interest:

1. Scientific work regarding the humanitarian logistics of refugee crises.
2. Demographic and numerical data related to the refugee populations.
3. Generally accepted guidelines and minimum requirements for shelter design and construction, established by a variety of sources.

Concept Development

The literature review revealed a significant gap, both in theory and in practice, with respect to a rational, multi-functional, and inclusive housing solution for displaced persons. This finding appealed particularly to the authors' scientific and cognitive background in architecture and engineering. As a result, this paper focuses on the idea of an exemplary accommodation center, equipped with all necessary services to provide refugees with basic coping skills and aiming to act as an intermediary step between first reception until full social integration. It is created as a flexible structure following the existing guidelines and design criteria for such settlements while furthermore incorporating sustainable tactics regarding energy consumption and waste management.

Legislative Framework, Practices, and Humanitarian Logistics

Existing Numerical and Statistical Data for Europe and the Middle East and North Africa Region

In 2015 the number of forcibly displaced people globally surpassed 60 million, a number exceeding the population of the United Kingdom and reaching almost 1% of the global population; as a comparison, a country comprised of all these people would be ranked 21st largest in the world (Figure 5). Compared to the 42.5 million in 2011, this signifies an escalation of over 50% in just 5 years [8].

Figure 6 illustrates, for the year 2015, a significant advancement in total refugee populations worldwide; especially in Europe, over 1.3 million new refugees were recorded, a number translating in a radical increase of 43% [8].

The Middle East and North Africa (MENA) regions are the two geographical areas mainly accountable for the influx of refugees in Europe during the last years [23]. However, the impressive fact, as seen in Figure 7, is that more than half of the global refugee flows originate in just three countries of this region [1].

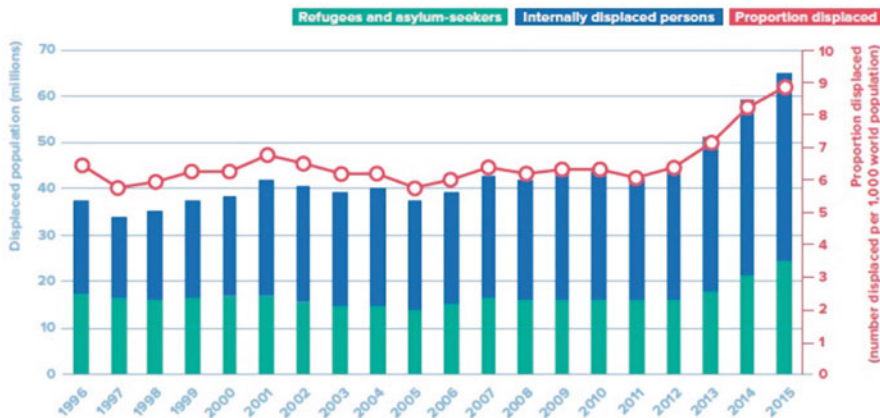


Fig. 5 Trend of global displacement and proportion displaced between 1996 and 2015 (end of year) [22]

UNHCR regions	Start-2015			End-2015			Change (total)	
	Refugees	People in refugee-like situations	Total refugees	Refugees	People in refugee-like situations	Total refugees	Absolute	%
- Central Africa and Great Lakes	625,000	37,600	662,600	1,173,400	15,900	1,189,300	526,700	79
- East and Horn of Africa	2,568,000	33,400	2,601,400	2,739,400	-	2,739,400	138,000	5
- Southern Africa	177,700	-	177,700	189,800	-	189,800	12,100	7
- West Africa	243,300	-	243,300	295,000	-	295,000	51,700	21
Total Africa*	3,614,000	71,000	3,685,000	4,397,600	15,900	4,413,500	728,500	20
Americas	509,300	259,700	769,000	496,400	250,400	746,800	-22,200	-3
Asia and Pacific	3,615,200	280,100	3,895,300	3,551,900	278,300	3,830,200	-65,100	-2
Europe	3,057,000	18,200	3,075,200	4,362,600	28,800	4,391,400	1,316,200	43
Middle East and North Africa	2,898,500	65,400	2,963,900	2,675,400	64,100	2,739,500	-224,400	-8
Total	13,694,000	694,400	14,388,400	15,483,900	637,500	16,121,400	1,733,000	12

* Excluding North Africa.

Fig. 6 Refugee populations by UNHCR regions in 2015 [8]

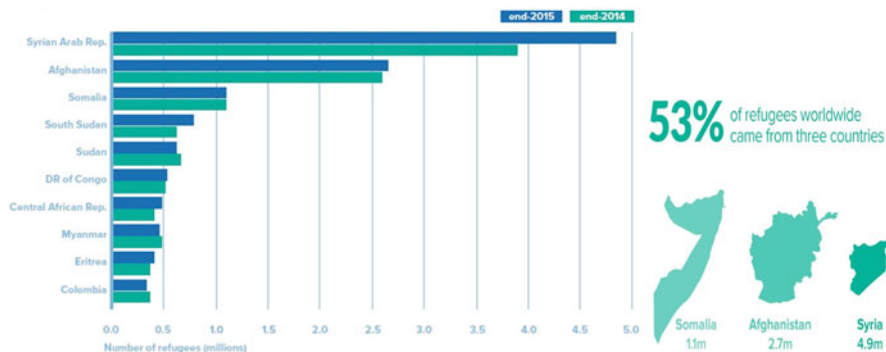


Fig. 7 Major source countries of refugees from 2014 to 2015 (end year) [8]

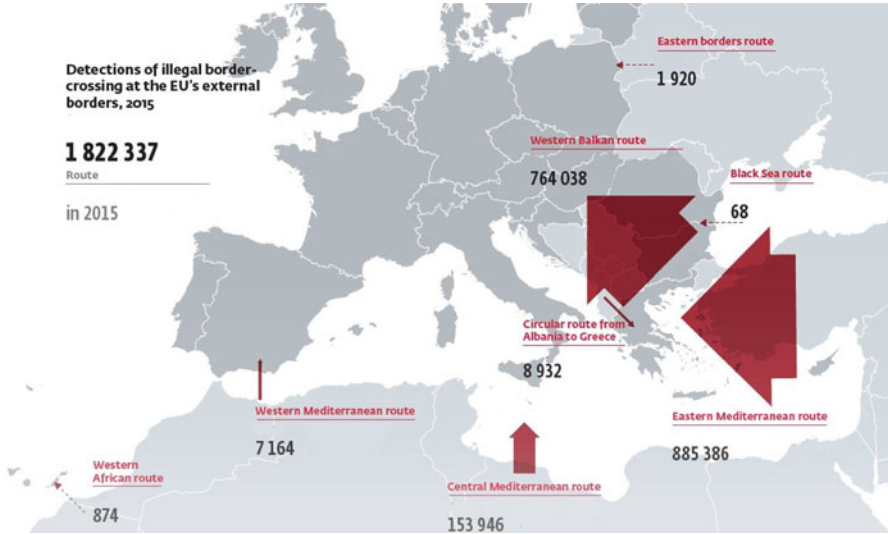


Fig. 8 Detected border crossings in 2015 [22]

The migrant flows from the Middle East and North Africa regions follow eight main passages to enter Europe [7]; routes and numbers are depicted in Figures 8, 9, and 10:

- (a) The Eastern Mediterranean route from Turkey to Greece, with two branches: (a) the land route from Turkey to the region of Evros, (b) the sea route from Turkey to the Aegean islands of Samos, Lesbos, and Chios.
- (b) The Central Mediterranean route from Libya to Italy and Malta.
- (c) The Western Mediterranean route from Morocco to Spain, with three branches: (a) the route across the Gibraltar straits, (b) the route from the Spanish cities Ceuta and Melilla in Morocco to Spain, (c) the route via the Canary Islands.
- (d) The Eastern European land route via the Russian Federation to Ukraine.
- (e) The Arctic route via the Russian Federation to Finland and Norway.

Data from Frontex, Europol, and UNHCR shows that the main body of refugees arrive in Europe by sea; it is estimated that in 2015 over one million people arrived this way [8]. The Mediterranean Sea thus has become one of the most travelled seas of the twenty-first century. Unfortunately, it has also become one of the most dangerous. Thousands of people have drowned or gone missing during the sea travel on unsafe and overloaded vessels; the number of deaths and density of incidents for 2016 are shown in Figures 11 and 12. In fact, current data indicates that the risk of dying during the crossing is close to 2%. In that respect, it is also probably the most dangerous border on earth, considering that it divides countries not at war with each other [24].

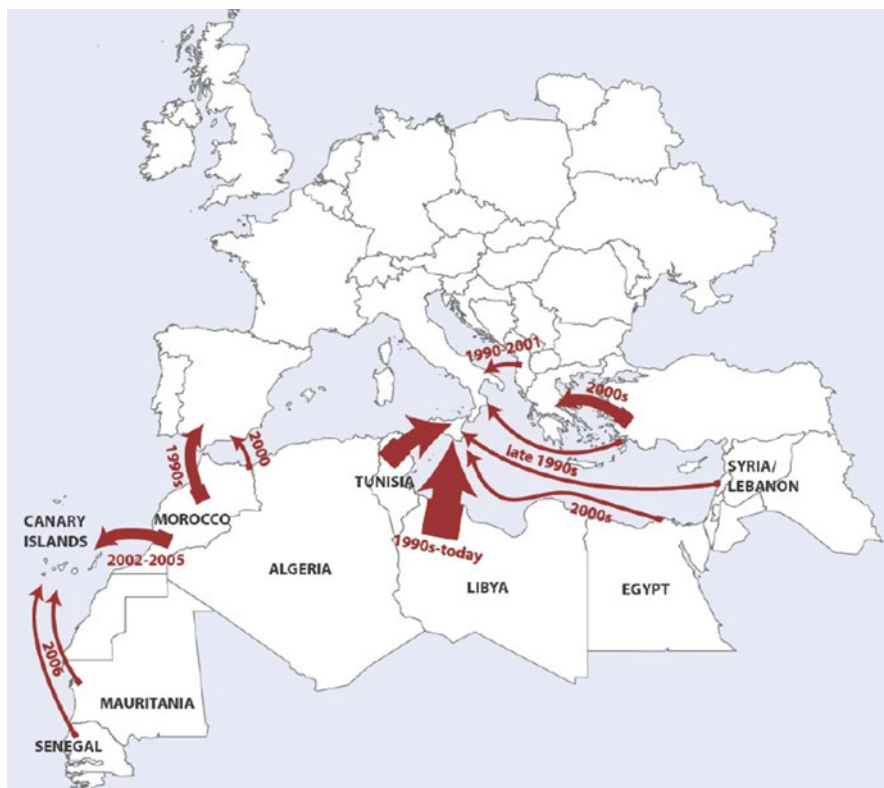


Fig. 9 Sea routes to Europe 1990–2015 [24]

In humanitarian crisis situations, clear demographic data is the key for decision-making. However, especially in cases of forced displacement, population groups are regularly in motion and their structure and human components are not stable. Furthermore, there is not one singular agency responsible for data collection; therefore, demographics are usually fractured and unreliable [5]. Some of the available composite data regarding both gender and age in Mediterranean arrivals is outlined in Figure 13.

