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Faculty of Economics and Administration

Planning Regional Development in countries affected by forced conflicts

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PLACE FOR “DISSERTATION ASSIGNMENT”

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In Pardubice 2017

Mohammed Al-Bareed

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TITLE

Planning Regional Development in countries affected by forced conflicts

ANNOTATION

The aim of this thesis was to evaluate the available data sources and to design the data set that would help to redevelopment and recover the regions and countries affected by a forced conflict, such as Yemen, to help development after the war stops to know where to start the redevelopment of the country and to have a clear idea where needs more attention and what are the priorities when it come to the reconstruction of key sectors of the economy of the country. Based on these findings and the information that are demonstrated in tables 2 and 3, we can conclude that the priority to relief and recover, reconstruct and rebuild is in the health sector and then clean water sources, and especially in the governorate of Sa'ada which had severe damages.

KEYWORDS

region, regional development, disaster, reconstruction

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LIST OF ABBREVIATIONS AND ACRONYMS

GAM	Global Acute Malnutrition
GDP	Gross Domestic Product
IDPs	Internally Displaced Person
IPC	Integrated Phase Classification
MAM	Moderate Acute Malnutrition
OCHA	Office for the Coordination of Humanitarian Affairs
SAM	Severe Acute Malnutrition
YEM	Yemen

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1 Introduction

The half of the second decade of the 21st century is full of forced conflict. Long-lasting fight of western countries to terrorism and calmed international conflicts escalated too many regional conflicts many countries, cities and urban areas located within the scope of natural disasters or in scope of industrial disasters, and with the increasing complexity of urban areas, and the complexity of social components and the complexity of economic and political, the effects of these disasters and wars have become more complex and worse than before, disasters and wars have affected all aspects of life, causing the most terrible effects, such as the loss of life and displacement, destruction of property, destruction of buildings and damage to the environment, as well causing economic problems, social problems, cultural problems, and psychological problems, and the impact will double if not handled properly in accordance with scientific methods and strategies.

Wherefore it is necessary to have a disaster management approaches and strategy disaster and subsequent reconstruction, as much damage occurs due to lack of the management practices of these disasters and insufficient planning to solve the problems resulting from them, and the lack of a clear strategic for post-reconstruction despite the devastation caused by disasters and wars, the restoration of development hours, however, these disasters can provide opportunities for development and development, addressing past problems, provided they are integrated into long-term reconstruction strategies in their areas of occurrence and directed towards urban sustainability.

The unstable conditions of many countries because of the continuation of the war. Cities and villages are constantly devastated by terrorist and military operations against the human and the place, so that reconstruction within the right foundations is a means of resistance, therefore the development of strategies is very critical for the countries and for their stability.

The main aim of the thesis is to design the framework that would help to redevelopment of the regions and countries affected by a forced conflict.

..

2 Regional development

Regional development is purpose to better understand the problems and issue facing the regions because of the contemporary economic and social changes, including the formulation of territorial policies accordingly regional development activities are always aimed at addressing regional problems and issues through development interventions which are best carried out at the regional level. It focuses on good practice in the support and promotion of wealth as part of an integrated geographical approach expressed at a regional scale involving regional actors. [1]

Development can be described as 'the proceed of building, engineering, mining or other operations under or over land, or the creating of any material change in the use of buildings or other land development can have all types of buildings, completely new construction, demolition and reconstruction or addition and alteration, whether they are residential, commercial, and industrial or others, they come under definition of development. It is the technique by which planning influence on a lot of people and, could be said to have its most direct influence. [2] [3]

Definition of region

The conception of the region is used universally, the concept is used in terms of and political and in common usage. A region can be described using a wide range of criteria, but common criteria include both variables which are spatial or geographical. Common as well are two elements social and cultural, the latter points raise questions of identity and attachment to place - i.e. regions can be defined by cultural factors. Identity is a powerful force in development. of notions of regions. [4]

In general, the concept of region expresses the fact that the planet Earth is a conspicuously heterogeneous object and that it demonstrates distinct divergence in its spatial (i.e. Geographical) characteristics.

The region is one of the fundamental and original notions in geography and connected spatial disciplines such as regional economics. [5]

Types of region

There are three types of region [6]:

- **Formal regions:** (homogeneous) or uniform region regions are places with similar features or areas in which definite characteristics are originate throughout the area. also, can defined by unity area and by similar cultural styles.
- **Functional regions:** sometimes called nodal regions are areas organized around nodes or core or is a set of places that are related together by a flow of something or in some other ways.
- **Perceptual regions:** sometimes called vernacular regions are build that reflect human feelings and stance about areas and are therefore shared. The reflect fillings and images more than any reality, i.e. physical features, formal political boundaries, or economic center.

3 Reconstruction of regions after wars and disasters.

The occurrence of disasters and the dangers resulting from them globally are increasing and accelerating. New types of disasters that did not exist in the past have led to significant losses on the overall urban environment, especially in the developing countries, affecting the economic, social and cultural levels.

So that we may relieve their impact, decrease their harm and make the reconstruction process more operative, efficient and low cost, we should first understand the disaster and how it occurs and factors increase or relieve the impact on the community and the urban environment.

Disaster recovery: there is three distinct disaster recoveries and has interrelated in meanings, First, it is an aim that involves the restoration of normal community activities that were affected by disaster impacts – in most people’s minds, exactly as they were before the disaster attack.

Second, it is a situation in the emergency management cycle that start with stabilization of the disaster circumstances (the end of the emergency reaction, situation) and ends when the community has returned to its normal routines.

Third, it is a process by which the community acquire the goal of recurrence to normal routines. The recovery approach involves both activities that were planned before disaster impact and those that were improvised after disaster impact. [7]

3.1 Definition of disasters and wars

Disasters are defined in many ways. There are many entities that have defined them, each according to their specialty, field of interest and the angle from which disasters are considered. The disaster has been defined as:

A tragic event, natural or artificial made by human as wars, and leads to destruction and impact on the daily life, natural environment, infrastructure and the environment built by human.

A considerable accident that cause loss of life and possessions, and might be natural due to nature (floods, earthquakes, volcanoes) or might be a technical disaster caused by a human action, whether voluntary or involuntary, purposely or slackly, and requires facing aid at the level of the international level, if the capacity to confront them exceeds national capacities. [8]

A tragedy caused by a natural or industrial hazard that threatens life, health, property, the environment and negatively affects society, the urban environment and the urban structure. This

disaster occurs because of the danger inherent in the region or because of weakness in the face of this danger. To increase their influence in place. [8]

A tragedy that occurs suddenly, causes great damage and destruction of property, disrupts the daily life system and causes unlimited and varied destruction according to geographical location, climate or type of land surface and the extent of vulnerability. This destruction exceeds the population's potential and therefore requires assistance from the regions or external states, which affect the mental, social, economic, political and cultural areas of the disaster. [8]

3.2 Reasons for increasing the impact of disasters on the urban environment

The impact of disasters has increased on the urban environment in modern times, compared to what was in the previous times due to a variety of reasons. Some of the most important reasons are mentioned below [7], [8]:

1. Increase the frequency of natural disasters in the modern era because of the great changes that humans have made in the natural environment, in addition to the occurrence of new types of disasters that did not exist previously, such as climate change, and nuclear disasters
2. Increase the world population, increase the size and complexity of communities, and use vulnerable areas (such as earthquakes and floods) for housing.
3. Unsettled and poor economic conditions in developing and poor countries lead to social and economic problems that weaken societies and make them vulnerable to disasters due to weak measures of prevention and low quality of the physical environment
4. Lack of preparedness for disasters, where the risk increases as the vulnerability increases and the readiness and absence of strategies to prevent these disasters.

3.3 The impact of disasters on the urban environment

Physical Impact: it is considered as the nearly all visualized and highest expenses with straight effect on the urban environment. This effect straight on reconstruction, involves buildings, public facilities, infrastructure and urban structure. include casualties (deaths, injuries, and illnesses) and injury to agriculture, structures, infrastructure, and the natural environment.

Economic Impact: The economic fabric is affected in the aftermath of disasters and wars, where severe damage sometimes leads to the destruction of the economy, private enterprise and industry are affected, trade movement is damaged and disrupted, and therefore funding is reduced at both the individual and public levels.

Social Impact: In times of disaster, social problems are exacerbated, poverty spreads, in addition to the lack of basic needs and the deterioration of living conditions, which leads to the emergence of deep social problems, which must be solved and dealt with very quickly and give them the attention they deserve. It be a demolition of buildings, but it is not visible, and its effects on the society are profound.

Cultural Impact: In times of war and disaster, cultural and historical evidence is destroyed because of the disaster or deliberately as in wars, whether these cultural and physical evidence is built, such as cultural centers, historical cities, monuments and religious symbols, or was a moral culture in customs and traditions, or history in books or Materials taught in schools with the aim of changing the visual image in the urban environment and forging history.

Political Impact: The situation is characterized by confusion, dispersion and instability, leading to severe weakness or collapse of governments at different local, regional or national levels. The situation varies from one government to another depending on the strength of these governments, their flexibility, their readiness and their ability to deal with the circumstances Emergency, and reconstruction, and one of the most important factors for the success of reconstruction operations is to restore political stability. [7], [8]

3.4 Types of disasters

With the increase in the incidence of disasters and the increase of types and the emergence of new types of them have been classified disasters in several ways, either is classified by the causative of these disasters [8]

Natural disasters: human is not into the event and out of the domain of human control such as earthquake - floods - volcanoes and others

Natural disasters caused by human: Are natural disasters, caused by imponderables in the natural system, because of human activities in the wrong activities in the globe, such as slips caused by logging and forests

Human made disasters: Wars, fires and environmental pollution Disasters from human action are directly linked to human behavior either deliberately or unintentionally and lead to destruction and adverse effects on all aspects of life, and can be classified this type of disaster to Two types:

Unplanned (unintentional) disasters: Occur because of negligence or lack of awareness of the negative effects that may occur

Pre-planned (deliberate) disasters: Disasters are intended to destroy and cause negative impacts on the urban environment and have specific objectives with intent and with prior planning.

Major impact disasters: Which cannot be known precisely when they occur, and occur mainly as a result of natural forces beyond the control of humans, such as earthquakes, volcanoes and storms.

Slow-impact disasters: Are disasters that occur gradually, grow over the course of days, months or years, and continue to grow so that the continuation of life is exposed to the greatest danger, and thus constitute a disaster, such as desertification, erosion, and Political misconduct. [8]

3.5 The stages of the development of the disaster and its mechanism of action

The disaster (whether natural or human-made) occurs and develops in three stages:

The first stage: The presence of danger somewhere whether directly or indirectly, poses a threat to life, property, and the environment, a direct seismic zone. There is a high probability of landslides and earthquakes, while deforestation, for example, leads to landslides, the tremor of danger developed indirectly in this case.

The second stage: The stage of the movement of this danger and the beginning of its effect, the moment of the movement of the disaster, then begins destruction affects the human, and this is usually the result of two reasons:

1. The lack of awareness or discrimination of the human being in the region and the continuation of normal life despite the existence of real danger, such as the continuation of construction in a region where earthquakes are frequent.
2. Weakness in confrontation: not to take preventive action when there are warnings, and neglect the readiness such as non-measures and adoption of building standards to resist earthquakes, for example

The third stage: Post-disaster: The impact of this disaster on the urban environment and the disasters that result from it, as a series of effects occur and lead to other disasters in the social and economic fabric in addition to the apparent destruction in the physical structure and infrastructure. [9]

3.6 Case of study

The country of Yemen is located in Asia in the Middle East on the far south of the Arabian Peninsula, it is ringed by the Indian Ocean (Arabian sea and the Gulf of Aden) and the Red Sea, It is boundary Saudi Arabia and Oman on the land and Eritrea, Djibouti and Somalia over the Seas, The Surface area of Yemen is 527,970 km². [10]

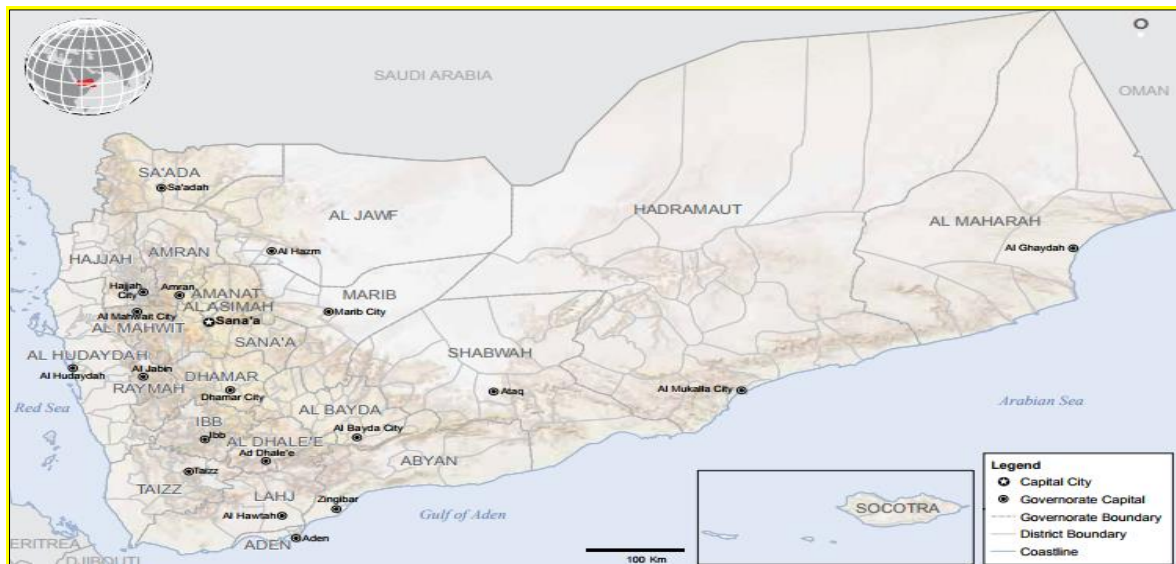


Figure 1 – Map of Yemen

Source: [11], [10]

Yemen has a very strategic location, it has open access to the Indian Ocean and therefore to international trade routes. Yemen has 22 governorates and most of them are within the western part of Yemen.