Unlike other demographic data, projections regarding religious beliefs can only be based on circumstantial data. Since the UN and Eurostat do not include information on religion in their reports, the proportion of Muslims among refugees seeking asylum in Europe may only be calculated as a combination of their nationality (Figure 14) together with the religious composition of their home countries [26].

According to the CIA World Factbook 2016 [27], the religious makeup of the top nationalities in Mediterranean arrivals is predominantly Islamic, as depicted in Table 2.



Fig. 10 Main routes to and within Europe [25]

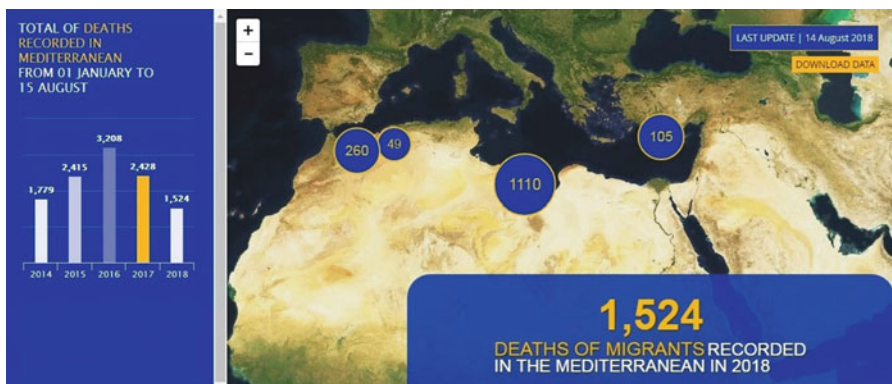


Fig. 11 Dead and missing persons in 2018 [15]

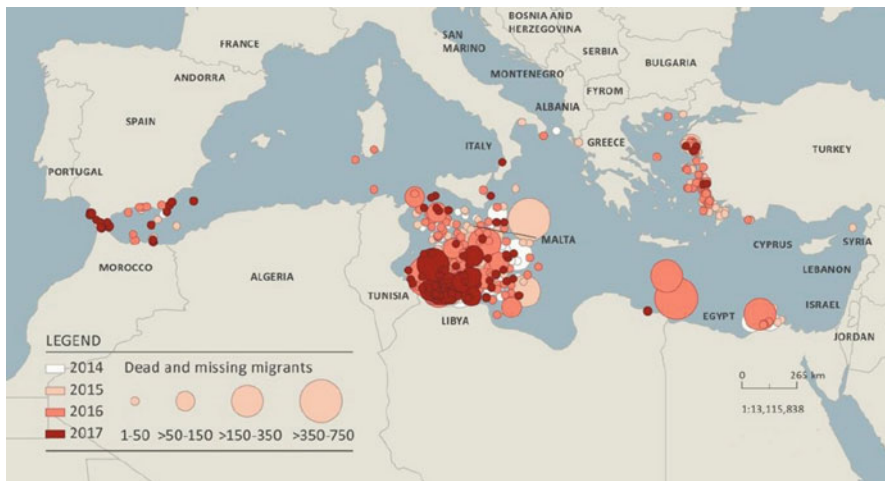


Fig. 12 Density of incidents [15]

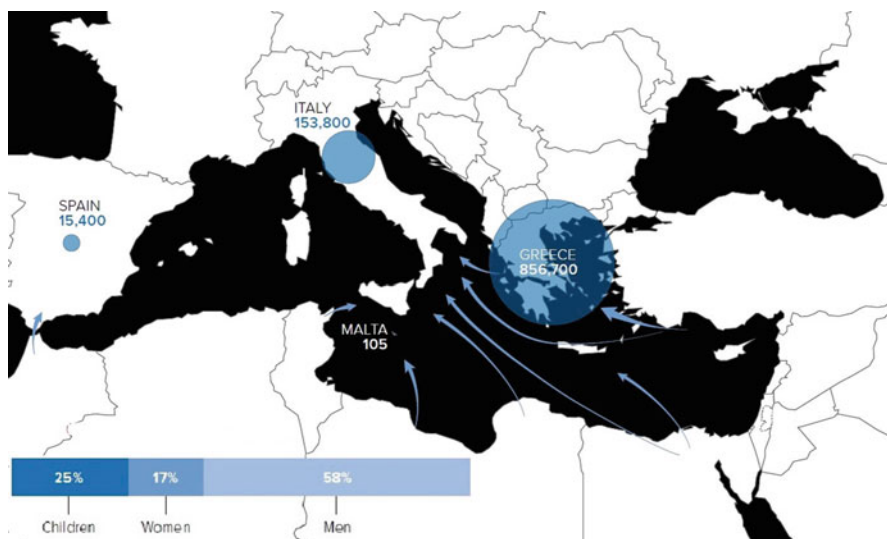


Fig. 13 Composite data regarding sex and age for Mediterranean arrivals in 2015 [8]

Consequently, it is reasonable to assume that 87% of all refugees arriving to Europe are Muslims. This estimation is significant, because religion is one of the most important drivers of animosity in hosting societies towards refugees [26].

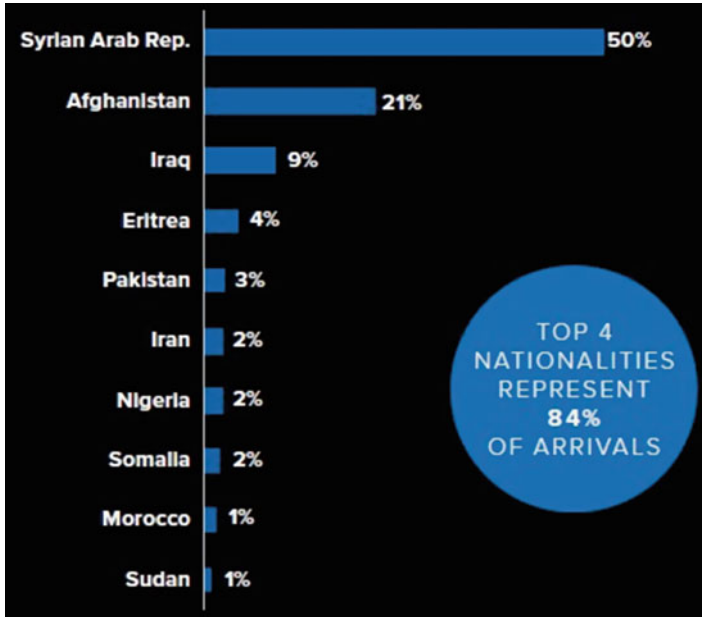


Fig. 14 Top ten nationalities of Mediterranean Arrivals in 2015 [8]

Table 2 Religious makeup in main refugee countries of origin [27]

Country of origin	Percentage of Muslim population
Syrian Arab Republic	87.00%
Afghanistan	99.70%
Iraq	99.00%
Eritrea	(Officially Muslim—no numerical data)
Pakistan	96.40%
Iran	99.40%
Nigeria	50.00%
Somalia	(Officially Muslim—no numerical data available)
Morocco	99.00%
Sudan	(Officially Muslim—no numerical data available)

Integration Issues

Forcibly displaced persons need security and acceptance, not exclusion and discrimination. However, it is very challenging to successfully integrate groups of people with already mixed national, religious, cultural, and social background into societies that are so heavily contrasting their own [8, 22].

Challenges of the Various Aspects of Integration

In order to avoid xenophobia, radicalization, and social fragmentation, policies should not be limited at addressing the most immediate and short-term humanitarian needs of refugees, such as registration, documentation, and temporary shelter. A long-term strategy must be developed, preferably at European level, to ensure homogeneity across member states and to prevent fragmentation within the European Union [28].

Such a strategy must include work opportunities, education, and social inclusion, defined as the progressive incorporation of displaced populations into their host country; it is a predominately qualitative concept and cannot be easily defined or measured. However, there are elements that can be identified as essential components of any successful assimilation process [5, 29]:

- *Legal*: legal residency status, equal access to justice, civil and political rights.
- *Economic*: equal economic opportunities, right to work, access to financial services.
- *Social*: right to social services (welfare, health care, and education), the absence of discrimination, participation in the social and cultural life, positive interaction with local communities.

Currently, there are significant deficits in one or more of these elements throughout Europe. Controversies in legal, social, and cultural issues exist in varying degrees in all hosting countries, depending on factors such as the level of relevant legislation, the mindset of local societies, or the pre-existence of similar ethnic groups from previous migrations; these controversies tend to become minor in countries hosting large numbers of refugees, while relying on a background of strong social infrastructure, such as Germany or Sweden [20, 30]; this does not apply to countries where the influx of new arrivals seriously threatens weak or nonexistent welfare systems. Health issues (e.g., interrupted vaccinations in areas of conflict, deteriorated refugee health, the spread of both communicable and non-communicable diseases) are being broadly ignored, especially in regard to children, despite the fact that they can easily affect the general population [22]; no comprehensive health plan has been developed thus far, and health institutions have remained for the most part silent [4]. Furthermore, prejudice and hostility towards Muslim population, originating back in the recession of the 1970s, has been evolving to an increased xenophobia and alarmism ever since. Research shows that, in the majority of European countries, anti-Muslim bias (Figure 15) is significantly more pronounced than anti-immigrant bias [31].

Social Impacts and Conflicts for the Hosting Societies

The large scale of this forced migration did evoke significant uneasiness and tension on a variety of topics within European countries [10]. The ideals of openness, free movement, and multiculturalism that formed the foundation of the EU had already

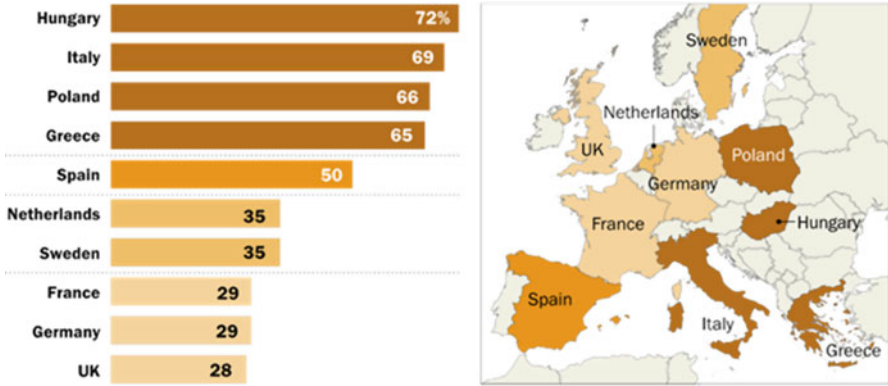


Fig. 15 Negative views of Muslims in European countries [6]

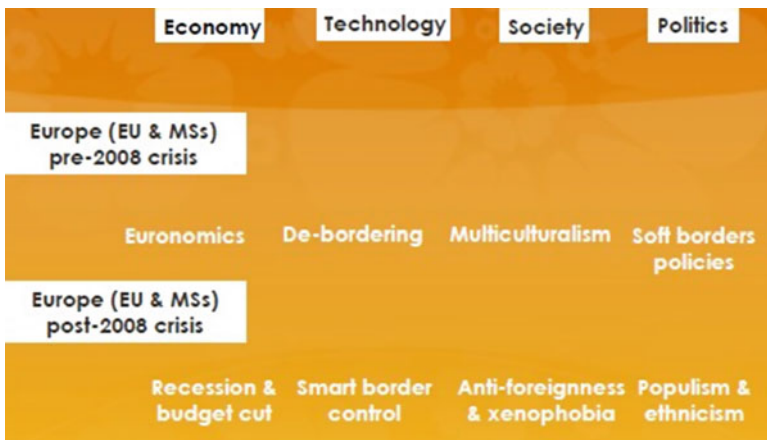
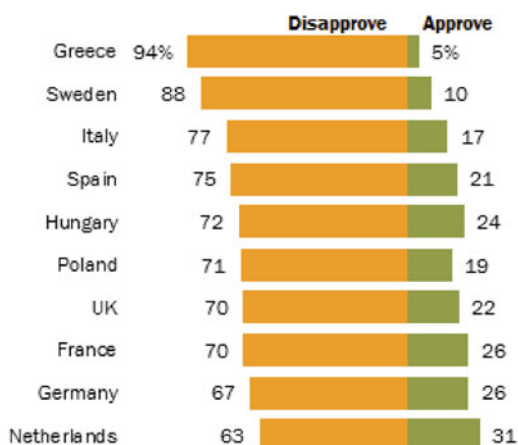


Fig. 16 The change of attitude and policies in pre- and post-2008 Europe [19]

suffered a major impact during the financial crisis of 2008. When the common economic policies failed to protect the Member States or assist in their recovery, the general attitude regressed back to restriction policies (Figure 16), thus consequently influencing the response to the refugee crisis [19].

The influx of refugees enhanced hostile feelings against “foreigners,” which in turn radically increased the popularity of populist and nationalist extreme-right parties, abolishing at the same time the public support from government parties. These political reactions may have the protection of national identity and social coherence at their core, nonetheless they are enforcing them with acts of discrimination and often violence against the people regarded as intruders [10, 32]. On the other hand, the incidents of sexual harassment against local women during the 2016 New Year festivities in Germany and Sweden triggered feelings of insecurity, vulnerability, and anger. More importantly, the brutal terrorist attacks in

Fig. 17 Public opinion on the EU's handling of the refugee crisis [6]



France and Belgium in 2015 and 2016 convinced both governments and public that radical Islamist groups have penetrated Europe using the mass movement of people as a cover-up, thus indiscriminately equating the refugees with terrorists and further stoking suspicion and hatred towards them [10].

These conflicts have led to increased border control, progressive isolation, and a strong trend against collective approach in several European countries and are causing disagreements to the various Member States. The escalating tension between EU members is aggravating already existing economic, social, and political schisms between countries and is threatening the general stability of Europe itself [21, 33]; this is reflected in the predominately negative public opinion pertaining to the EU's handling of the refugee crisis, illustrated in Figure 17 [6].

There is a very pragmatic risk that these problems will ultimately impede balanced refugee integration and will create migrants without roots, perpetually circulating from country to country and futilely seeking asylum [34]. There are currently at least 76,000–80,000 people stranded in Greece and the Balkans (Figure 18) without official status or the possibility to legally continue their travel [15].

International, European and National Legislation

Data shows that the current global migration trends will not abate easily [10]. However, the world in general and Europe in particular continue to remain unprepared for dealing with the waves of migration, both in humanitarian and in legislative terms; and while displaced people can demonstrate adaptability to circumstances, governments, organizations, and the public fail to do so [10]. Furthermore, quality of life—expressed as legal, economic, cultural, and social integration—needs to be clearly defined in a comprehensive, broadly accepted, and binding way [5, 35].

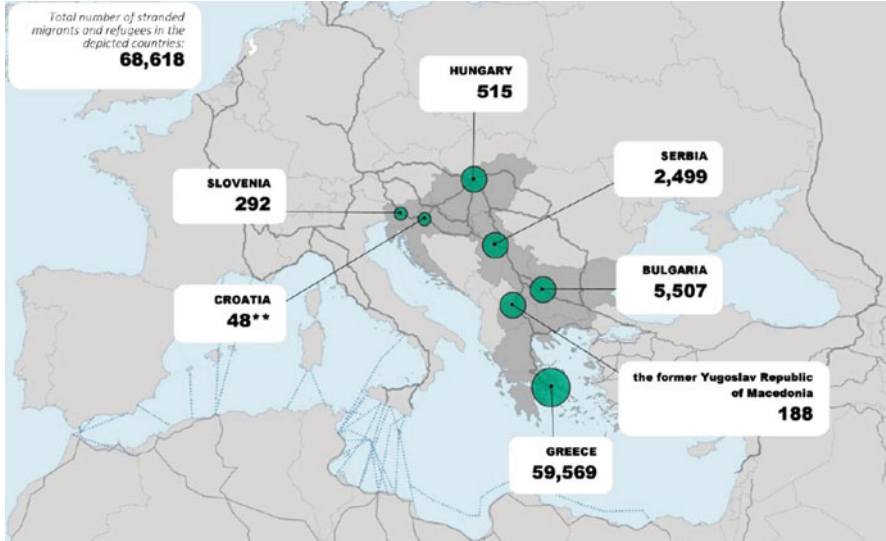


Fig. 18 Number of stranded people in Greece and the Balkans [15]

The Protection of Life in International Law

At the center of the refugee crisis lies the protection of all human life; it is a very complex issue that includes aspects such as protection of freedom and life from persecution due to race, religion, nationality, social or political preference, protection of children, sea rescue, and combat of human trafficking [19]. The existing relevant legislation is subdivided into four sections [36] namely: (1) International refugee law, (2) International human rights law, (3) International humanitarian law and the law of neutrality, and (4) International criminal law. These are not laws in the traditional sense, they are rather a sequence of statutes, declarations, convention proceedings, committee conclusions, and protocols; in that respect, they are better described as generally accepted guidelines, and therein also lies the difficulty of globally adopting and strictly enforcing them.

The European Legislation

In regard to the refugee issue, by the late 1990s Europe was moving towards the shared strategy of ending the “exilic bias” (i.e., of stemming the refugee flows through direct intervention in the conflict areas); furthermore, it had undertaken two more formal actions [3]: (a) the Dublin Convention, ruling the country of first entrance as the exclusively designated country for asylum application and (b) the

Schengen Group of countries, aiming at establishing shared border policies (e.g., movement of goods, services and people, visa policy, and one common external border).

In the years between 1995 and 2016, in the effort to manage, control, and restrain the refugee flows, the European Union has undertaken a number of further initiatives [19, 37, 38]. Among them, aiming to control the EU borders and regulate the refugee influx are the establishment of the agency for border control management (FRONTEX), the EU Border Surveillance System (EUROSUR), the Asylum, Migration and Integration Fund (AMIF), and the EU Naval Force Mediterranean (EUNAVFOR MED). Moreover, for dealing with the groups already within its borders the EU has enacted the European Asylum Support Office (EASO), the European Agenda on Migration, and first and second relocation plan; addressed to refugees that have entered in Greece, Italy, and Hungary [39].

These are more or less isolated and short-term attempts to achieve a measure of control over the crisis and not a serious effort to develop a multilateral strategy able to incorporate all aspects of the issue—legislative, economic, humanitarian, social, cultural or regarding security and integration. In order to achieve that, Europe has first to overcome an increasing distrust and apprehension towards a central European administration and the ensuing member states' strong tendency to act unilaterally in their own national interests [10, 19].

National Management Strategies: Implementation and Current Measures

Until 1995, every European country followed its own guidelines and legislation; these were in general restrictive and were focused on four actions [3]: (1) prevention of access (e.g., increased border security), (2) discouragement of asylum seekers (e.g., deficient accommodation conditions, limited rights and benefits), (3) efforts to accelerate refugee determination procedures, and (4) repatriation of failed applicants.