Table 1 - Demographic fact

Language	Arabic
Religion	Mainly 99.1% Islam, other 0.9% (includes Jewish, Bahai, Hindu, and Christian; many are refugees or temporary foreign residents).
Resources	Agriculture, fishing, Industries and extraction and refining of oil and gas.

Table 1-A – Demographic fact

Population	Male	Female	Median age [years]	Sanitation facility access [%]	poverty [%]
27,431,707	13,877,000	13,601,000	19.2	53.3	85

Table 1-B – Demographic fact

GDP Growth [%]	Population below poverty line [%]	Unemployment rate [%]	Inflation rate [%]	Current account balance [billion] [\$]	Debt [billion] [\$]
-28.1	54	27	31.5	- 1.532	7.661

Source: Author, [15]

Table 1B changes in economic indicators in the first year of the war. GDP had a huge impact of 28.1 %, it is only logical to assume that because of war many people lost their jobs and therefore the productivity of the country decreased. That means lower GDP and higher unemployment rate, which is estimated to be 27 % only in the first year. Following that the inflation rate increased to 31.5 % and debts to around 7.6 billion US dollars. These changes are very bad for any country and have many negative impacts on the lives of people, especially in

a poor country such as Yemen which has been battling poverty, they would have devastating effects. Poverty rates have been increased to 85 % in Yemen since the war started.

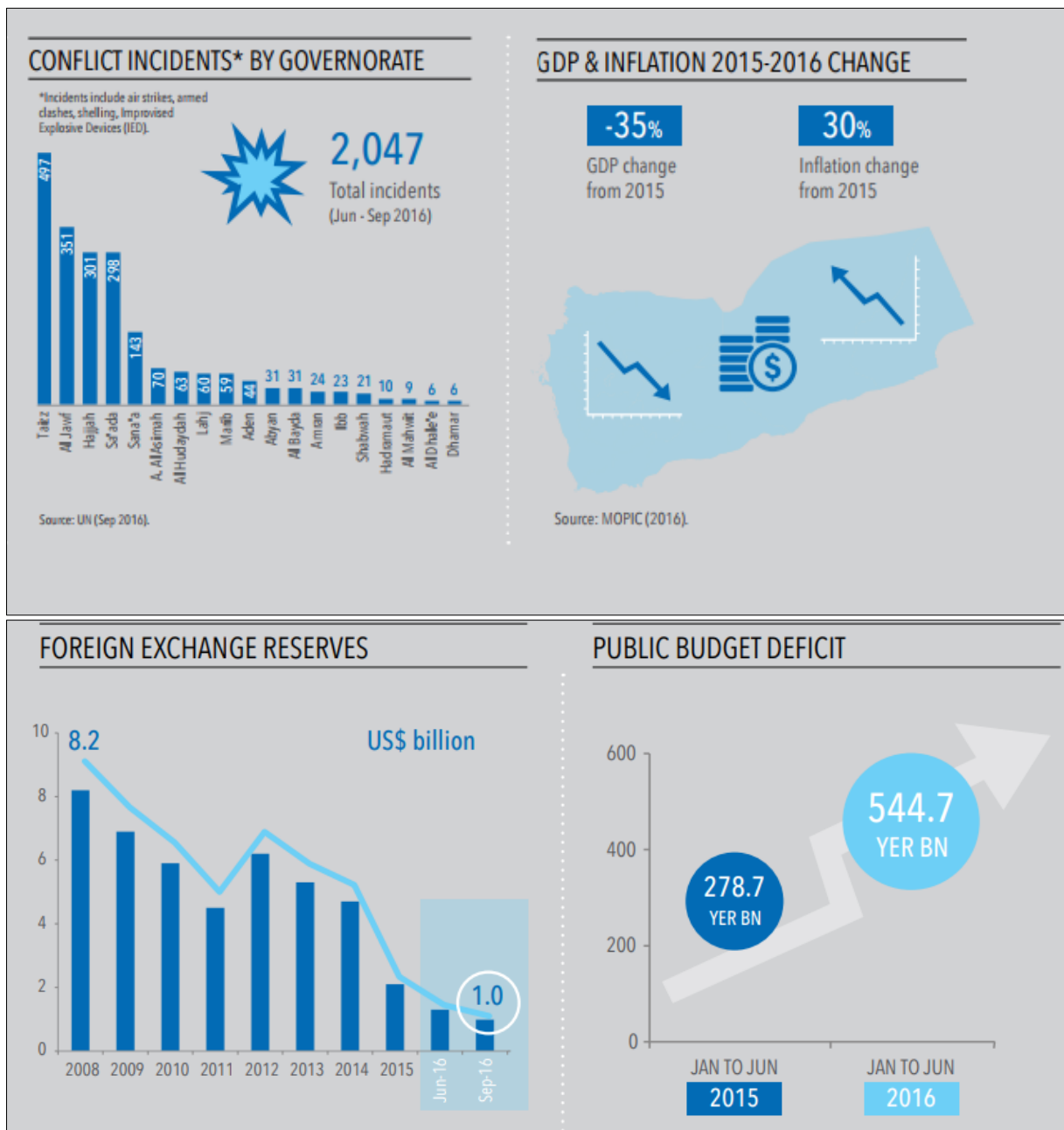


Figure 2 –Foreign exchange and public budget deficit

Source: [15]

The figure above (Figure 5) shows the changes in some of economic indicators in Yemen since the war started. GDP and foreign exchange reserves have been dramatically decreasing and in the other hand inflation and public budget deficit have been increasing. GDP had decreased 35% in a year, inflation has increased about 30% in one-year, foreign exchange reserves have decreased from about 8 billion dollars to about 1 billion dollars in 8 years, and public budget deficit had almost doubled in about a year.

Growth of the humanitarian needs in key sectors

As a result of conflict has left an estimated 18.8 million people are acquiring assistance or protection to meet their basic needs, including 10.3 million who are in acute need for 29 months. This represents an increase of almost 20 % since late 2014 and is driven by increases across key sectors. The 18.8 million people in need estimation is lower than the 21.2 million cited for 2016. These changes not reflecting an improvement in catastrophic humanitarian situation in Yemen, but rather a further tightening around priorities [11]

- **Food security and agriculture**

Under estimation about 14 Million people are currently out of food, including 7 Million people not able to forecast where the next meal will be offered from.

This showing a 33 % increase since late 2014. Agricultural production, employing more than half of the population, has also drastically declined due to insecurity, big costs, and sporadic availability of agricultural inputs.

The fishery sector has also been heavily impacted with a near 50 % reduction in the number of fishermen due to the reasons of impact of the crisis. [11]

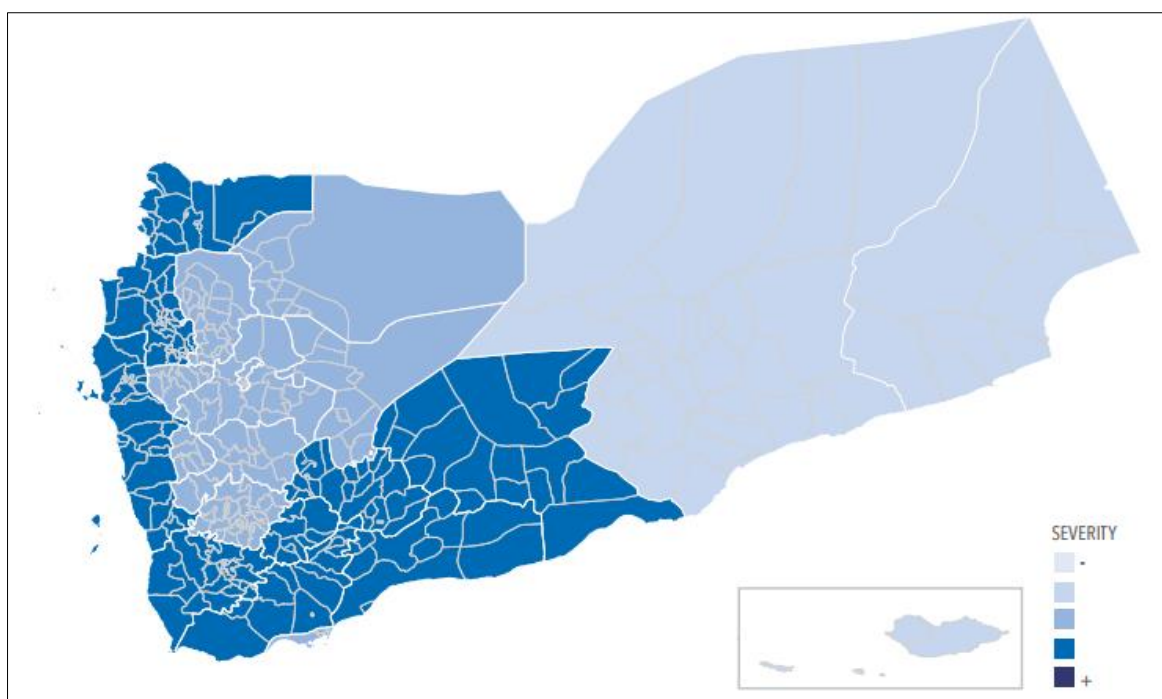


Figure 3 – Severity of needs for food security and agriculture

Source: [15]

The figure above (Figure 6) is showing Areas with the highest cross-sector needs severity for food security and agriculture urgently require an integrated response to ensure basic life-saving and protection services.

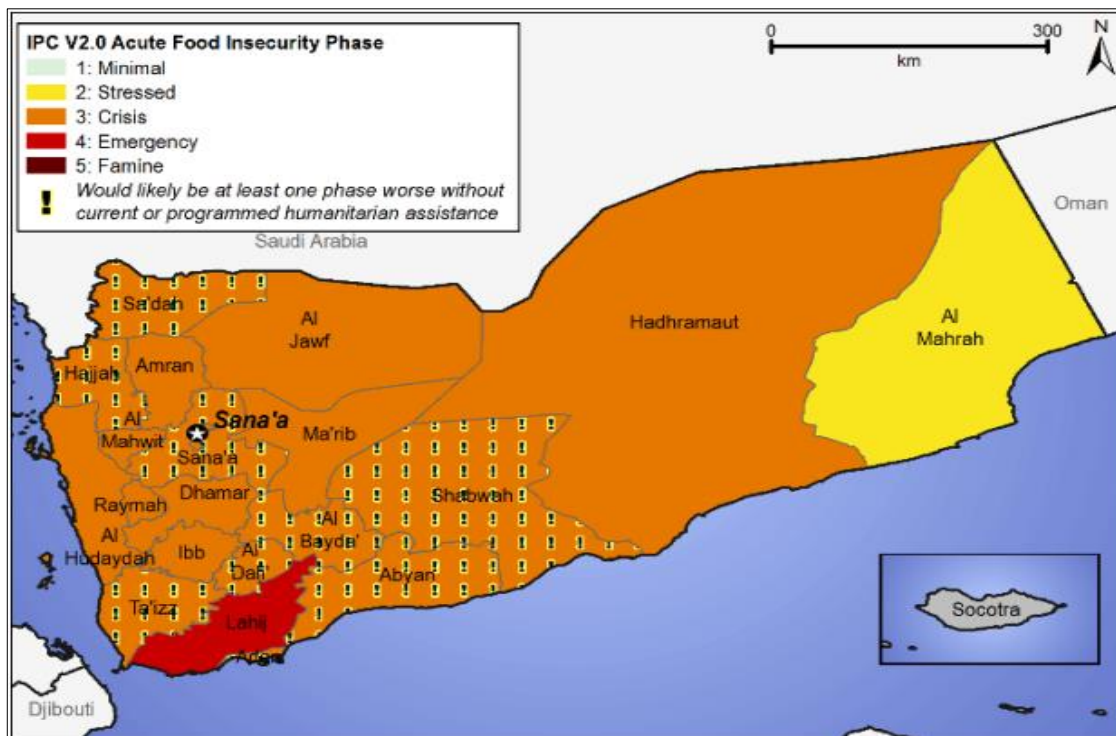


Figure 4 – Current food security outcomes, June 2017

Source: [12]

The figure above (Figure 7) is showing the five phases of acute food insecurity and show that almost all the country is suffering from food crisis and one out of 22 governorates under emergency phase.

IPC Integrated Phase Classification with their description:

1. **Phase 1 Minimal:** An estimation has been rehearsed that more than four in five families are able to have essential food and other nonfood required without engaging in atypical, irregular strategies to get nutrition and revenue.
2. **Phase 2 Stressed:** On a par with any humanitarian help at least one in five families in the area have the following or worse: at least agreeable strategies.