Unfortunately, disagreements between member states regarding a plethora of issues have further deteriorated the situation to the point that countries presently implement conflicting measures to address the refugee crisis. Actions to restrict access range from increased controls to barbed-wire fences on external borders (e.g., Hungary, Slovenia, and Bulgaria), to temporary border controls even within the Schengen area. Some countries reject the predetermined quota of refugees, impose restrictions on access to asylum processes, and family reunification (e.g., Austria, Denmark, Finland, Germany, and Sweden) or refuse to receive non-Christian groups in their territories. Whereas some countries (e.g., Norway, Sweden) issue temporary work permits for highly skilled refugees together with the possibility of education for minors, other countries refuse them these opportunities, while simultaneously unduly prolonging the asylum processes [8, 9, 28].

To conclude, actions taken so far both at the EU level and at the national level are short-term, fragmented, antagonistic, incomplete, unclear, and ineffective. In order to avoid unpredictable consequences in the future, essential is the development and implementation of a long-term strategy focusing on social and economic integration for the refugees, by providing equal opportunities in work, education, health care, and housing, without at the same time compromising the coherence as well as the safety and security of the hosting societies [3, 28].

Critical Assessment of the Current Situation and the Available Solutions

The need for permanent and stable resolution regarding all forcibly displaced persons—refugees, IDP’s, and stateless persons—is clear and irrefutable for everyone involved. Beyond full legal recognition, there are three established permanent solution alternatives, pursued mostly by the UNHCR [5, 8, 10]. More specifically: (1) voluntary repatriation: the return to their homes is obviously the most popular among refugees, (2) resettlement: relocation to a third country is an option whenever refugee needs cannot be met in the country of first asylum, and (3) local integration: this entails legal, economic, cultural, and social inclusion, and it encompasses a permanent home, the ability to sustain a livelihood, the economical contribution to the host country, and the lack of intolerance or unfairness.

So far, the achievement of a reliable solution remains an unresolved challenge. The incessant warfare in the whole MENA region in general suggests that repatriation cannot be considered as an option yet; only about 200,000 out of the 7.5 million displaced people decided to repatriate voluntarily in 2015 [8]. Furthermore, no willing relocation countries exist, since most of them have already exhausted their available resources. Thus, the only feasible and reasonable solution for the foreseeable future is local integration [38].

It is established that a responsible and successful assimilation should form part of the middle ground between the undisciplined and uncontrolled entry into a host country with its inherent risk to safety and the total debarment due to an irrational and unjustifiable xenophobia. And since integration commences with first reception, it is essential that hosting countries must develop extended reception capacities, improve the efficiency of national asylum systems, and increase refugee recognition rates [38, 40]. However, even in Europe conditions are not always ideal, since the load is carried predominantly by those countries with the weaker economies, while a significantly large number of refugees are still enclosed in emergency facilities suffering progressively adverse conditions [10, 41].

Long-Term Policies and Framework

The Problem of Shelter

Considering the fact that refugees must by definition be addressed as a vulnerable social group, a critical and central aspect of all first reception, temporary accommodation, and full inclusion is shelter in the broader sense of sanctuary from adversities and dangers. The concept of “adequate standard of living” is already included in the EU Reception Conditions Directive (2013/33/EU, article 18) in connection to the actual waiting period of the asylum application process; this concept should be expanded to the full duration of a person’s stay within a country’s jurisdiction.

Adequate and decent housing must be ensured in order to protect the life and health of people, prevent sexual or gender-based violence, and address the specific needs of children [9]. The first step towards this objective is the establishment of emergency admission, registration, and assistance centers [40]. Beyond that essential initial stage, the important need for long-term accommodation creates the

Table 3 Advantages and disadvantages of enclosed settlements and open housing

Advantages	Disadvantages
<i>1. Enclosed settlements</i>	
<ul style="list-style-type: none"> • Enhanced safety and protection • Better identification and estimation of population numbers • Improved monitoring of health status • Easier organization of basic services (e.g., distribution of goods, vaccinations) • Centralized support systems • Easier planning of future options (e.g., repatriation) • Improved economy of scale in the provision of services • Better communication possibilities • Better skills coaching (e.g., language teaching) 	<ul style="list-style-type: none"> • Increased risk of disease outbreaks due to overcrowding • Strong dependence on external support • Diminished autonomy • Social isolation • Possible degradation of the surrounding environment • Possibility of security problems within the camp
<i>2. Open housing</i>	
<ul style="list-style-type: none"> • Higher persons mobility • Better access to external jobs • Use of existing infrastructure (e.g., public health system) • Faster reconstruction of economic substance 	<ul style="list-style-type: none"> • Increased effort to access en masse the total refugee population • Difficulty in monitoring health needs or emergencies • Diminished access to relief programs (e.g., food aid) • Risk of destabilization in the local community and frictions between local residents and refugees • Possible decline of whole urban districts into ghettos

ongoing controversy between the two currently predominant alternatives: planned camps vs. housing in private apartments.

Each of the two alternatives favors both significant advantages and serious disadvantages (Table 3), thus making the choice between the two a difficult one [36, 42]. The suitability and choice between the two alternatives cannot be absolutely determined, as it depends heavily on individual circumstances: number of refugees in relation to the absorbing capacity of local communities, demographic constitution of each refugee group, ethnic, cultural, and religious compatibility and tolerance level between refugees and local residents, specific political situation, and equilibrium within the receiving nations.

However, one general conclusion that can be drawn with relative certainty is that planned camps should be predominantly short-term oriented, whereas individual housing within the boundaries of local societies is more suitable as a long-term solution on the path to full social integration [36, 42].

Refugee Settlements: Existing Guidelines and Design Criteria

Natural and man-made disasters are not a rare occurrence and as a result, the various agencies involved in the management of such extreme situations (e.g., UNHCR, US Army, The Red Cross, Doctors without Borders, etc.) have all developed sets of practical standards to optimize the relief operations. Most significant among them is the “Humanitarian Charter and Minimum Standards in Disaster Response”; it is the result of the Sphere Project, initiated in 1997 as a teamwork between international non-governmental organizations and continuing to evolve ever since [14].

General Design and Construction Principles

An inadequately designed refugee settlement can become an ailing environment, both literally and figuratively, therefore optimal planning and organization are essential, in order to minimize corrective actions, make management easier and more cost-effective, and achieve the most efficient allocation of land and resources [36, 42]:

- Basic needs that have to be addressed include shelter, essential healthcare, nutrition, water and sanitation. Other issues involve resource logistics, camp coordination and camp management (CCCM), non-food items (NFI, e.g., clothing, bedding, etc.), telecommunications and security [43].
- Initial design should focus on optimal camp size and density to avoid overcrowding—both for health and security reasons—flexibility to adapt to changing requirements and advance planning for all seasons and weather conditions—for health and environmental reasons and to achieve maximum cost-effectiveness [42, 44].
- Health is always one of the major concerns in any area where large groups of people congregate for longer time periods. Some of the most common health

hazards include pollution of surface and groundwater, contamination of the environment, development of breeding areas for disease carrying vectors, and presence and spread of insects and rodents. They are attributed to poor sanitation and waste water management, insufficient or inadequate garbage reception points, dust in the air or smoke, and they need to be addressed during the design phase [36].

- In emergency situations, changes in the traditional demographic structure of groups are to be expected; they include the absence of men as traditional family care-takers and transition of this role to female family members with subsequent increased risks for their safety, significant numbers of unaccompanied children, and increased numbers of older, sick, injured, or disabled people. These changes create additional special circumstances and gender considerations and need to be taken into account [36].
- The first step prior to the planning of a refugee settlement should be an environmental baseline study to (a) determine the status of the current environmental situation, (b) detect any possible sensitive issues, such as environmentally protected sites that the camp should distance itself from, (c) calculate the use of local resources, (d) appraise the actual impact of the settlement to the environment, all with the scope to mitigate or minimize as much as possible the temporary and permanent adverse effects [44].
- Integral part of the initial planning should be a comprehensive exit strategy, not necessarily in regard to the duration of stay for the consecutive cycles of refugee groups, but more importantly in terms of an end-of-life approach, i.e., the fate of the facilities after they have concluded their avail. In that respect, a simple decommissioning cannot be considered the most efficient solution; a more creative approach should be incorporated within the original concept [36].

Site Selection and Planning

Optimal site selection is the foundation of any successful settlement. Even though it might seem difficult, or at times outright impossible, every effort should be made so that the chosen plot will satisfy the majority of characteristics listed in Table 4 [42, 44]. As a general rule, however, overestimation of potential needs or adversities is preferred to underestimation [36].

Site Organization, Infrastructure, and Services

In designing the spatial organization of the settlement, the factors to be taken into account include minimum space allocation per person, individual space requirements for each installation, minimum distances required between various uses, and easy accessibility of all services (Table 5).

Equally important are qualitative aspects such as security factors, social structure, cultural traditions, relationships, and vulnerable groups within the population [42].

Table 4 General prerequisites for the eligibility of settlement building sites

<i>1. Topography and size</i>
<ul style="list-style-type: none"> • Plot: Almost flat, above flood levels, without extreme surface variations • Ideal slope: 2–4% and < 10% • Soil: Absorb surface water easily • Rocky subsoil: To be avoided • Groundwater table: >300 m below the surface • Plot size: Satisfy all the space allocation criteria and additional free area reserves • Plot outline: Allow for a low-density design • Area required for social and communal functions: Not to be underestimated
<i>2. Water resources</i>
<ul style="list-style-type: none"> • Location: Close to a source of good, potable water • Drill-well construction: Only after a detailed hydrological survey, and only when no other option is available • Transportation of water by tank trucks: To be avoided when possible • Quantities of water: Sufficient to cover the settlement's demands; allow for the probable excess use of water
<i>3. Public utilities</i>
<ul style="list-style-type: none"> • Location within or very close to the public utilities grid (i.e., water, sewage, and electricity)
<i>4. Accessibility</i>
<ul style="list-style-type: none"> • Adequate road infrastructure • Proximity to towns, markets, hospitals, and other national public services • Access to public transportation
<i>5. Security</i>
<ul style="list-style-type: none"> • Location away from international borders (over a 50 km radius), conflict areas, or other sensitive areas • Areas with extreme climatic conditions to be avoided
<i>6. Environment and vegetation</i>
<ul style="list-style-type: none"> • Site: Dispose sufficient vegetation to provide shade, wind protection, decreased soil erosion, and dust generation, improved micro-climate • Trees: Not to be an impediment to construction • Soil: Allow for small-scale gardening and production of vegetables
<i>7. Land rights</i>
<ul style="list-style-type: none"> • Inhabitants of the settlement: Exclusive rights to use the plot • Public land made freely available: Good choice • Legal and traditional land rights or uses: Not to be violated

The objective of these emergency settlements should extend beyond creating a simple housing space to protect from the elements and safeguard life and health; ideally, they should recreate and enhance a sense of privacy and security for the displaced people [42, 44]. In regard to the administrative and community services available within the settlement (Table 6), the possible requirements can vary depending on a number of factors; among others, number of people housed in the settlement, particular needs or specific nature of the population, planned duration of stay.