3. **Phase 3 Crisis:** On a par with any humanitarian help at least one in five families in the area have the following or worse:
 - Nutrition consumption gaps with top or higher frequent serious malnutrition.
 - Are marginally to meet minimum nutrition only with accelerated depletion of livelihood property that will command to nutrition consumption gaps.

4. **Phase 4 Emergency:** On a par with any humanitarian help at least one in five families in the area have the following or worse:
 - Large nutrition consumption gap resulting in very top acute malnutrition and excess molarity.
 - Extreme loss of livelihood assets that will lead to nutrition consumption gaps in the short term.

5. **Phase 5 Famine:** Even with any humanitarian assistance at least one in five families in the area have an extreme lack of nutrition and other basic requirement where starvation, death, and destitution are evident. Evidence for all three criteria (nutrition consumption, acute malnutrition, and mortality) is required to classify Famine.

- **Water, Sanitation and Hygiene (WASH)**

Estimated 14.4 million people acquiring assistance to enable safe drinkable water and sanitation, including 8.2 million who are in critical acute need. Which is representing an increase of 8 % since late 2014, and the severity of needs has concentrated.

Failing urban water and sanitation systems are contributing to a public health crisis, with a significant increase in malnutrition rates and outbreaks of cholera, dengue and scabies occurring in 2016.

Critical WASH infrastructure and supplies have been destroyed in the conflict, acute attempt is needed to prevent the water and sanitation systems from collapsing and to provide services to those living where existing structures are not in place or cannot be supported [11]

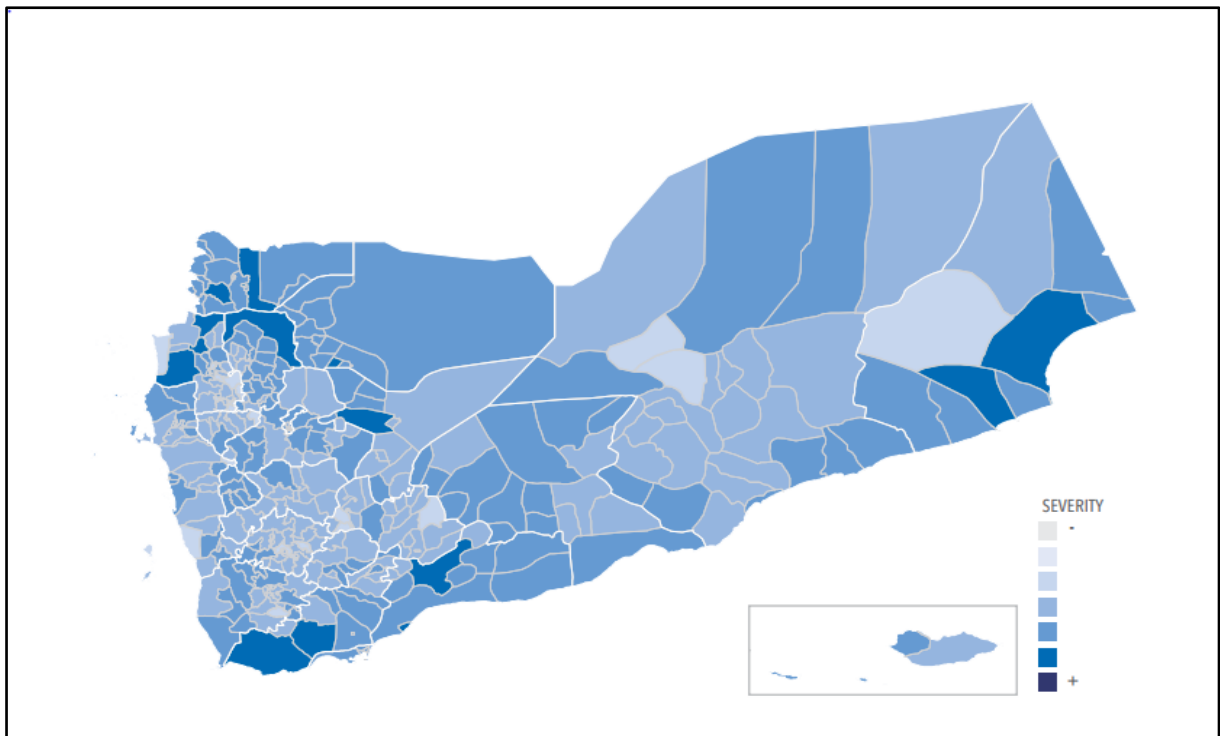


Figure 5 – Severity of needs for water sanitation and hygiene

Source: [15]

The figure above (figure 8) is showing Areas with the highest cross-sector needs severity for water sanitation and hygiene urgently require an integrated response to ensure basic life-saving and protection services.

As we can see in figure 8, Yemen is severely in need for clean water and sanitation, in some areas more than other but overall the need is urgent almost everywhere. Water is one of the most important physiological needs of human beings and having clean sources of water is significantly important not only to maintain a healthy population but also to use for agriculture and some industries to have food for the population.

- **Health**

The Yemeni healthcare system is nearly break down due to conflict, collapsing infrastructure, and deficiency shortages of health staff, and only 45% of health facilities are functioning.

Until October 2016, at least 274 health facilities had been destroyed or damaged in the conflict, in 16 out of 22 governorates of health systems are partially or totally not functioning.

estimated that 14.8 million people deficiency access of basic healthcare, including 8.8 million living in severely under-served areas. [11]

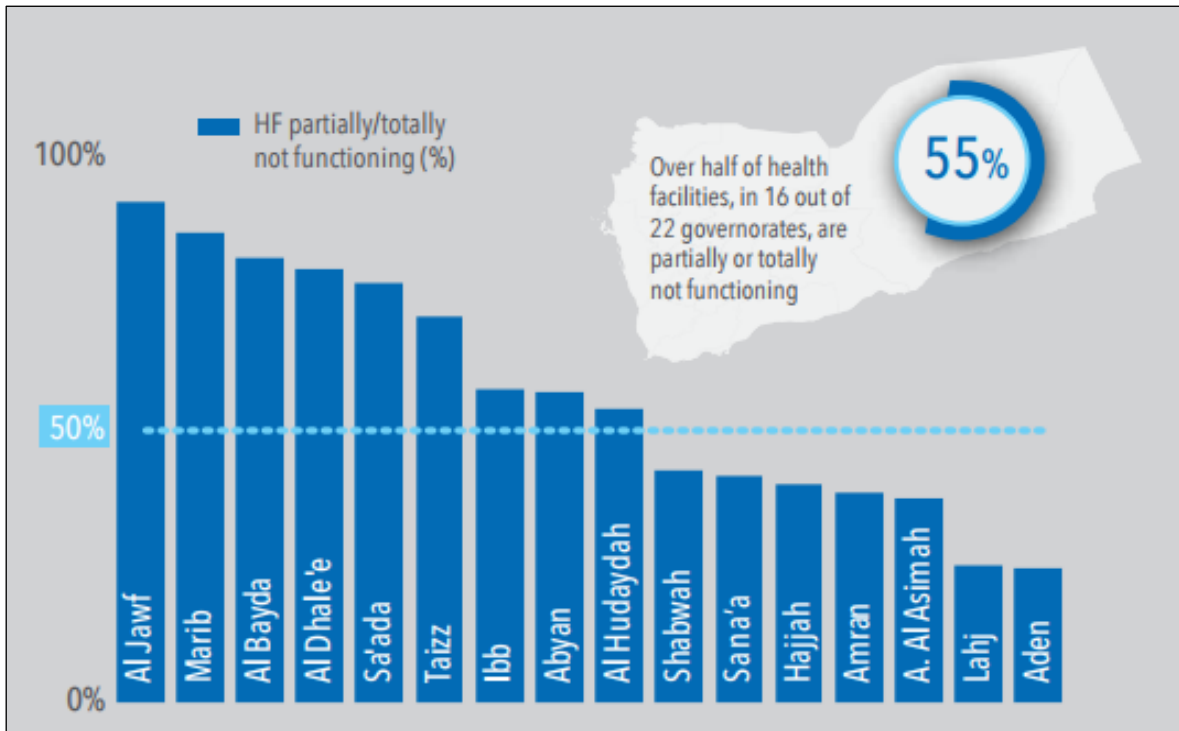


Figure 6 – Status of health facilities

Source: [15]

The figure above (figure 9) is showing that over half of health facilities, in 16 out of 22 governorates, are partially or totally not functioning.

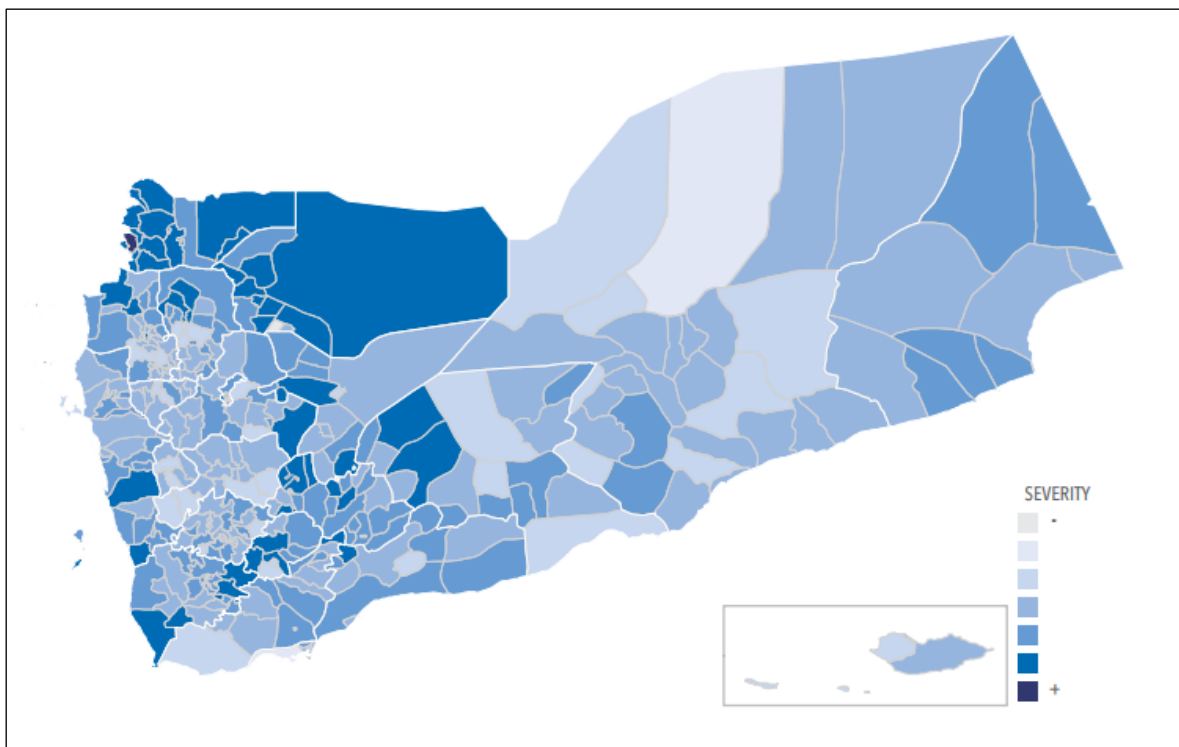


Figure 7 – Severity of needs for Health

Source: [15]

The figure above (figure 10) is showing Areas with the highest cross-sector needs severity for health urgently require an integrated response to ensure basic life-saving and protection services.

More than half of the health facilities in Yemen are, not operational, and these are in almost all areas of Yemen. This is especially problematic because people have lack of medical care everywhere in Yemen. It is only safe to assume that there is a lack of medicine as well. This is a very dangerous problem and could be a humanitarian tragedy because people could die due to lack of medicine and medical care even from those kinds of diseases which should pose no threat in the 21st century.

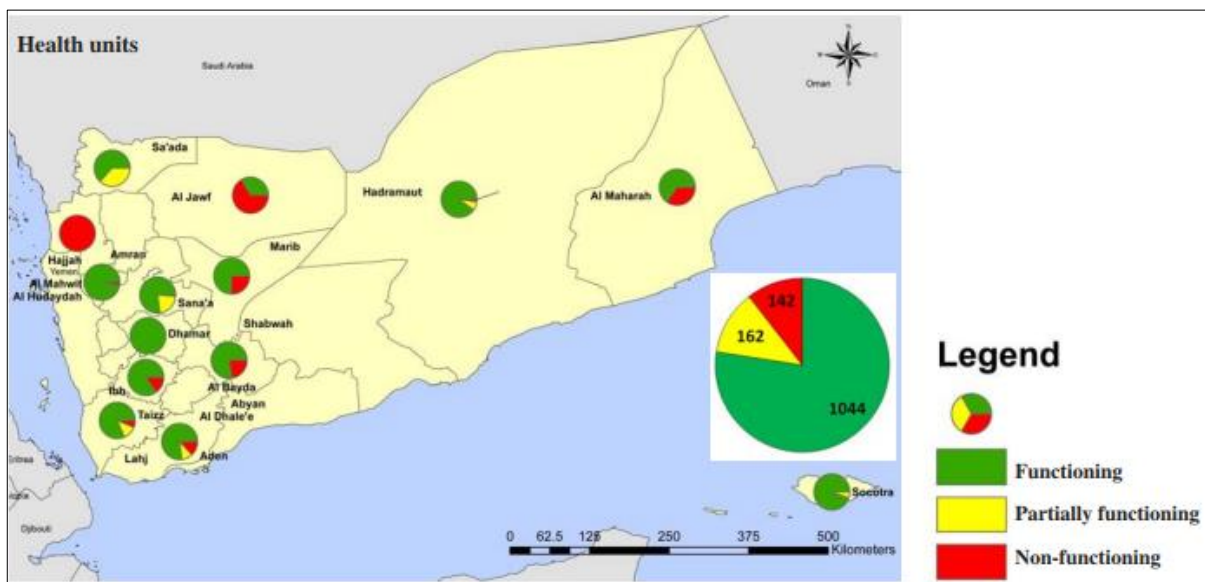


Figure 8 – Health functioning units

Source: [13]

Figure 11 shows the health units in Yemen in May 2015, which is within the first months of the beginning of the war. We can see that the governorate of Hajjah was left with no functioning health units from the very beginning of the war; And in other governorates we can see that some of the health unites are partially functioning.

This could be because these centers were bombed and destroyed and/or because they had shortage of supplies.

According to figure 12 we can see that not only the heath facilities in the cities were affected but rural hospitals were also severely affected by the war.

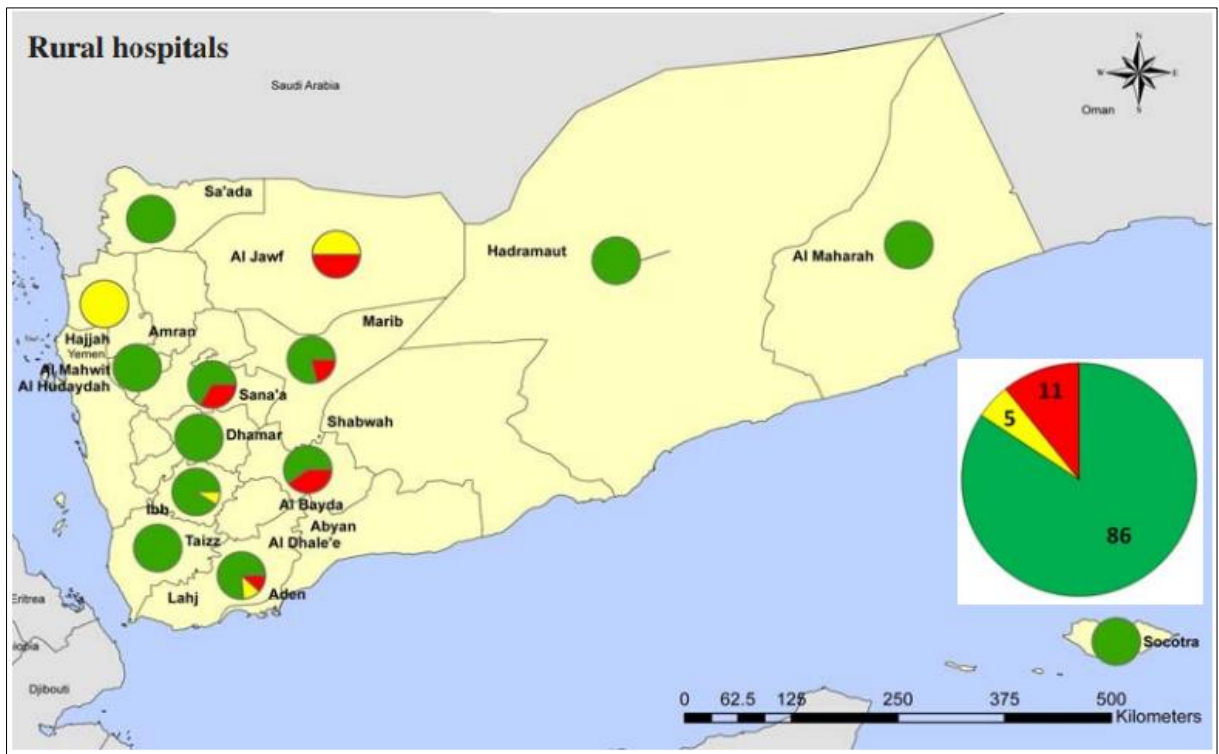


Figure 9 – Rural hospital in governorates of Yemen

Source: [13]

Figure 13 shows the same story in maternal clinics in Yemen and we can see that the governorate of Hajjah is the most affected one in the beginning of the war.

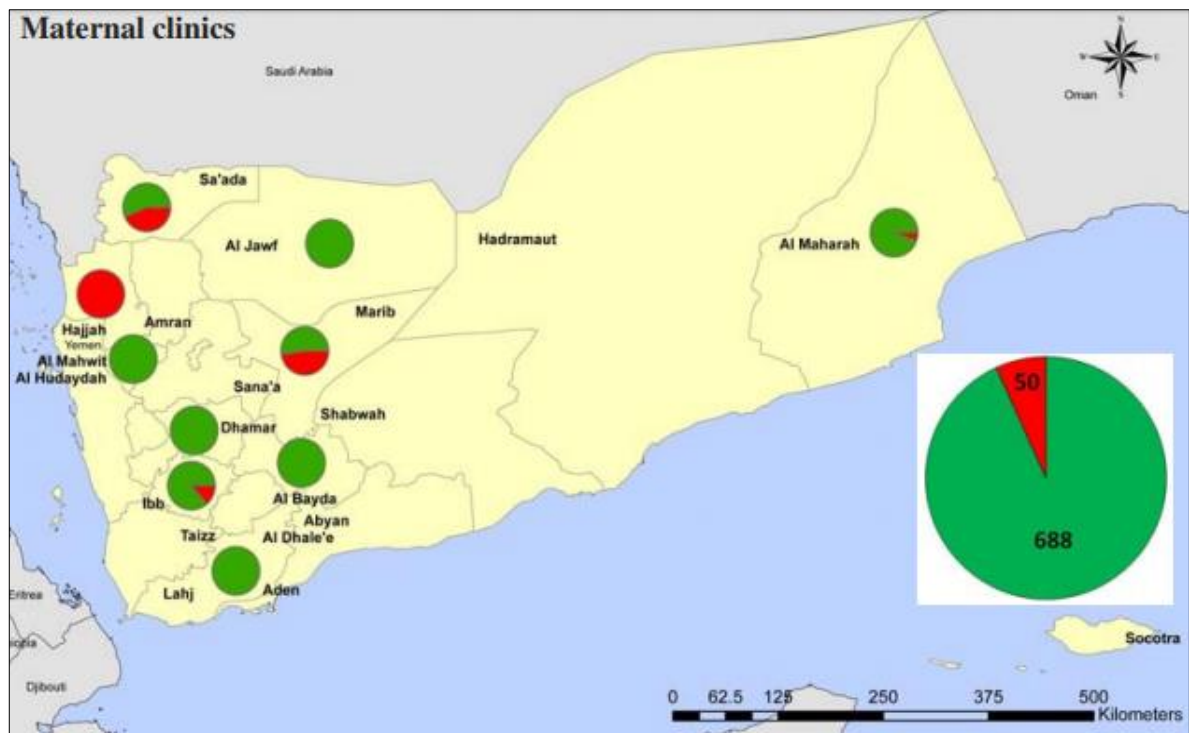


Figure 10 – Maternal clinics

Source: [13]

The figures 11, 12, and 13 demonstrate that the health facilities were targeted since the beginning of the war and show how much of public health care facilities are functioning, partially functioning and non-functioning only by May 2015.

- **Nutrition**

Almost 4.5 million people require services to treat or prevent malnutrition, including 4 million in acute need who live in the worst affected areas. This represents a 148% increase since late 2014.

Within the population in need, nearly 462,000 children are currently suffering from Severe Acute Malnutrition (SAM) – a nearly 200% increase since 2014.

In addition, 1.7 million children and 1.1 million pregnant or lactating women are suffering from Moderate Acute Malnutrition (MAM).

Global Acute Malnutrition (GAM) rates are as high as 31% in some locations – more than twice the emergency threshold.

The most pressing needs are concentrated in Al Hudaydah, Hajjah, Amanat al Asimah, Sa'ada, Taizz, Ibb, Dhamar, Hadramaut, Lahj and Aden

Nearly 1.2 million infants and young children require preventative nutrition services, including supplementation of a high-energy diet and support on infant and young child feeding. [11]

We could very clearly see in figure 14 that there is no data available for the east part of Yemen. However, the western part of Yemen is suffering significantly and is severely in need of nutrition.

In some areas of the western Yemen we can see less severity of needs for nutrition but nevertheless it is still a lot of need.

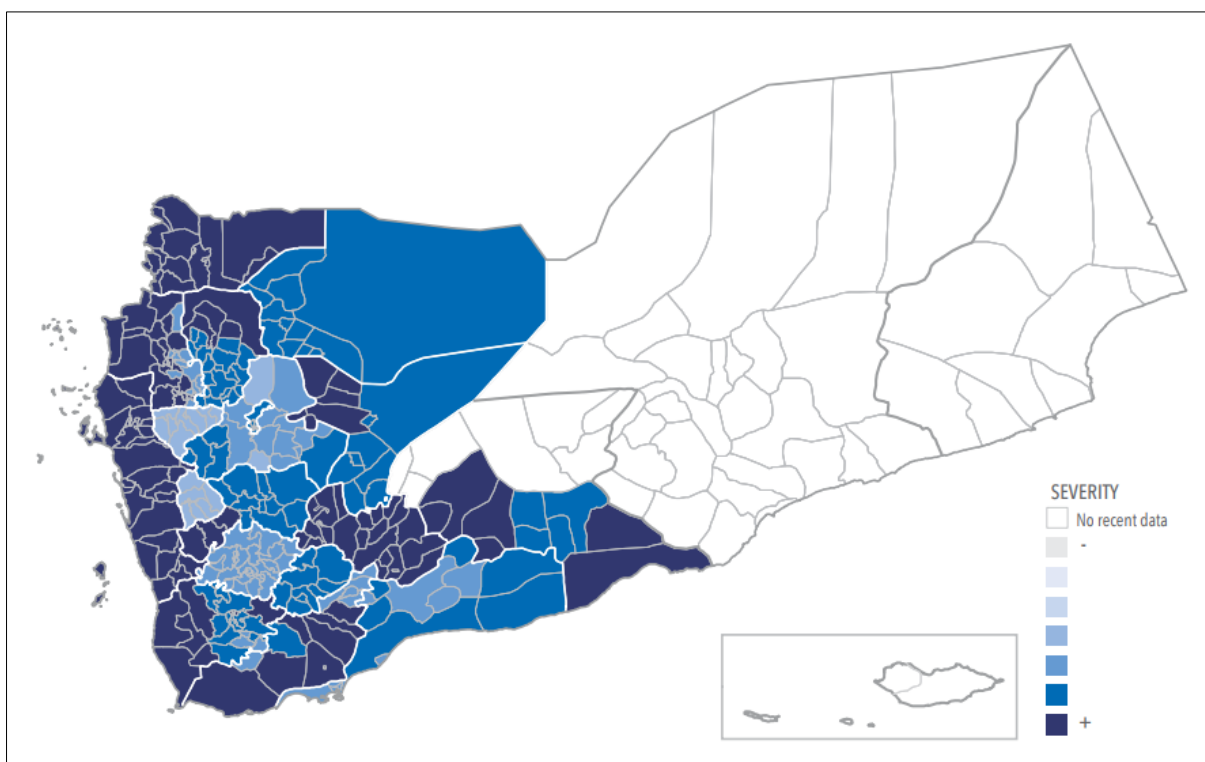


Figure 11 – Severity of needs for Nutrition

Source: [15]

The figure above is showing Areas with the highest cross-sector needs severity for Nutrition urgently require an integrated response to ensure basic life-saving and protection services.

- **Shelter and non-food items**

More than 4.5 million people require assistance with shelter, nonfood items or management of collective centers in which they are living, from these people, 3.9 million are in areas of acute need.

This represents an enormous 748% increase since late 2014 – the result of large-scale population movements during time of conflict.

Violent clashes, indiscriminate shelling and air strikes have forced millions of people to flee their homes.

Some 2.2 million people are currently displaced, 51% of whom are sheltering in Taizz, Hajjah and Sana'a.