Moreover, according to the total size and population of the settlement, some functions—usually administrative—should be centrally located and easily acces-

Table 5 Infrastructure requirements for emergency settlements

<i>1. Electrical supply and distribution</i>		
<ul style="list-style-type: none"> • #1: Security lighting, access lighting and equipment operation • #2: Individual living quarters; minimum requirements are light and one power outlet • #3: Electrical power to be provided for heating and cooling of the individual units 		
<i>2. Water supply and distribution</i>		
<ul style="list-style-type: none"> • Potable water: For drinking and cooking • Potable water: Preferably for all other settlement operations; if quantities are not adequate, non-potable water can be used for cleaning and bathing • Connection to the local public water system: Preferred option • A gravity-fed distribution system within the settlement recommended • Absolute minimum capacity of the system: 20 L/day/person for whole population • Further water requirements: Possible firefighting; grey water or rainwater use is also recommended • Water treatment facility: Recommended for maximum resource efficiency • Rainwater collection system: Is also desirable 		
<i>3. Fire prevention</i>		
<ul style="list-style-type: none"> • Adequate firebreaks (i.e., distance between structures) • Location of potential fire hazards (e.g., fuel storage areas) into consideration • Fireplugs: Located in appropriate spots everywhere within the camp 		
<i>4. Access roads and parking</i>		
<ul style="list-style-type: none"> • Access roads within the settlement: Designed to address every possible daily activity or emergency situation • Road surfaces: All-weather, appropriate for heavy-duty vehicles • Specific design requirements (e.g., minimum dimensions, turning radius) to be applied 		

Table 6 Typical administrative and community services requirements for emergency settlements

1. Administration	<ul style="list-style-type: none"> • Administrative office • Registration office • Social services office 	<ul style="list-style-type: none"> • Archive room • Reception and waiting area
2. Health	<ul style="list-style-type: none"> • Medical center • Pharmacy 	<ul style="list-style-type: none"> • Infirmary
3. Food	<ul style="list-style-type: none"> • Kitchen—Food preparation area • Dining area 	<ul style="list-style-type: none"> • Food storage (cold, frozen and dry goods)
4. Sanitation	<ul style="list-style-type: none"> • Latrines • Washing and bathing areas • Laundry area 	<ul style="list-style-type: none"> • Laundry supply storage • Garbage disposal areas
5. Community	<ul style="list-style-type: none"> • Teaching area • Community area—Congregation area 	<ul style="list-style-type: none"> • Religious areas—Prayer rooms
6. Warehousing	<ul style="list-style-type: none"> • Non-food items storage. 	<ul style="list-style-type: none"> • Distribution center

sible for all, others—usually those regarding personal hygiene—are best to be decentralized to accommodate smaller groups of people [36, 44].

Quantitative Standards for Spatial Allocation and Services

Specific quantitative standards regarding space allocation, services, and infrastructure are detailed in Table 7 [36]. All the standards quoted above are evidently not legally binding; rather, they are the result and combination of both theoretical analysis and practical experience gained on the field. These guidelines are designed to establish a baseline level of protection, comfort, and dignity for those forcibly displaced persons, while at the same time maximizing time and resource efficiency and minimizing possible adverse effects. For those reasons, it is strongly advisable that a serious effort be made for their application, if not improvement, as a whole.

The Case Study of the Accommodation Center Project

At this point it must be once more stressed that EU and its immediate neighbors has done and is doing nothing to comply with the aforementioned international standards. The radical example of the Tripoli Zoo in Libya, used as a temporary detainee center since 2011, showcases the often inhumane housing conditions imposed on people that have lost everything and in the majority of cases through no fault of their own. These grossly violating basic human rights conditions are not solely occurring in the so-called third world countries, but in member states of the EU as well. There, accommodation facilities range from a minority of large, conforming to guidelines, and professionally managed centers all the way to the majority of small, improvised, inadequately equipped, and badly controlled “hotspots,” usually housed in abandoned buildings or warehouses and often lacking even the most basic goods like shelter or sanitation [45]. For the refugees, and in view of their anticipated extent of stay in the area, these actions should—as mentioned before—include the provision of decent housing, medical services, and opportunities in education or training and work. On the other hand, hosting countries should be assisted in relieving the strain on their own basic infrastructure regarding health and education, as well as on the connectivity of their social fabric [46, 47].

The Accommodation Center Concept

Everything that has been elaborated on insofar is in its majority a theoretical approach to a very complex and multifaceted issue. It is in light of the above extensive theoretical review and in search for feasible and applicable alternatives well within the realm of realization that this accommodation center concept has

been developed. It concerns the creation of a prefabricated multi-functional model settlement to act as an intermediary hospitality center for the refugee population in any host country. This project obviously does not have the ambition to address and

Table 7 Quantitative standards for emergency settlements

<i>Space allocation</i>	
Land	• 30–45 m ² /person
Sheltered space	• 350 m ² /person/min. Ceiling height: 2 m
Fire break space	• 50 m wide area between shelters for every 300 m built area
Roads and walkways	• 20–25% of entire site
Open space	• 15–20% of entire site
Site gradient	• 1–5% (ideally: 2–4%)
<i>Water</i>	
Water supply	• Min. 20 L/person/day
Water tap stand	• 1 per 80 persons
Water distance	• Max. 200 m from household unit (optional: 100 m) • No further than a few minutes' walk
Water pipes	• Depth 40–60 cm to avoid damage from surface activities • Areas with low temperatures: Depth 60–90 cm to avoid frost
<i>Sanitation</i>	
Latrines	• 1 per 20 persons/optional: 1 per family, separate latrines
Latrine distance	• Max. 50 m—Min. 6 m from household unit • Close enough to facilitate use, but far enough to prevent smells and pest issues
Shower	• 1 per 50 persons, separate shower areas for men and women
Refuse container	• 1 × 100 L/50 persons
Communal refuse pit	• Size: 2 m × 5 m × 2 m, 1 per 500 persons.
<i>Health</i>	
Health center	• 1 per 20,000 persons, optional: 1 per settlement
Referral hospital	• 1 per 200,000 persons
<i>Food</i>	
Nutritional value	• 2100 kcal/person/day
Food quantity	• 36 tonnes/10,000 people/week
Feeding center	• 1 per 20,000 persons • Optional: 1 per settlement
<i>Warehousing</i>	
Storage area	• 15–20 m ² /100 persons, optimal: individual refugee storage
Commodity distribution area	• 1 per 5000 persons

(continued)

Table 7 (continued)

<i>Space allocation</i>	
<i>Communal services</i>	
School	• 1 per 5000 persons
Market place	• 1 per 20,000 persons, optional: 1 per settlement
<i>Administration</i>	
Administration offices	<ul style="list-style-type: none"> • As appropriate • Includes all administrative functions
<i>Security</i>	
Lighting	<ul style="list-style-type: none"> • As appropriate • Emphasis on priority areas (latrines, public areas) and security
Security post	• As appropriate
Security fencing	<ul style="list-style-type: none"> • As appropriate • Depending on individual circumstances and security issues

resolve the whole problem of social integration in its entirety; merely, it is intended as what is perceived a necessary intermediary step between first reception and full integration or eventual relocation and even repatriation [48].

All relevant data points to the fact that homogenization of populations with significant pre-existing barriers regarding the language, religion, culture, and ethics, if it is not well-prepared, cannot be achieved without considerable turbulences for both sides. And if for the local residents this groundwork is mostly limited in a general understanding of the existing differences, the neutralization of illogical fears, and the development of tolerance and acceptance, for the refugee “newcomers” it entails issues much more practical and urgent in nature, considering that they directly influence their ability to survive in dignity in their new surroundings. The transitional accommodation center aims to create a secure, unthreatening environment where the feeling of safety can be restored, the integration obstacles can be in part or in whole removed or at least smoothed out and the acclimatization to the new circumstances can be achieved in relatively controlled conditions.

The main characteristic of the proposed settlement is its compact design, considering that it demands a comparatively small land plot of only 4000—5000 m² to accommodate 500 people; the reasonable size of the plot and the moderate number of residents help to create a more user-friendly, village-like atmosphere—without however compromising the existing guidelines regarding space allocation or excluding any of the desirable functions [36]. These functions of the settlement have been specifically selected to form part of the general strategy of facilitating the prospective inclusion in the hosting society as well as providing the stepping stones for a decent future standard of living. In addition to the provision of safe, equipped with all essential amenities and reasonably comfortable living quarters, which is the most basic function of the accommodation center, the supplementary five services that have been deemed essential for the success of the project include:

Administration

Administrative services are organized to provide assistance, handle complications, and perform all relevant duties in regard to four distinct sets of issues; more specifically, the objective is (a) to coordinate and regulate the short- and long-term management of the center, (b) to execute the recording, filing, and archiving of all relevant refugee data, (c) to disentangle and resolve legislative and bureaucratic issues regarding asylum procedures and immigration laws, residency permits, or even repatriation, and (d) to resolve problems and facilitate in every way the interaction between the refugee population and the local society. These tasks may seem overly ambitious; however, given the relatively small number of people residing within the center at any given time, they can be accomplished competently and with a significant probability of success.