An additional 1 million people have returned to their areas of origin, from all returnees, 68% have returned to 33 districts in Aden, Amanat Al Asimah and Taizz. However, the sustainability of their return is precarious

About 55% are living with host communities, straining already scarce resources, and 19% are living in collective centers or spontaneous settlements that require basic services. Among returnees, 86% have returned to their original homes. [11]

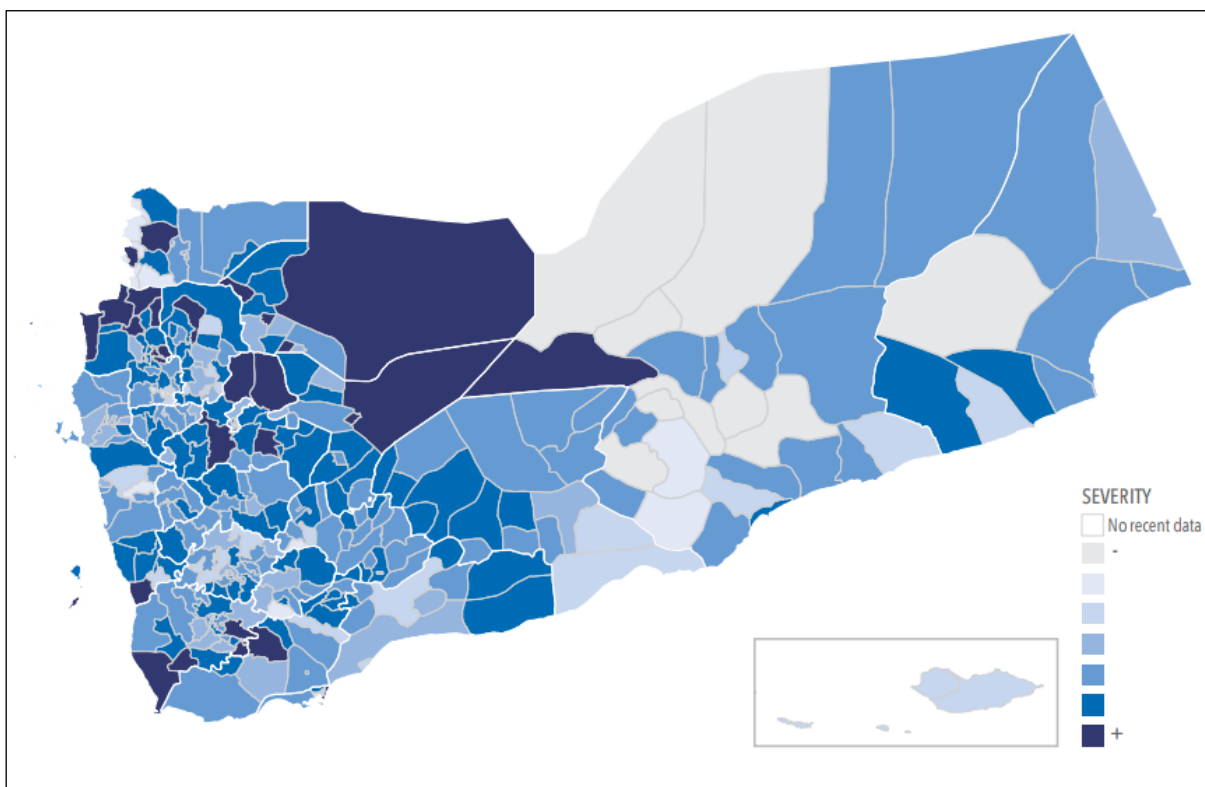


Figure 12 – Severity of needs for Nutrition Severity of needs of shelter and non-food items

Source: [15]

The figure 15 is showing Areas with the highest cross-sector needs severity of shelter and non-food items urgently require an integrated response to ensure basic life-saving and protection services.

In August 2015, the surveys have been completed in 8 governorates of Yemen.

Those 8 governorates are Al Bayda, Taizz, Hajjah, Al Hudaydah, Sa’ada, Sana’a, Aden and Lahj. From the survey’s results its show that Global Acute Malnutrition (GAM) the rate above 15 % emergency threshold in all sites in Al Hudaydah, Aden and Sa’ada governorates, with similarly high rates reported in part in lowland area of Taizz, Hajjah, Lahj and Sana. Global

Acute Malnutrition rates as high as 31 % were reported in some districts of Al Hudaydah– well over twice the emergency threshold.

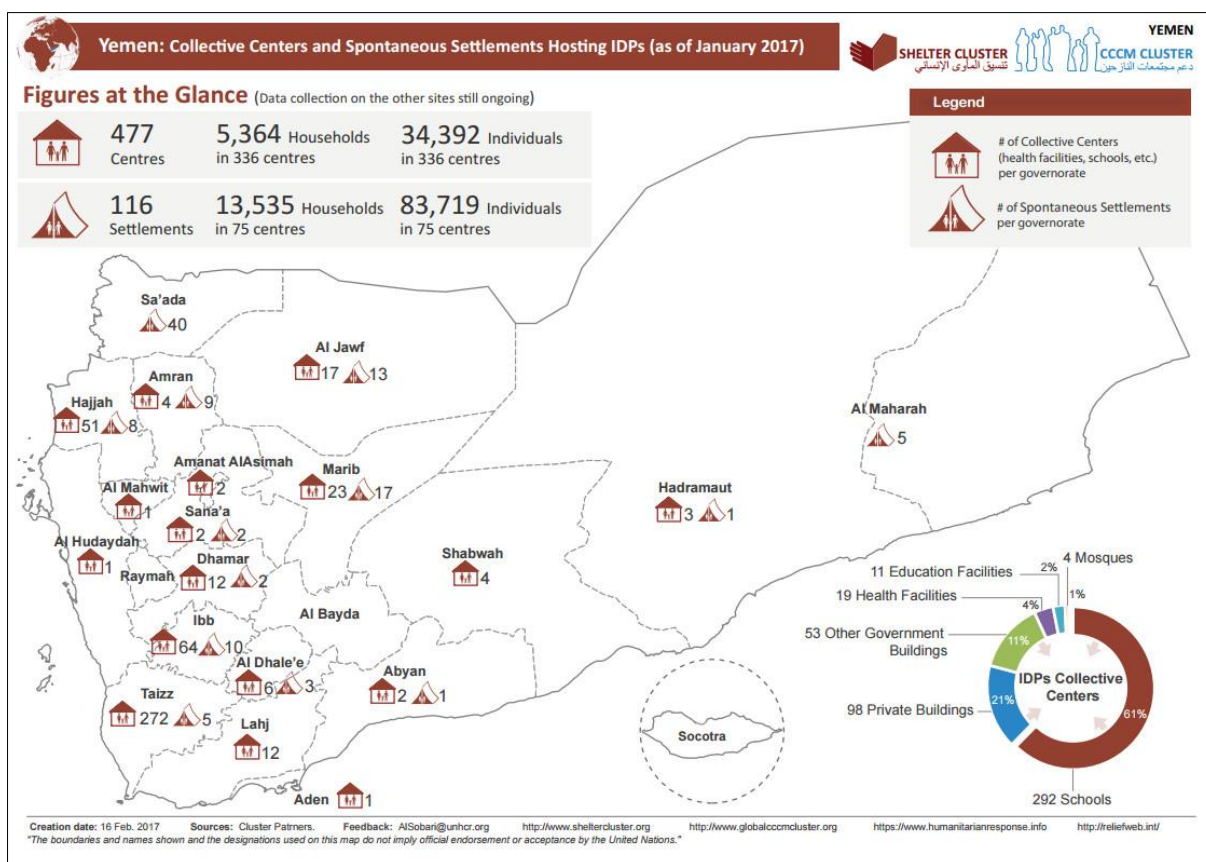


Figure 13 – Collective centers and settlements in Yemen

Source: [14]

The figure 16 is describing the Areas with detailed numbers of collective centers and spontaneous settlements Hosting IDPs (internally displaced person) in January 2017.

Many people lost their houses in the war and figure 16 shows the number of the settlements and governmental housings in different governorates as well as the number of people already settled in them. These numbers could give us a rough idea for how many houses are needed to be rebuilt after the war is over.

- **Education**

Almost 2 million children in Yemen are currently out of school, this represents 27% of the 7.3 million school-aged children and includes 513,000 children.

Altogether, 2.3 million people need support to ensure that crisis-affected children can access education, this includes 1.1 million people living in acutely affected areas.

More than 1,600 schools across the country have been affected by the conflict, including conflict-related damage or occupation by armed groups.

Resources available to education authorities have declined substantially, decreasing authorities' ability to ensure continuity of the education system. [11]

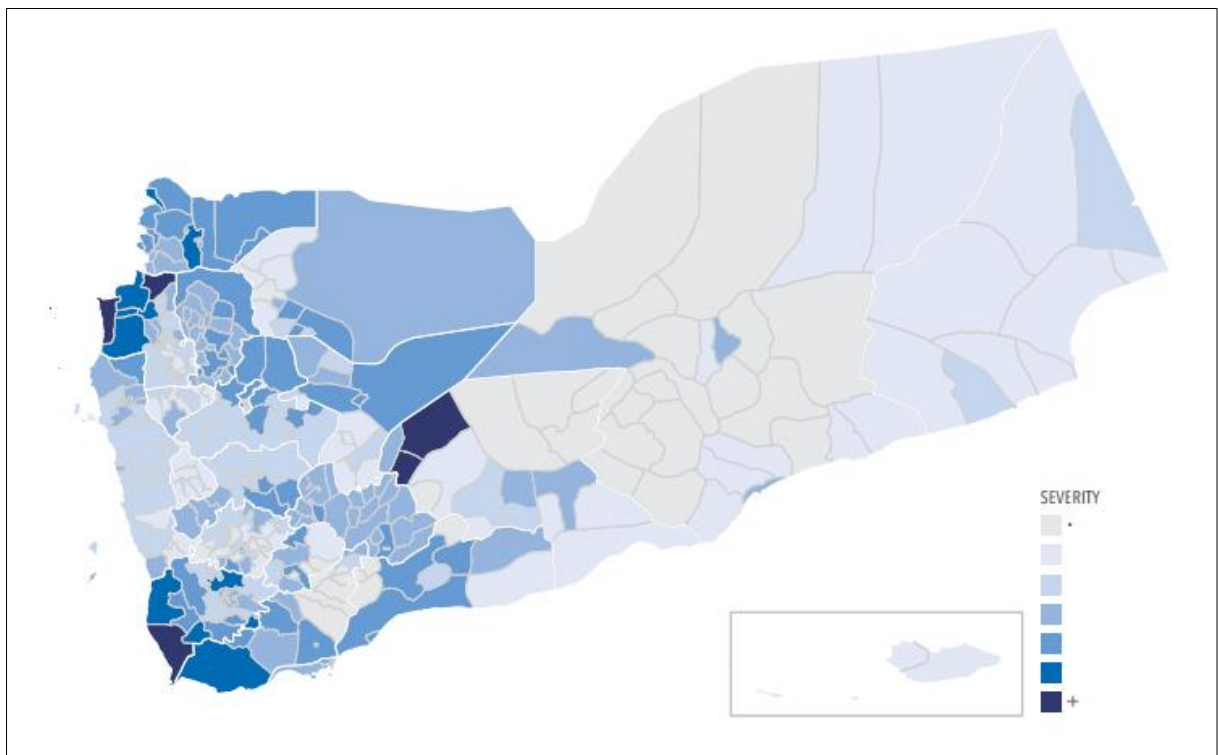


Figure 14 – Severity of needs of Education

Source: [15]

The figure 17 is showing areas with the highest cross-sector needs severity for Education urgently require. We can see that the western Yemen is more effected by the war conflict and more educational facilities were destroyed partially or totally. From the governorates, the governorate of Taizz is among those which suffered more damage and needs extra attention while rebuilding the country after the war.

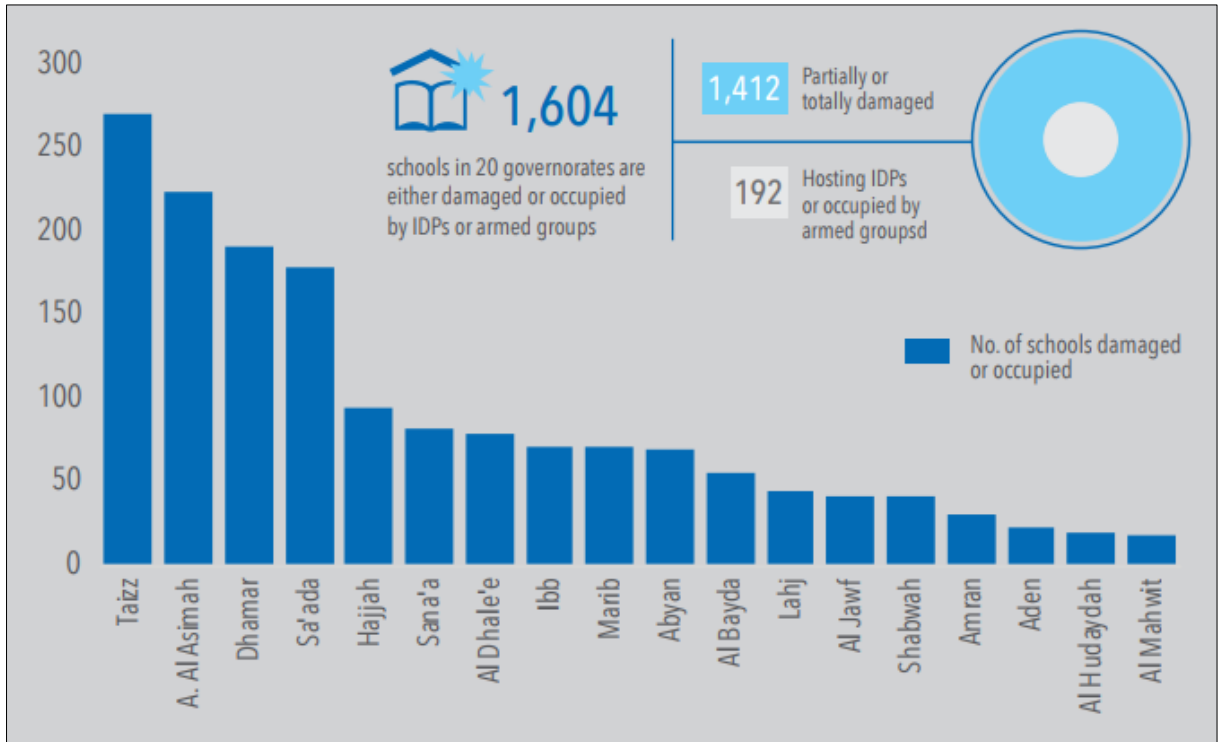


Figure 15 – School affected by governorate

Source: [15]

The figure above (figure 18) is showing that in 18 out of 22 governorates across the country, more than 1600 schools have been affected by the conflict, including conflict-related damage or occupation, 1412 schools are totally or partially damaged and 192 schools are occupied by hosting IDPs or by armed groups.

From the figure 18 we can see that most of the damaged or destroyed schools are in governorates which are in the western part of Yemen. This figure also shows the number of damaged or occupied schools.

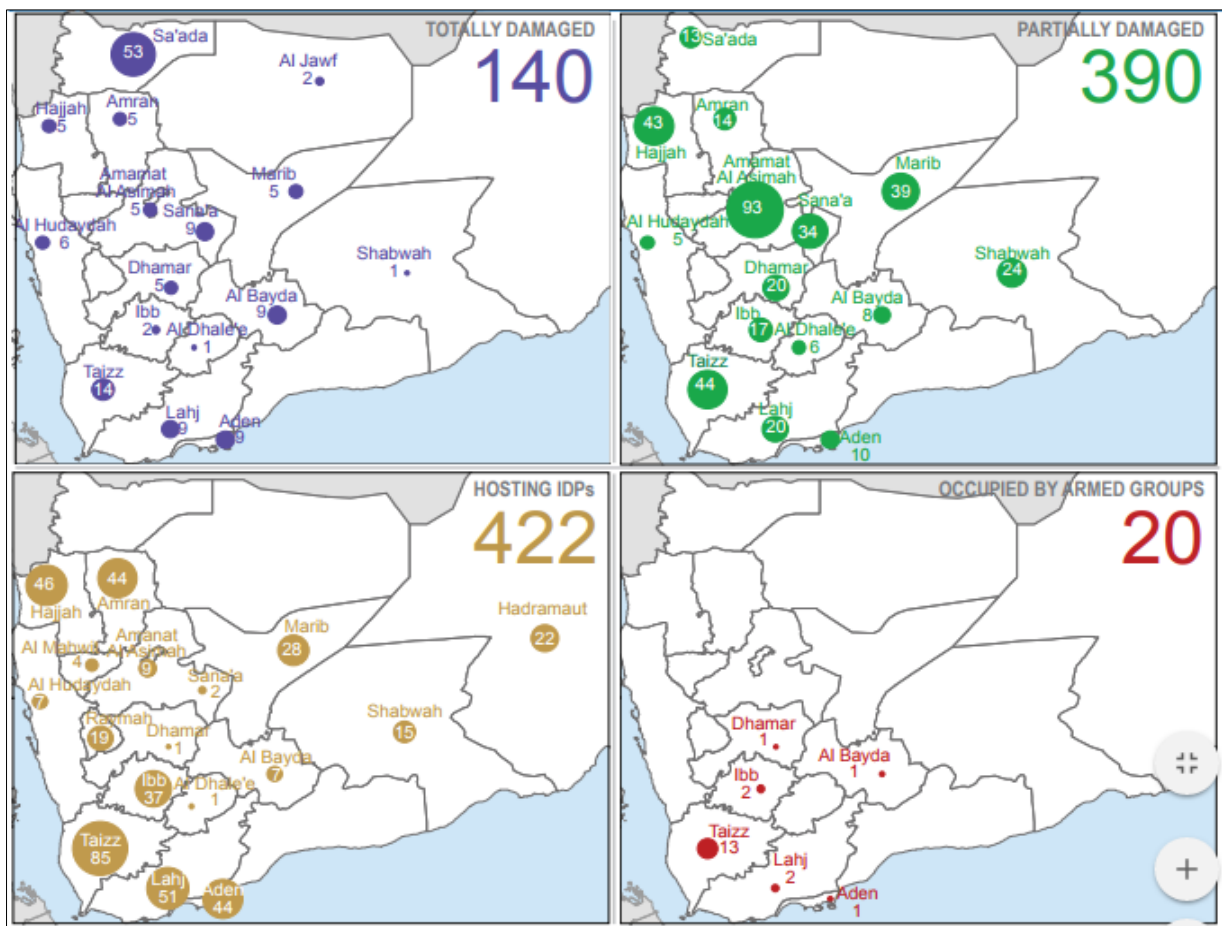


Figure 16 – Number of Schools affected

Source: [15]

The figure above is showing number of schools in 20 governorates are either totally or partially damaged or occupied by hosting IDPs (internally displaced person) or armed groups, bombing and airstrikes affecting civilian infrastructure it is continue unabated raising more damage and destruction of schools. As of 18 September 2015, an estimated 140 schools were totally damaged, 390 schools partially damaged, 422 schools occupied by hosting IDPs, and 20 schools occupied by armed groups across Yemen. schools damage and destruction has been particularly severe in the governorates of Hajjah, Marib, Sa’ada, Sana’a and Taizz where the conflict has intensified [15]

3.7 Analyze data

The Yemeni economy is being wilfully destroyed, with preliminary results of the Disaster Needs Assessment estimating \$19 billion in infrastructure damage and other losses – equivalent to about half of GDP (Gross Domestic Product) in 2013. [16]

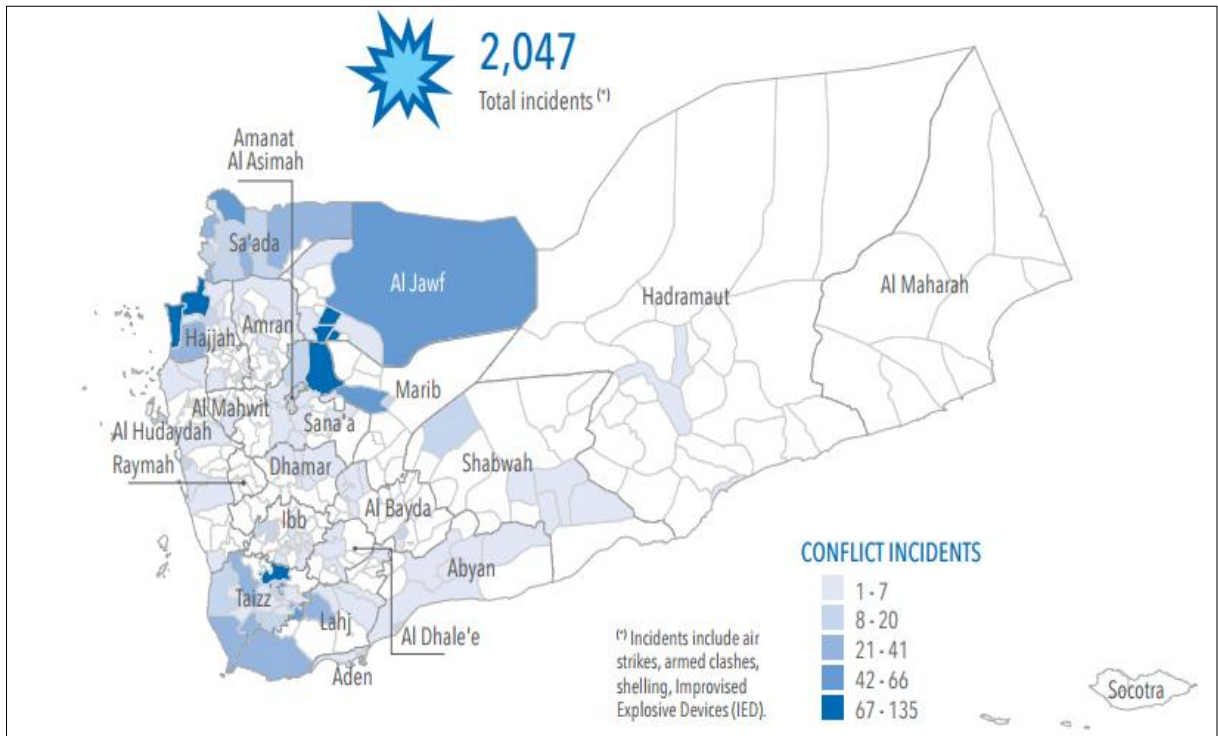


Figure 17 – Number of conflict incidents

Source: [15]

The figure 13 above is showing number of conflict incidents include air strikes, armed clashes, shelling, Improvised Explosive Devices

As of late 2016, ongoing conflict between Coalition-backed forces, Houthi/Saleh forces, and other groups continued to inflict heavy casualties, cause extensive damage to public and private infrastructure, and impede rapid delivery of humanitarian assistance.

More than 19 months of conflict have killed or injured nearly 44,000 people and forced more than 3 million people from their homes. Parties to the conflict have attacked private and public civilian infrastructure, including 325 verified attacks on schools, health facilities, markets, roads and other sites. [11]

4 Post-conflict state restoration and peacebuilding.

Post war and disaster reconstruction: Disaster reconstruction may be understood as the process of building what is destroyed by the disaster or war, but the definition of this form is incomplete, because it takes into account the reconstruction of what is destroyed from the physical structure only, and neglects the rest of the components of the urban fabric and Physical structure is part of it, as the physical structure is in fact a reflection of the cultural, social, economic, history, technology and climate.

The work has defined post-disaster reconstruction strategies as a set of disaster preparedness and preparedness processes and policies, thus meeting the urgent need during the disaster and reconstructing the aftermath of the disaster, both short- and long-term, So that these policies are comprehensive in all respects Life is concerned with the reconstruction of the destroyed during disasters within the other contents (social, economic, cultural), and these policies vary in nature from those that are placed in normal conditions and conditions, because it is to meet the needs in abnormal and unstable conditions [17]

Principles of Reconstruction Strategies: A strategy for post-disaster reconstruction is based on five principles that serve as determinants and guide them, and these are principles.

Protective: Not only plans to address the effects of the disaster, but also plans to avoid disaster as much as possible, through pre-emptive measures.

Comprehensive: All the effects of the disaster are addressed at different levels and different elements, whether social, cultural, economic or political.

Integrated into development plans: This strategy is part of urban development plans. Disasters are likely to happen anywhere, so they need to be considered when preparing any future development plans.

Sustainability: This strategy achieves sustainability, can re-run the wheel of life and sustains itself, and strengthens communities in the face of disasters.

Flexible: Adjustable and fast adaptations with the latest developments and changes on the ground. [18] (see Figure 1)

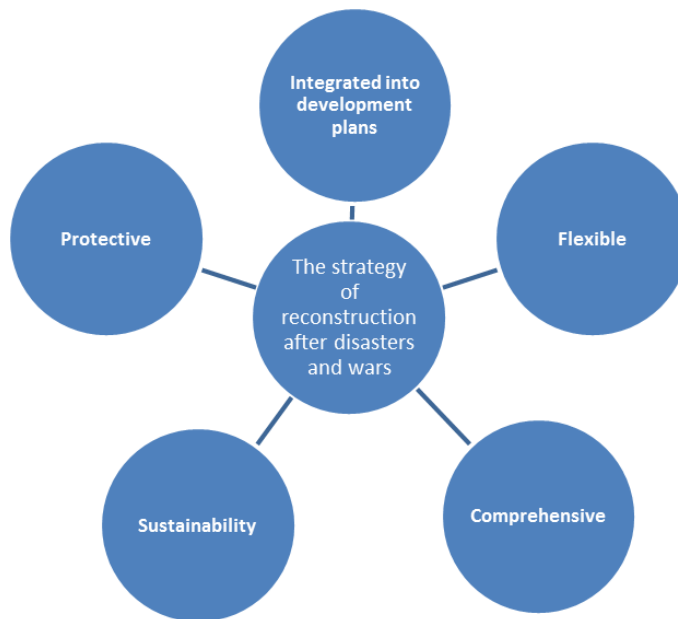


Figure 18 –Strategy for post-disaster reconstruction

Source: author, [18]

4.1 Preparation and implementation a reconstruction strategy

The process of preparing a reconstruction strategy includes a set of processes to be carried out in different stages of time, to transfer the strategy from the theoretical level to the level of implementation on the ground and the most important of these operations:

- **Policy making:** It is prepared in the pre-disaster phase.
- **Organization:** These operations are also carried out in the pre-disaster period, as these operations are part of the preparedness and prevention procedures.
- **Implementation and modification:** These operations are carried out after the disaster or the war.
- **Evaluation and follow-up:** It is an ongoing process, mainly in the post-implementation phase, operations are evaluated and lessons are taken to modify policies, avoid errors and improve performance [18]

4.2 Stages of disaster management and reconstruction

The stages of disaster management and reconstruction are three stages: pre-disaster, during-disaster and after disaster. (see Figure 2)



Figure 19 – Stages of disaster management and reconstruction

Source: [19]

Pre-disaster

This is the most important phase of the disaster management and reconstruction strategy. Where information is collected, expectations and potential scenarios are developed. Based on this information, policies, plans, strategies and roles are developed to prepare, prevent and mitigate the impact of disaster or war.

Preventative measurements (prevention): Are measures taken to prevent disaster or war. Some disasters can be prevented while others cannot.