Health

The accommodation center is equipped with a small medical center with the purpose to (a) perform initial medical screenings and general health checks, (b) provide the necessary medications, vaccinations, and consistent treatment protocols of possible pre-existing diseases, (c) attend to problems such as undernourishment or exhaustion, and (d) deal with small, everyday medical emergencies. The scope is to address moderate health issues in a consistent and organized way, without the risk of interrupted or inappropriate treatments while at the same time without unduly burdening the regular public health infrastructure if not absolutely imperative.

Food

To ensure the correct nourishment of the refugees is deemed a most important aspect of their stay within the center, especially in regard to the more vulnerable groups among them and until their good health is fully restored. Individual kitchen facilities increase construction cost while at the same time presenting an a serious risk for accidents; further than that, many of the residents may not be in a position to prepare food to themselves (e.g., unaccompanied children, elderly or disabled people, etc.). Therefore, the provision of food in (a) adequate quantities, (b) decent quality, and (c) nutritional value as prescribed by the guidelines is an essential amenity of the accommodation center.

Education

The educational services pivot around two main axes. One is the learning of the local language, since this will remove one of the most significant barriers of inclusion;

at the same time, the refugees can get acquainted with the ethics and customs of their new home country. The other axis is training in basic working skills for those who lack any, or most importantly, assistance in the official recognition of existing skills and knowledge according to the host country laws; this might include university degree validation processes or licensing examinations. Part of this educational mechanism is also the sharing of knowledge among people, given that local instructors will cooperate with accordingly qualified members of the refugee population in order to facilitate the learning process and additionally remove possible traces of distrust.

Work Opportunities

The final step before integration in the hosting society is preparation for job placement, considering that decent work according to individual qualifications is the essential means for unaided and dignified sustenance and, given time, evolution and prosperity within the society. The theoretical components of this process involve support in recognizing competencies, workshops on interviewing skills, and assistance in creating an effective CV. The practical components include part-time jobs, at first within the settlement and then in the immediate area, in cooperation with the local authorities and residents.

In addition to all of the above, the center's operation principles include the provision that the inhabitants will assist in the management and day to day operations (e.g., cleaning, teaching and sharing knowledge, assisting in food distribution, partaking in maintenance work, etc.), each one according to his or her specific qualifications, talents, or capabilities, but with no exceptions whatsoever besides impairing health problems. This allocation of work among the inhabitants, already recommended by existing guidelines, will assist in creating and preserving a sense of ownership and responsibility for the refugees, but also achieve a reduction in operation cost and human resources required [36].

Design and Construction

As it is outlined in the general layout plan of the settlement (Figure 19, courtesy of Icon Architecture), the main body of the building is located at the front part of the plot, facing the access road and entrance to the settlement; it houses all the centralized functions. More specifically: (1) administration offices, (2) medical ward, (3) reception and waiting area, serving both administrative and medical needs, (4) food preparation area, (5) food storage area, (6) multi-functional rooms, mostly for educational or religious use, and (7) indoors central gathering area, designed as a common area for sitting, dining, communicating, and socializing.

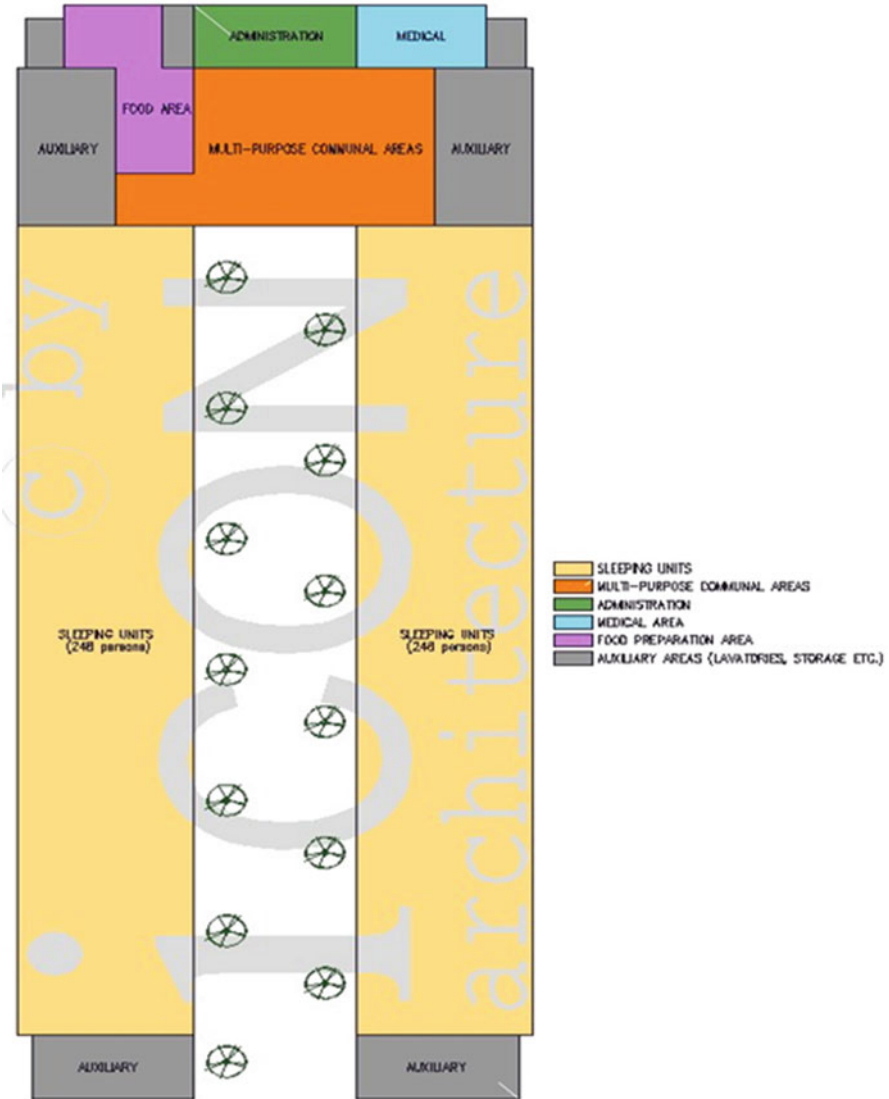


Fig. 19 Accommodation center general layout [49], All rights Reserved)

It must be noted that the areas designated for the use of the refugees are deliberately characterized by increased versatility, in order to accommodate a wider variety of functions, both as dictated by the general everyday needs of the inhabitants but also according to the specific demands arising from whatever demographic structure they might have in every separate occasion.

Towards the back of the plot and away from the road and the main entrance unfold the two wings of housing quarters; this spatial organization ensures an increased level of privacy combined with a lower level of general disturbances (e.g., from traffic, noise, etc.). These quarters incorporate: (1) individual living modules, (2) latrines and washing areas, and (3) laundry areas and cleaning supplies storage rooms.

The living modules are the place where the refugees can retreat in, not only to sleep, but also to rest or enjoy some private moments; they cannot be very generous in dimensions due to the general size restrictions, they are however within the minimum space allocation guidelines and they do provide enough room for the basic equipment (i.e., beds, closets, tables, and chairs). Between the two wings and freely accessed from the indoors gathering area lies an open-air inner courtyard, protected from the elements with light fabric tents and dedicated to communal outdoor activities. Sleeping modules facing the inner courtyard are reserved for the most vulnerable and in need of protection residents, such as unaccompanied children, single women, youths, elderly or disabled people, and households with predominantly female or underage members. Accordingly, sleeping modules facing the outside are assigned to the more capable and self-reliant members of the community.

In regard to utilities, the electrical lines, water pipes, and sewer pipes serving the complex run along a walkway created by the back sides of the two rows of opposite facing sleeping modules in each wing. These lines are open and exposed for easy installation, control, and repairs; the walkway however is fully enclosed and accessible only to the maintenance crew. An internal service road surrounds the complex and provides easy approach to every part of it, both for everyday needs (e.g., garbage collection) and for any other exigent circumstances (e.g., medical emergencies, fires, etc.).

The building is assembled from simple shipping containers. The external walls and roofs are constructed from insulated aluminum panels, 6–10-mm thick, according to the use and to the climatic conditions of every individual location. The whole settlement is constructed in the factory as prefabricated units and then transported and assembled on-site according to the plans. It is important that the building site should be selected according to the existing guidelines, since this ascertains strong reductions in construction time and cost. Due to the light construction, the site work needed includes minor earthworks for ground leveling, a light foundation for the containers, the construction of the essential infrastructure, i.e., the main lines for electricity, water, and sewer, as well as the internal roadwork. The described mode of construction offers a significant number of advantages such as: (1) very short on-site construction time, (2) uncomplicated installation, (3) optimal maintenance, (4) above average insulation, (5) seismic safety, and (6) optimal relationship between quality and cost. Moreover, the project design is also incorporating environmentally friendly technologies to promote sustainability, especially in the energy and waste management sector.

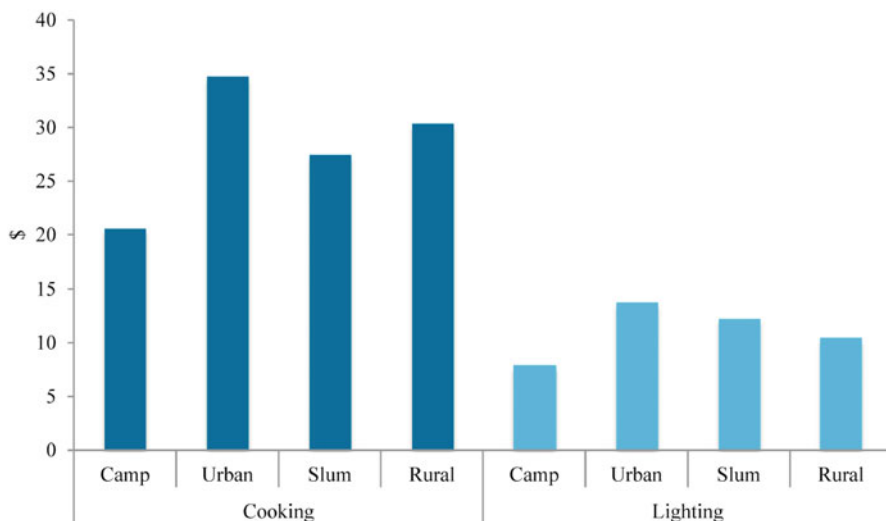


Fig. 20 Per capita annual spending on energy by forcibly displaced people in different settings [50]

Renewable Energy Sources

One of the significant issues related to the daily operation and services of an emergency settlement, and one of the most easily overlooked, is energy consumption. As a result, an investment on energy infrastructure is usually not a central concern in emergency humanitarian relief. However, studies show that in only one year, 2014, energy use from forcibly displaced people globally amounted to the equivalent of almost four million tonnes of oil being burned, while the cost of energy for cooking and lighting per year per family of five was calculated at \$200 minimum (Figure 20); this amount adds up to an unwarranted global total cost of over two billion dollars in the same year [50]. Moreover, the consumption of this amount of fossil fuel equivalents results in significant CO₂ emissions, with all negative consequences to the environment.