Preparation (Preparedness): Action is taken to respond quickly and systematically in the event of disasters and wars. These procedures are based on projections, studies and utilization of past experiences. These include effective disposal during and after disasters and wars. These operations cover the establishment of an emergency operations center, and storage of necessary materials, and prepare plans to provide food and drink, developing search and rescue mechanisms and assessing damage and needs. [20], [19]

During the Disaster

Urgent relief: Is the period immediately following disasters and wars, in which attention is paid to the assessment and provision of the basic needs of the people, the rescue and tracing operations, and the assessment of losses and damage, in which information is collected to adjust the policies and plans, to correspond with the new data on the ground, The local community, which carries out rescue operations and initial assistance after the disaster and then reach the trained technical teams and experts from local government departments such as civil defense or firefighting equipment. These efforts may be supported by some non-governmental organizations, especially relief efforts and providing people with basic needs. After 24 hours, international aid teams begin to arrive.

Rescue: It usually begins during wars and disasters and continues to end the war. It may last days, months or years depending on the circumstances. [18]

After the Disaster

Rehabilitation (recovery): At this stage, all aspects of normal life begin to be restored. This phase generally begins at the end of the relief phase and may last for several years. At this stage, some critical decisions are made, and detailed plans are drawn up based on the actual data collected from the reality, not as the first stage, in which plans were made based on expectations and similar studies.

Comprehensive reconstruction: Reconstruction projects (housing construction and rehabilitation of the physical environment) are being carried out at this stage. The process of monitoring and evaluation of all reconstruction projects is carried out, in which information is collected, strategies are adjusted and new plans are prepared and constructed. In this way, the stage of reconstruction overlaps with the pre-disaster phase of the future. This period requires a long period because it essentially means restoring the natural life of the rotation in the disaster area. This phase includes short- and long-term reconstruction (see Figure 2). [18] [20], [19]

4.3 Examples of recovery

Our example is the war in Beirut, Lebanon. (Haret Hreik) at 2006.

Haret Hreik is a mixed Shia and Maronite Christian municipality, in the Dahieh suburbs, south of Beirut, Lebanon. It is part of Baabda District. Once an agricultural village, Haret Hreik lost its rural identity due to the wave of refugees from Southern Lebanon who settled in the town and made it another urban neighborhood of Dahieh. Haret Hreik is located northeast of the Beirut–Rafic Hariri International Airport and north of the towns of Laylake and Bourj el-Barajneh, west of Hadath and south of Chyah.

The town is the head-quarters of the Shi'ite group Hezbollah. Israeli warplanes destroyed the headquarters and civilian homes on July 2006.

Results of July war 2006

Damage to the residential, commercial and environmental infrastructure According to municipal statistics, approximately 265 buildings were destroyed or damaged for severe damage, it has destroyed about 3,199 housing units and 1,610 commercial units. In general, more than 20,000 people have lost their homes, they became homeless.

The principles of reconstruction

- to secure the fastest possible redistribution of displaced persons within the geographical area of their residence to maintain on the social fabric that existed in the region before the war.
- Improving the quality of public spaces, providing public spaces as a right to the community and as an urgent need the environment is inhabited by people with low incomes.
- the balance between the movement of vehicles and the need of pedestrians.
- Provide access to adequate lighting and ventilation in residential units Special.
- Provide sufficient space for parking of the private sector through the arrangement of options Corner in residential and commercial neighborhoods.
- Making reconstruction a collaborative effort between the public sector, which has a supportive role for the public space, and among the population and staff who should undertake the task of reconstructing private buildings.
- To rely on simple and easy to use approaches in planning, so the projects will be completed.
- Or institutional schemes that have been put in place, a challenge where the intervention service is possible and their extent, to become the same size that the community can easily deal with.

strategy of the disaster management and the recovery

- Evaluation for all the damages and losses
- Provide the mobile health care and facilities
- Provide the shelters for the people who they lost them homes
- Rebuild the infrastructure and environmental infrastructure
- Rebuild the housing units and institutions
- Rebuild the commercial unites

4.4 Learned lessons

- The importance of the participation of civil society, especially specialists, in stimulating debate and contributing to the preparation of strategies.
- The importance of working on the preparation of maps and studies conscious and high responsibility considers past, present and future and include the human needs of social and cultural as well as material needs.
- Analyze previous problems and then find solutions to them in the planning process and new reconstruction processes.
- The importance of working on the preparation of studies and strategic analysis to identify opportunities and strengths to benefit from them, and identify threats and vulnerabilities, to avoid the negatives and errors in the new reconstruction.
- To prepare a structure for reconstruction that would serve as guiding principles in its overall framework for comprehensive reconstruction operations that would take care of all aspects.
- To manage the processes of re-implementation to achieve the greatest efficiency in the shortest time to alleviate the suffering of the people and not to drop the psychological, social and cultural needs (due to lack of time and work pressure).

5 Overview and evaluation of available data sources

The aim of this thesis is the evaluation of available data sources and to design the data set that would help redevelopment and recovery of the regions and countries affected by a forced conflict. As a study case, I have chosen Yemen.

Just a few short years ago, Yemen was judged to be among the poorest countries in the world, ranking 154th out of the 187 nations on the U.N.'s Human Development Index. One in every five Yemenis went hungry. Almost one in three was unemployed. Every year, 40,000 children died before their fifth birthday, and experts predicted the country would soon run out of water

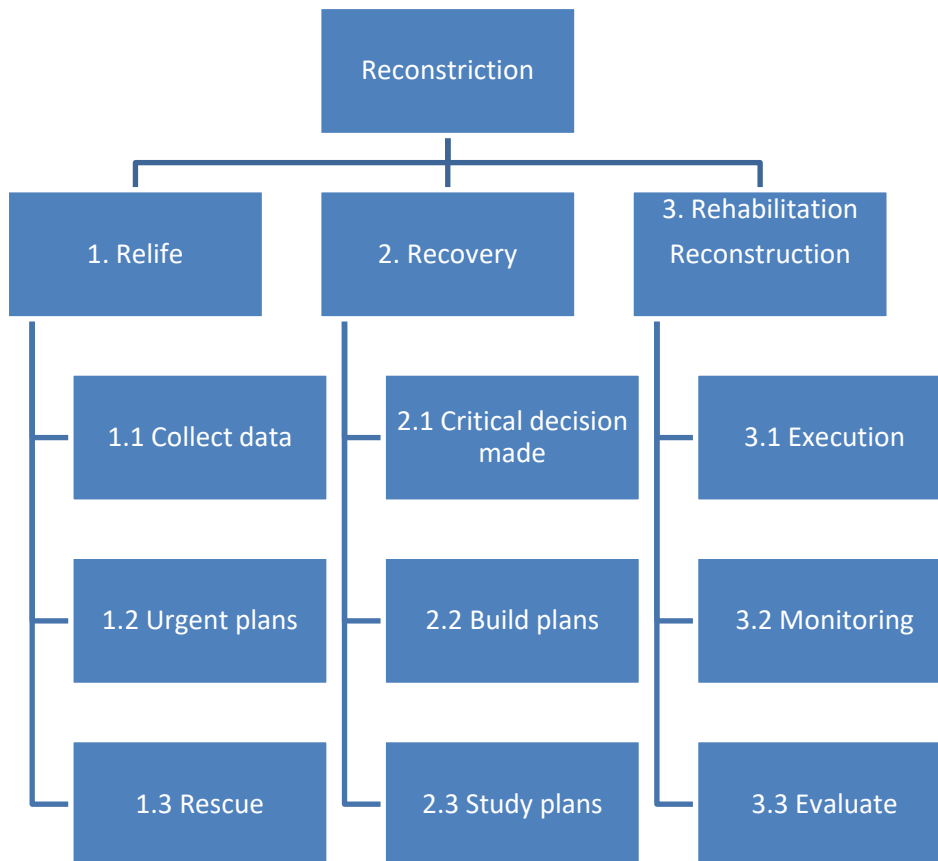
Such was the dire condition of the country before Saudi Arabia unleashed a bombing campaign in March 2015, which has destroyed warehouses, factories, power plants, ports, hospitals, water tanks, gas stations, and bridges, along with miscellaneous targets ranging from donkey carts to wedding parties to archaeological monuments. [21]

Thousands of civilians — no one knows how many — have been killed or wounded. Along with the bombing, the Saudis have enforced a blockade, cutting off supplies of food, fuel, and medicine. A year and a half into the war, the health system has largely broken down, and much of the country is on the brink of starvation [21]

5.1 Model for reconstruction after disaster



Figure 20 – Model for reconstruction after disaster



Source: Author [19]

Relief: this stage taken immediately following disasters and wars

- Collect data and information about losses and damage.
- Make urgent plans correspond with new data in the ground.
- Rescue usually begins during wars and disasters and continues to end of the war and It may last days, months or years depending on the circumstances.

5.2 Data collection and Data sources

The data were gathered from online sources: the Office Coordination of Humanitarian Affairs (OCHA) which lead by ReliefWeb [11], from the world report for 2017 by the Human Rights watch [15], live maps for a map [22] and country economy [23], the Central Intelligence Agency (CIA) [16]. The data should contain the seven core capabilities necessary for mitigation to be successful (see Case study 3.6):

- Threats and hazard identification
- Risk and disaster resilience evaluation
- Planning
- Public information and warning
- Community resilience
- Long-term vulnerability reduction
- Operational coordination

Table 2 - Types of data in different stages

No	Stages	Types of data
1	PreDisaster	Geographic, Demographic, Economy, Social, Infrastructure, Institution, Victims, IDPs, Damage & Loss Assessment, Need Assessment
2	Emergency Relief	Numbers & Distribution of IDPs & temporary shelters
3	Early Recovery	Shelters, basic infrastructures, social services, basic livelihoods, facilitation
4	Rehab. & Recons.	Housing, infrastructures, social, local economy, institution, water network, electricity network, Waste management, communications, bridges, roads and railways, Etc.
5	On-site Rehab.Recon.	Identification of Household, rehab location, risk mitigation, financing, time-frame
6	Relocation	Ident. of Household, location preparation, risk mitigation, financing, time-frame
7	Better Livelihood	Applying Disaster Mitigation & Risk Reduction for Better Settlement & Livelihood

Source: Author [19]

Health facilities: Evaluation of the health facilities corresponding to the highest number of people in need and acute need is in the health sector. The health problem should be immediately to be deal with because it has a higher urgency

The data may include:

- Identification of health care needs that can no longer be met with community resources due to the disaster.
- Assessment of disaster-related structural, functional, and operational impacts to health care facilities (e.g., hospitals, clinics, nursing homes, assisted living centers, blood banks, dialysis centers, substance abuse treatment facilities, poison control centers, medical and dental offices).
- Evaluate the disaster regarding to the structural, functional, and operational impacts to health facilities and programs.
- Development of consistent messaging and guidance concerning stress management and strategies.
- Identification of public health threats in sheltering, potable water and wastewater that can cause or exacerbate negative environmental health outcomes.
- Evaluate of disaster regarding to the structural, functional, and operational impacts to social and public services facilities (as example, community congregate care, child care centers, Head Start centers, senior centers, homeless shelters).

Table 3 - List of damaged health facilities in governorates of Yemen, page 24

Name of cities	Totally destruction	Partially destruction	Population
Abyan	1	2	556000
Aden	2	6	894000
Albayda	1	1	744000
Al Jawf	1	3	576000
Al Dhale'e	2	0	698000
Al Mahwit	1	2	677000
Al Maharah	0	0	144000

Al Hudaydah	3	2	3097000
Amant Alasima	1	13	2821334
Amran	3	3	1039000
Dhamar	2	2	1862000
Hadramaut	0	0	1384819
Hajjah	14	6	2072000
Ibb	1	4	2778000
Lahjj	2	1	961000
Raymah	0	0	614181
Marib	4	1	328707
Sa'ada	23	1	1044000
Sana'a	6	7	1405666
Shabwah	5	1	619000
Taizz	7	1	3116000
Total	79	56	27431707

Source: Author [15]

Table 3 is showing in total and detailed numbers of totally or partially destruction of health facilities affected by conflict in governorates of Yemen.

From the data in table show that the most damaged health facilities are in Sa'ada 23 hospitals were total destroyed and 2 partially destroyed, in Hajja 14 hospitals were total destroyed and 6 partially destroyed and Taizz 7 total destroyed and one partially destroyed.

Foods and shelters: The number of people in needs for food followed by water and shelters. Include

- Housing recovery strategies developed pre-disaster.
- Research results related to the disaster recovery housing area.
- Initial impact evaluation post-disaster.

Infrastructure: (water network, electricity network, Waste management, communications, bridges, roads and railways, Etc.).

Data should include:

- Identification of critical facilities
- Considerations belong to infrastructure to reduce pre-post-disaster.
- Development of public engineering services to reduce risks from disasters and expedite recovery;

Economic and Public services: Evaluation of the educational sector, industrial and agricultural sector, trades sector and the transportation sector, postal service, banks, public library, public security, environmental protection and Urban planning. Include

- Establishment of a process for information sharing and coordination to better leverage the delivery of available resources.
- Incorporation of mitigation measures into redevelopment following a disaster to assist the community to minimize future risk.
- Disaster-related opportunities (e.g., chance to innovate, bring in new industries, create green spaces, and revise economic development strategy based upon lessons learned).
- Development of new strategies for quickly adapting to changed local market conditions, reopening businesses, and/or establishing new businesses.