In order to address these issues, at least in part, the accommodation center electrical installation planning includes the provision for the positioning of a photovoltaic panel system on the roof of the building. Solar energy is maybe the least demanding of the renewable energy sources in terms of installation, service, and operation, combined with a relatively low construction cost. Furthermore, if the construction budget is adequate and the location is suitable, there is the option of additionally installing one or more small wind turbines as a further contribution to the energy demands of the settlement. In view of the fact that this particular accommodation center project is designed to be by default situated on the outskirts

of urban areas, the produced electrical energy can be fed directly on the grid and used according to the operational needs. However, the technological progress in respect to energy storage devices (i.e., batteries) will, in the very near future, make the construction of similar hosting facilities feasible even in off-grid areas by ensuring their energy autonomy.

Waste Management

Even though it tends to be disregarded as well, waste management is a challenging issue, especially in cases where considerable numbers of people live and circulate in a relatively dense space for longer periods of time; in such cases the volume and weight of garbage can easily reach significant amounts [36]. The general categories of waste produced in any such case are (a) grey water, i.e., water from bathing and laundry, (b) toilet waste, and (c) solid waste, e.g., organic remains from food, packaging materials, papers, etc. The present accommodation center is designed to interconnect with its neighboring communities, consequently waste disposal can effect through their public infrastructure; and yet, waste management should include more than simple garbage collection and removal.

Concerning grey water, treatment systems are available on the market, their installation however entails considerable cost and complicity, as it necessitates separate drainage lines and as a result they cannot be regarded as an option for the purposes of the specific project. Together with toilet waste, grey water is to be disposed in the public sewer network; in the rare cases where no such network exists, septic tanks will be constructed at the periphery of the site and at its lowest level to collect the waste and to be emptied at regular intervals. Nevertheless, as a partial compensation and even though rainwater cannot be characterized as waste per se, an independent system of rainwater collection, comprising of roof gutters and rainwater tanks, will be installed. This system will both resolve the issue of surface drainage that can potentially create problems regarding soil erosion or possible flooding and also make the center more resource efficient by utilizing the collected water for auxiliary purposes (e.g., plant irrigation, cleaning of solar panels or outdoor areas, firefighting), thus reducing the consumption of potable water significantly.

Nonetheless, the main by-product of human activity, both in volume and in treatment issues, is solid waste. As regards the sub-category of organic waste, the usual method of management is transport to the local landfills; yet, as a preferred alternative, it can be utilized for composting within the settlement; this is an optimal way for the disposal of food remains, with the additional advantage of potentially becoming an income generating initiative. Even though this process requires some technical knowledge, there are small systems easily available that can be operated without difficulties and with little skill; to facilitate the process, and besides the

appropriate garbage bins dispersed throughout the settlement, a separate collection area for kitchen waste will be constructed in close proximity to the food preparation area. Included therein will also be vats specifically assigned for the collection of cooking oils and fat.

In relation to all other forms of refuse, and based on the concept of waste separation to facilitate and promote the objective of reuse or recycling, the proposed method is installation of several green, i.e., recycling spots [51]. Specially appointed and enclosed areas, similar to the plan in Figure 21, and located on the periphery of the site will accept the appropriate individual trash receptacles, each designated for a different material category and demarcated accordingly with a different color (Figure 22), including, as a minimum, the following: (1) paper and cardboard (e.g., packaging materials), (2) plastic, (3) glass, (4) metal, and (5) electrical and electronic equipment. Furthermore, optionally: (1) mixed packaging (e.g., tetra pack), (2) hazardous household waste (e.g., cleaning products packaging, solvents, etc.), (3) wood and timber, (4) batteries, (5) garden waste, and (6) fabrics and clothing items.

Special provisions are made for medical waste (e.g., used syringes, needles, bandages, expired medicines, etc.), that can be potentially hazardous. For that purpose, a securely enclosed collection area equipped with biohazard containers will be constructed as an attachment to the medical center; that waste will be disposed separately by the medical personnel only. To conclude, instigated by the awareness that waste generation deriving from the center's operation is the sector with the most impact to the surrounding environment, the aim is to manage the substantial amount of waste in the most efficient and environmentally friendly way [52].

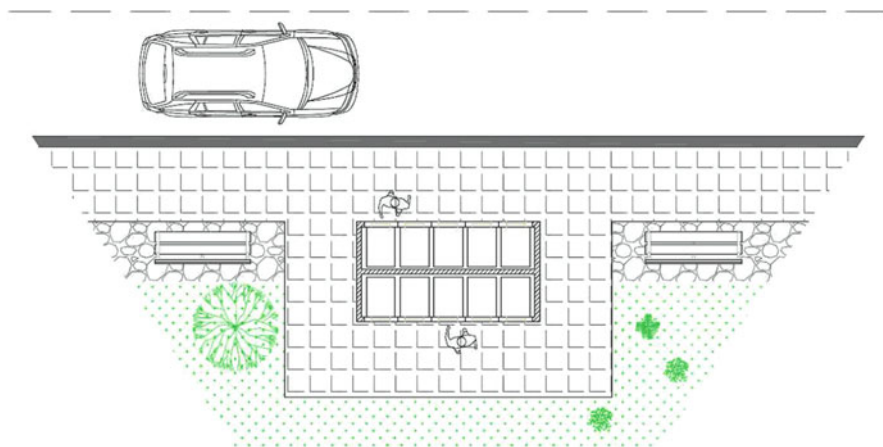


Fig. 21 Indicative layout of a neighborhood “island” green spot with 800 m² area size [51]



Fig. 22 Examples of color coded recycling bins [48, 51]

Techno–Economic Study

Duration of construction and cost of construction are integral parts of any project. Consequently, an initial assessment for the determination of these two factors is also included in the accommodation center project; meantime, an effort has been made to ascertain that this preliminary approach is valid, even if subject to unforeseeable factors.

Concerning the duration of construction, there are two distinct phases: (a) construction of the units in the factory and (b) assembly time on-site. Factory construction time is estimated between 14 and 18 weeks, depending on timely orders, size of the factory, and punctuality of payments. Within this timeframe, the site work and utilities infrastructure can also be completed. Finally, on-site assembly time is estimated between 12 and 14 weeks, mostly depending on weather conditions and work crews' coordination. Moreover, a reasonable amount of time for the transportation of the prefabricated units must be allowed in addition to these timeframes.

With respect to the total construction cost, as outlined in Table 8, it is tentatively calculated at 1.7–2 million dollars, under the provision that the accommodation center will be interconnected with the local infrastructures. However, it must be stressed that this is only a very rough estimate of cost. A number of factors—most important among them the country of installation—are affecting all areas, building, site work, utilities, and peripherals, they are responsible for critical outlay variations and as a consequence they will influence the total construction expenditure significantly. Some of these variable costs and their causes and impacts are included in Table 9.

On the other hand, when evaluating the construction cost, significant factors must be taken into consideration: (a) the initial cost breakdown per capacity is estimated only for one group of inhabitants; however, the center will accommodate consecutive group of refugees and therefore this cost will decrease significantly throughout the center's operation cycle (e.g., assuming a conservative two groups/year the cost breakdown for the first year drops to \$1700–\$2000/inhabitant), and (b) the initial construction cost should be evaluated in relation to the total projected utilization and life cycle of the project as is elaborated further.

Table 8 Estimated construction cost range

<i>1. Building</i>	
<ul style="list-style-type: none"> • Reception area • Administration offices • Medical ward • Food preparation and storage area • Multi-functional rooms • Central gathering area 	<ul style="list-style-type: none"> • Individual living modules for ~500 people • Latrines and washing areas • Laundry rooms • Storage rooms
<i>2. Site work</i>	
<ul style="list-style-type: none"> • Site clearing and fill • Foundations 	<ul style="list-style-type: none"> • Roadwork • Landscaping
<i>3. Utilities</i>	
<ul style="list-style-type: none"> • Water installation • Sewer installation • Electrical installation 	<ul style="list-style-type: none"> • Photovoltaic installation • Green spot installation • Rainwater collection installation
<i>4. Peripherals</i>	
<ul style="list-style-type: none"> • Building permit • Transport • Assembly 	<ul style="list-style-type: none"> • Furniture and equipment • Miscellaneous
Estimated total cost range (VAT not included)	\$ 1,700,000—2,000,000
Cost breakdown:	
<ul style="list-style-type: none"> • As per built space: \$600—\$700/m² • As per capacity: \$3.400—\$4.000/inhabitant 	

Differentiated Second Phase Utilization and End-of-Life Approach

In every project with the ambition to be sustainable, a crucial and integral, even if easily ignored aspect that must be taken into consideration from the initial steps in planning onwards is the end-of-life approach, i.e., the attempt to establish the optimal way to conclude its circle of existence. In the present case, after it has fulfilled its original purpose, and instead of being demolished or fall into disuse, the accommodation center can conveniently be modified and further utilized in different capacities; in that respect, the prefabricated metal construction is an important feature that contributes to the versatility of the project. By adding or removing modules the building can be easily enlarged or reduced in size, according to the future needs; likewise, partition walls can be removed or erected to modify the footprint of rooms and utility lines, being open and accessible, can be easily moved or extended. Even the elevations can undergo a transformation, by being painted, stuccoed, or even clad with different materials to support and enhance the new function. Taking the layout of the center into consideration and with the condition that only minor alterations should be required, the potential alternative uses can include: (1) educational facilities (e.g., school, training center), (2) shopping center,

Table 9 Construction cost fluctuation factors

Variable costs	Causes and impacts
1. Construction site characteristics	<ul style="list-style-type: none"> • Soil quality (e.g., sandy or rocky soil) • Gradient • Distance from existing infrastructures
2. Materials cost	<ul style="list-style-type: none"> • Global fluctuations of raw materials cost • Local material prices • Impact on: <ul style="list-style-type: none"> – Factory construction cost – Utilities installation cost
3. Labor cost	<ul style="list-style-type: none"> • Local cost of labor: <ul style="list-style-type: none"> – In country of factory – In country of assembly • Impact on: <ul style="list-style-type: none"> – Factory construction cost – Assembly cost – Utilities installation cost
4. Transportation cost	<ul style="list-style-type: none"> • Distance from factory to building site • Accessibility of building site
5. Additional features	<ul style="list-style-type: none"> • Septic sewer • Wind turbines • High security fencing, etc.
6. Contractor fees	<ul style="list-style-type: none"> • Building contractor fees range: 10–20% <ul style="list-style-type: none"> – The project however might be assigned to local, national, or army technical services
7. Taxes, etc.	<ul style="list-style-type: none"> • Local taxes related to the construction • VAT percent variations • Currency exchange rates

(3) office complex for civil authorities or private professionals and practitioners (e.g., lawyers, doctors, engineers, etc.), (4) primary health center, (5) homeless shelter and welfare services, (6) assisted living center for elderly or disabled people, and (7) accommodation for students (i.e., dormitories).

Even in the case that, for some reason the occupation of the original lot is no longer feasible or desired (e.g., the location is not fit for the prospective use, the landowners want the property returned to them, etc.), the settlement can be further utilized still. Entailing a cost much lower than traditional demolition, and again due to its construction, the building can be dismantled and transported to a different location to be reassembled and used anew; moderate reparations will of course be required, but yet again they are not comparable to the construction cost and complexity of a new facility of this size. The settlement can retain its original role as a refugee accommodation center, or assume any other alternative use as mentioned above.

At this point it must be mentioned that, since the concept of the project could be applied to any major catastrophe, there is the additional option of creating an inventory of such settlements, warehoused and ready to be assembled at any time and in any place needed. Even if it seems far-fetched, this suggestion is feasible and

should be taken into consideration from any country where the statistical probability of crisis situations entailing destruction of properties and requiring emergency shelter (e.g., hurricanes, floods, wildfires, earthquakes, etc.) is higher than regular.

When it has ultimately reached its end of life, the building can then be permanently dismantled and the majority of construction materials (e.g., steel, aluminum, and drywall) can be easily recycled, thus contributing to both environmental and economic efficiency. Even the cost of building site reinstatement is small; given that little initial work regarding foundations was demanded, no major earthwork is required to restore the site to its original condition. To conclude, and irrelevant of the chosen end-of-life alternative, the refugee accommodation center remains a project both efficient and compensatory all the way through from its commencement to its termination.

Conclusions

Mass movements of populations, either planned and deliberate or urgent and impulsive, are not new to societies. They have happened before and they will continue happening for as long as the underlying causes, such as economic insecurity, food scarcity, conflicts, or natural disasters—those induced by climate change included—do not cease to exist. Among them, the refugees, fleeing their homes out of fear for life and safety, are the ones mostly in need of support and assistance; however, they are also grossly neglected in terms of official recognition and legal status. Induced from those mass movements, the ever-increasing demand for humanitarian assistance in emergency situations initially led to the formation the Red Cross in 1863 and was further addressed with the foundation of the United Nations High Commission for Refugees; even today, UNHCR remains the predominant actor and retains the highest authority on refugee issues [53]. As everyday goods become scarce in increasingly large parts of the world and both natural and man-made disasters occur with disturbing frequency, the distinct scientific branch of humanitarian logistics has evolved in order to satisfy the need for efficient management of goods, materials, information and human resources, also combined with advance preparation, data processing, and use of expert knowledge, thus ensuring the success of any humanitarian relief operation. Unfortunately, problems affecting societies globally do not seem to be abating and humanitarian relief, however successful, will continue to be in high demand. The focus of this paper was to examine the current refugee crisis affecting the European and MENA region. The scope was to develop a compact yet also versatile refugee accommodation center, based on the principles of sustainability and suitable to address part of the needs arising from the current or any other similar disaster situation [54].

The analysis of historical data from the nineteenth century onwards has illuminated the fact that this seemingly unprecedented tide of forcibly displaced people is not a novelty in the European continent. In fact, within the last 200 years, Europe has experienced no less than six different, bigger or smaller waves of

forced migration within its boundaries, each with its own distinct characteristics and ensuing problems. The final, current refugee wave was instigated in part by the incessant poverty in North-Central Africa and South-Central Asia, but more importantly, by the violent armed conflicts in Eritrea, Iraq, Afghanistan, and most recently Syria. The deliberate annihilation of infrastructures in the areas of conflict, the dire conditions in the countries of first asylum in the Middle East, as well as the fall of the Gaddafi regime in Libya and the ensuing opening of sea routes in the Central Mediterranean all contributed to the rapid inflation of the refugee movement towards the European region.

However, even though Europe has always been the theater of internal displacements, only in recent years has it become such a highly desirable hosting region, thus unwillingly assuming the role of a strong actor, compelled to provide assistance rather than receiving it from others, but also reluctant to act; therein lies the significant distinguishing factor between the current and all former forced migration situations, and not in the size of the refugee populations. Despite the negative climate within Europe and taking into consideration the continuing instability in the MENA region—and the so far dormant displaced populations (e.g., Palestinians) potentially influenced into seeking asylum in Europe, the prognosis for the future is anything but optimistic; and with conflict generally becoming the pattern in world affairs, forced displacement will not cease to exist globally.

Even though it is not always clear or complete, the analysis of available statistical data has helped to highlight distinct features and particularities of the current refugee wave [55]. Concerning religion, one of the main causes of anxiety in Europe, the available data is only circumstantial, since no agency includes relevant information in their reports. Still, the estimated percentage is around 87%. To conclude, it is indisputable that a long-term presence of large refugee groups with all their various characteristics and dissimilarities is inevitable in Europe. This commands the development of a long-term strategy with an aim towards full social integration. To achieve this predominately qualitative goal, this strategy must incorporate and address a variety of issues of legal, economic, and social nature. Nonetheless, at present there are significant deficiencies and discrepancies in all these areas among hosting countries, depending on the pre-existing state of their relevant infrastructure, their political and economical standing and the mindset of their citizens.

The expected tension ensuing by the large scale of forced migration has been amplified beyond measure on the fertile ground of post-2008 Europe. After the financial crisis of 2008, European nations regressed to a state of introversion. Distrust for a European central governing authority, increased border control, xenophobia and ethnicism flourished, overturning the ideal of an open Europe. These feelings, further supported by the recent brutal terrorist attacks, found a voice to express themselves in increased hostility and discrimination against refugees, thus ignoring all positive aspects their arrival might entail [29]; additionally, they resulted in a strong trend against collective actions among countries. Measures taken so far are disjointed or sporadic, prioritizing border control, maritime surveillance, search and rescue operations, and the establishment of bureaucratic rather than humanitarian supporting structures. As a result, no reasonable and complete, but

also fair and humanitarian crisis management strategy yet exists [56]. Nevertheless, and regardless of divergent political backgrounds and refugee policies, the demand for a durable and solid solution is undeniable. As a result, hosting countries, whether they realize it or not, are facing the dilemma of either showing indifference and thus allowing a forced penetration, probably in the outskirts of society with all the entailing risks, or developing strategies for controlled and managed social and economical integration.

One of the major issues and also integral part of a successful social inclusion process is the problem of shelter. Adequate housing is essential for the protection of life and health, elimination of sexual and gender-based violence and regard for the specific needs of children, not only during initial emergency admission but also all the way into full assimilation. In respect to that, the current discussion between the two existing alternatives, planned camps or open housing, has been analyzed and the advantages and the disadvantages of both options presented. It has become clear that the choice is not influenced only by the specific characteristics of each proposal, but it is also further dependent on individual circumstances, e.g., the absorbing capacity of communities, the demographic profile of refugee groups, the social tolerance and compatibility levels and, not least of all, the stage of integration. Furthermore, the suitability of any emergency response settlement strongly relies on a set of criteria regarding design and construction, site selection and planning, site organization, infrastructure and services, as well as spatial needs. Unfortunately, this does not apply to the majority of the reception centers established in countries throughout Europe, where living conditions are most often unacceptable and, in some cases, violate even the not basic human rights. Within this context, and as part of a focused uniform plan of action, the paper has elaborated on the development of a compact accommodation and hospitality center made of shipping containers, to function as an intermediary stage in adaptation between initial reception of the forcibly displaced and full social integration. This project aims at maximizing the respect for human rights and values and also at minimizing the impact on society and on the environment. The main objective is to create a secure, unthreatening environment capable to restore the sense of safety and dignity of the forcibly displaced people, while at the same time removing the barriers of language, religion, culture, and ethics and, in parallel, relieving the strains on local infrastructures, mostly on health and education. This goal has led to the integration of administrative, medical, educational, job related, religious, and social functions within the settlement, together with the full inclusion and participation of the inhabitants in the operations and proceedings of the accommodation center. Regarding the environmental sustainability, the main issues addressed are optimal land utilization, renewable energy use, and waste management programs. Creating added value for the “raw” material (shipping containers) and prolonging the unit’s life span by enabling transformation and change of use, transportation and reuse, and finally end-of-life dismantlement and recycling also lie within this scope. Furthermore, this project is versatile enough to be expanded and adapted for the implementation on further social groups in need of support.

To conclude, it can be maintained that, in order to facilitate the whole assimilation process between forcibly displaced and local populations, and taking advantage of the existing policy void, this concept is attempting to create a novel intermediary integration phase not previously considered. Moreover, the results could serve as a useful tool for governments and organizations to better plan ahead and respond fast and efficiently not only in regard to the actual refugee crisis, but also in any possible humanitarian disaster situation, including those emanating as consequences of climate change.

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