Table 4 - people acute in need vs. in need analysis

People in need	Acute in need	In need
Health	8.8 M	14.8 M
Housing and Infrastructures	8.2 M	14.5 M
Food	7.4 M	14.1 M
Education	1.1 M	2.3 M
Economic and Public services	N/A	N/A

Source: Author, [15]

As shown in table above (table 4) according to the analyzes, that the highest number of people in need and acute need is in the health sector, after that the biggest need is for water followed by food and shelter. These are physiological needs of people and all have significant importance. However, the health problem should be immediately being dealt with because it has a higher urgency and increasing and because we don't want people to suffer from illnesses, especially from contagious diseases that threatens the entire population of Yemen.

Given the prior analysis, health care facilities are the number one priority to start reconstruction with.

Recovery: at this stage, all aspects of normal life begin to be restored

- Critical decision made.
- Build plans based on the actual data collected from the reality.
- Study plans in which plans were made based on expectations and similar studies.

5.3 The Process of Post-Disaster Recovery

The process of recovery is a major aspect of disaster, and its management greatly impacts citizens. Such catastrophes disrupt lives and businesses, as people await assistance, infrastructure repair, and the return of their neighbors. Management of recovery matters because the aftereffects of disasters extend over time. Many people survive the initial disaster but then suffer from the recovery as the economy stagnates, social networks weaken, and health care and support services decline. The physical recovery from disasters takes many years and the psychological scars can last for decades.

Post-disaster reconstruction can offer opportunities for betterment and for fixing long-standing problems:

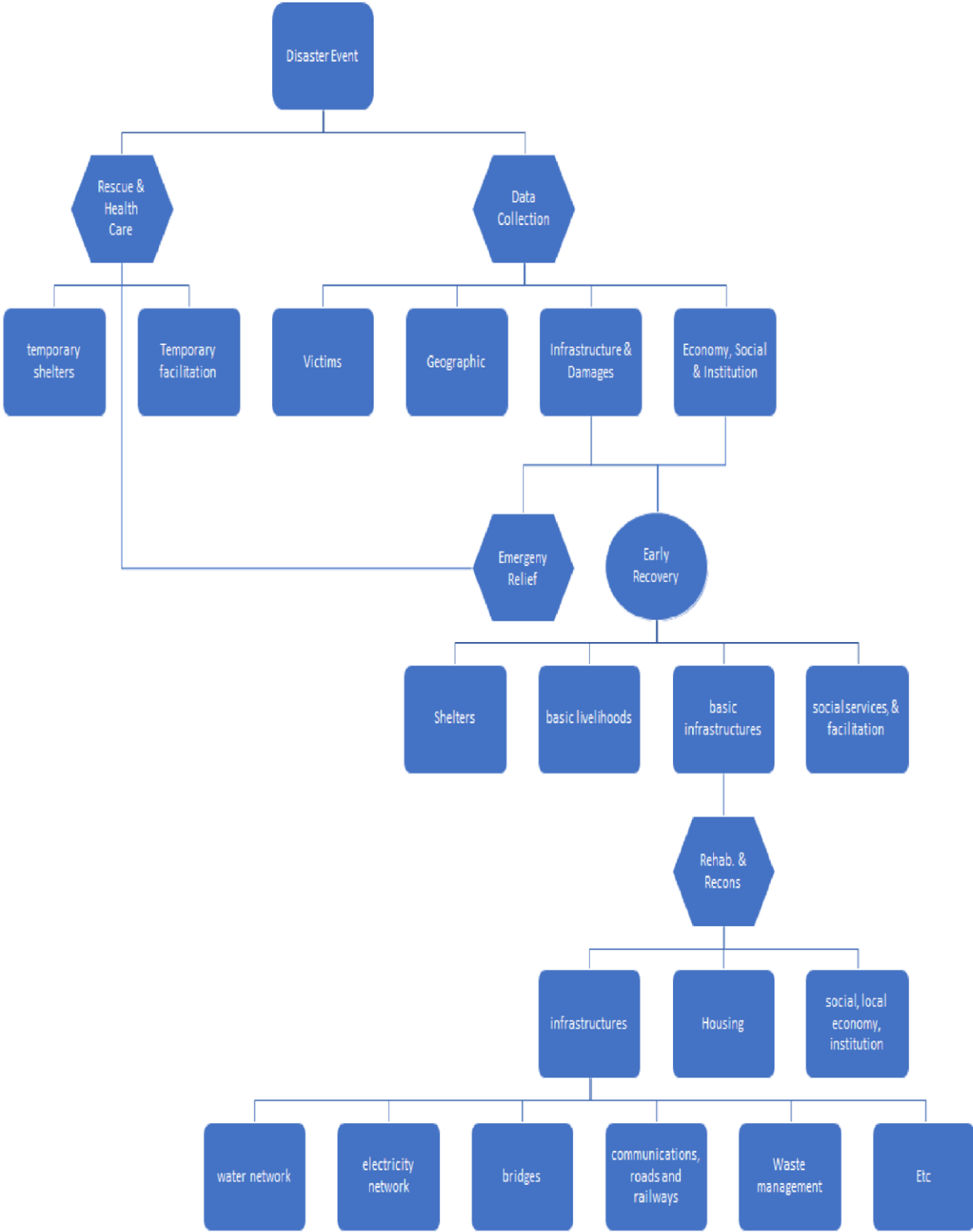
- Renew infrastructure
- Create new land-use arrangements
- Improve construction and design standards.
- Reinvent economies, and improve governance.

Reconstruction can present a chance to reduce the effects of future disasters by improving construction quality, avoiding hazardous locations, and improving community awareness and preparedness.

- **Rehabilitation & Reconstruction:** at this stage reconstruction projects are being carried out
 - Execution for all plans were taken in the previous stage.
 - Monitoring of all reconstruction projects (information collected, strategies are adjusted, new plans are prepared and constructed).

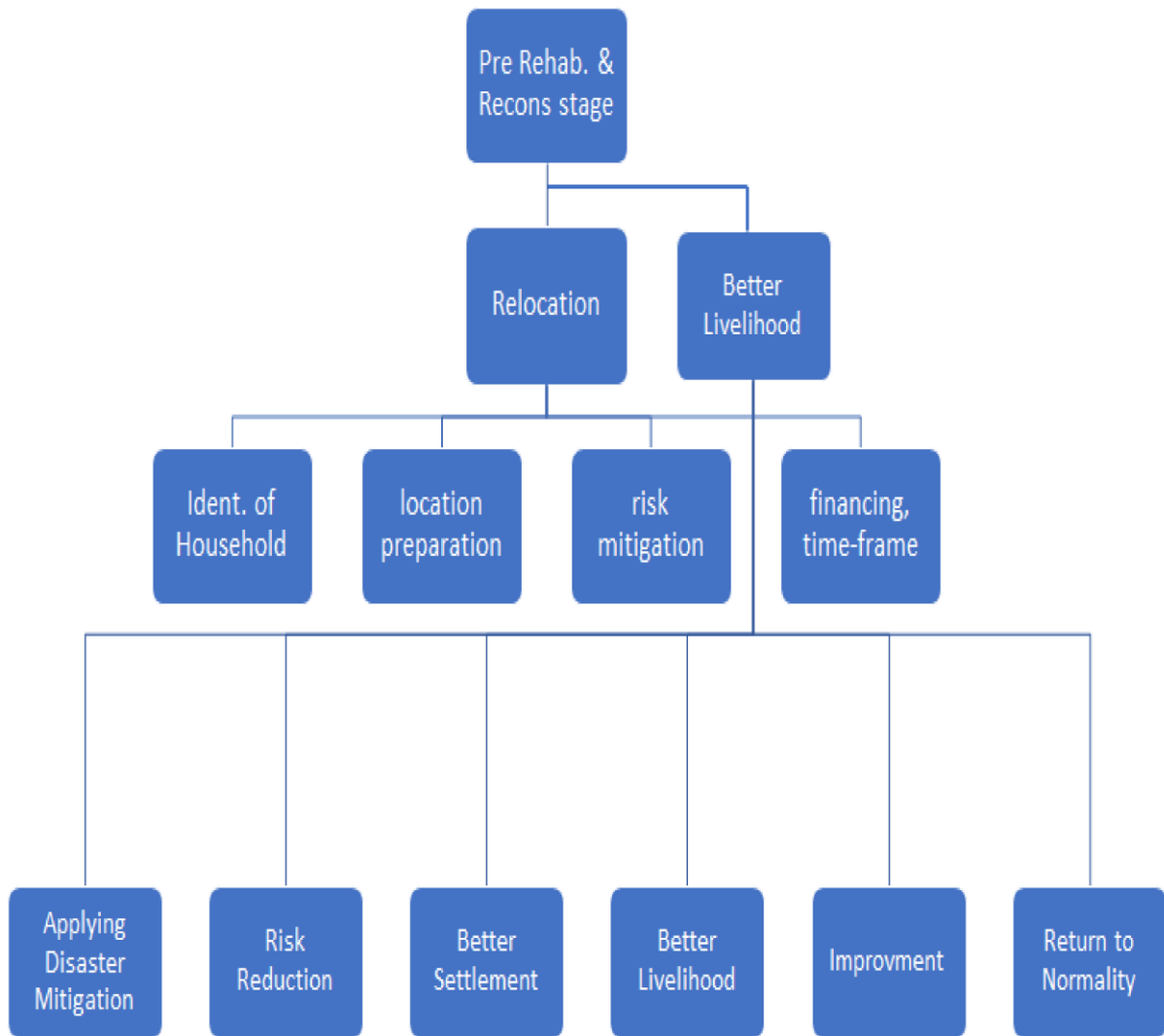
5.4 Schemes of data set suitable for reconstruction of a conflict-affected area

Figure 21 - schema of the stage for the rehabilitation & reconstruction post-disaster & war.



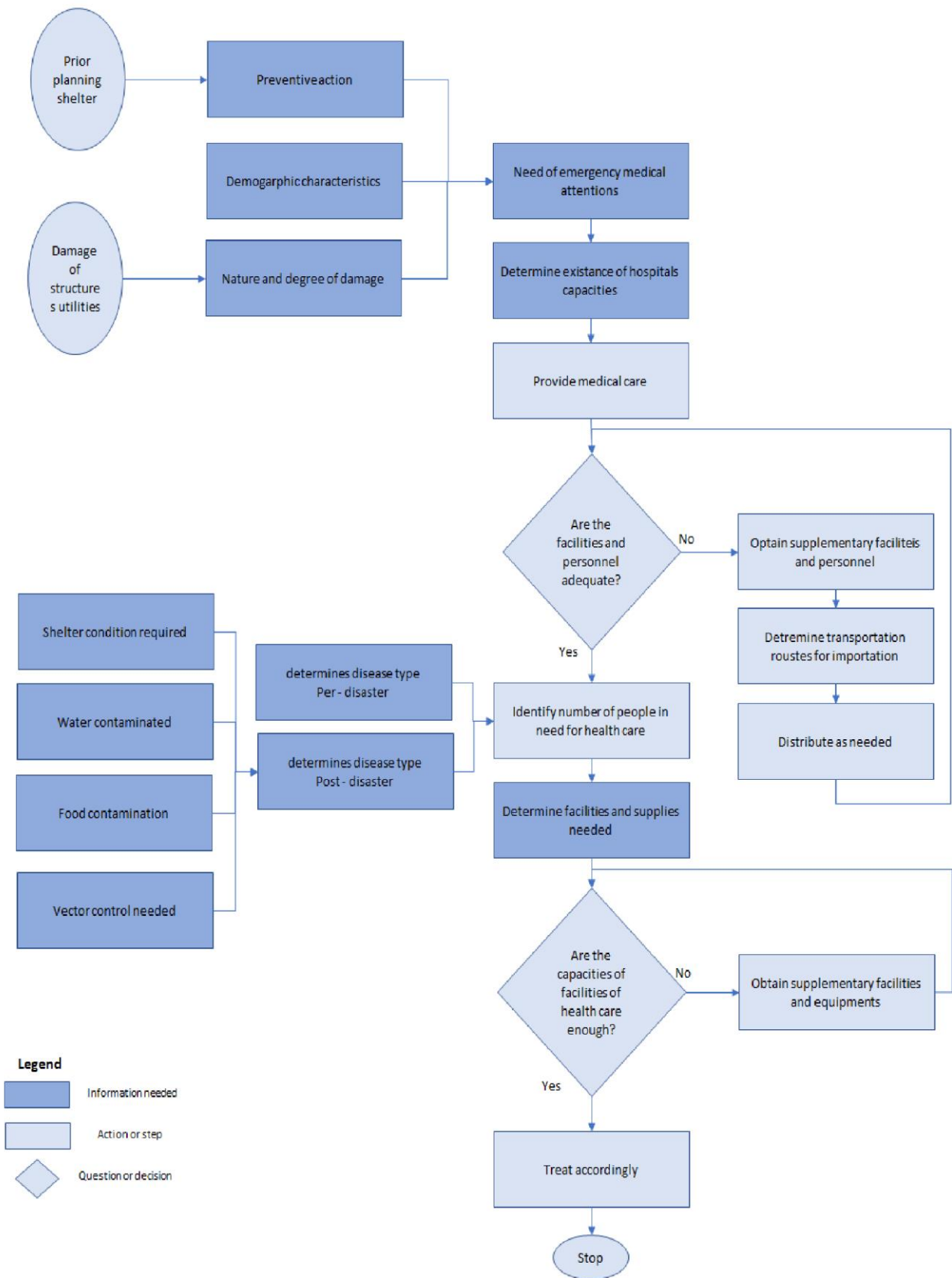
Source: Author

Figure 22 - schema of action pre- rehabilitation & reconstruction post-disaster & war.



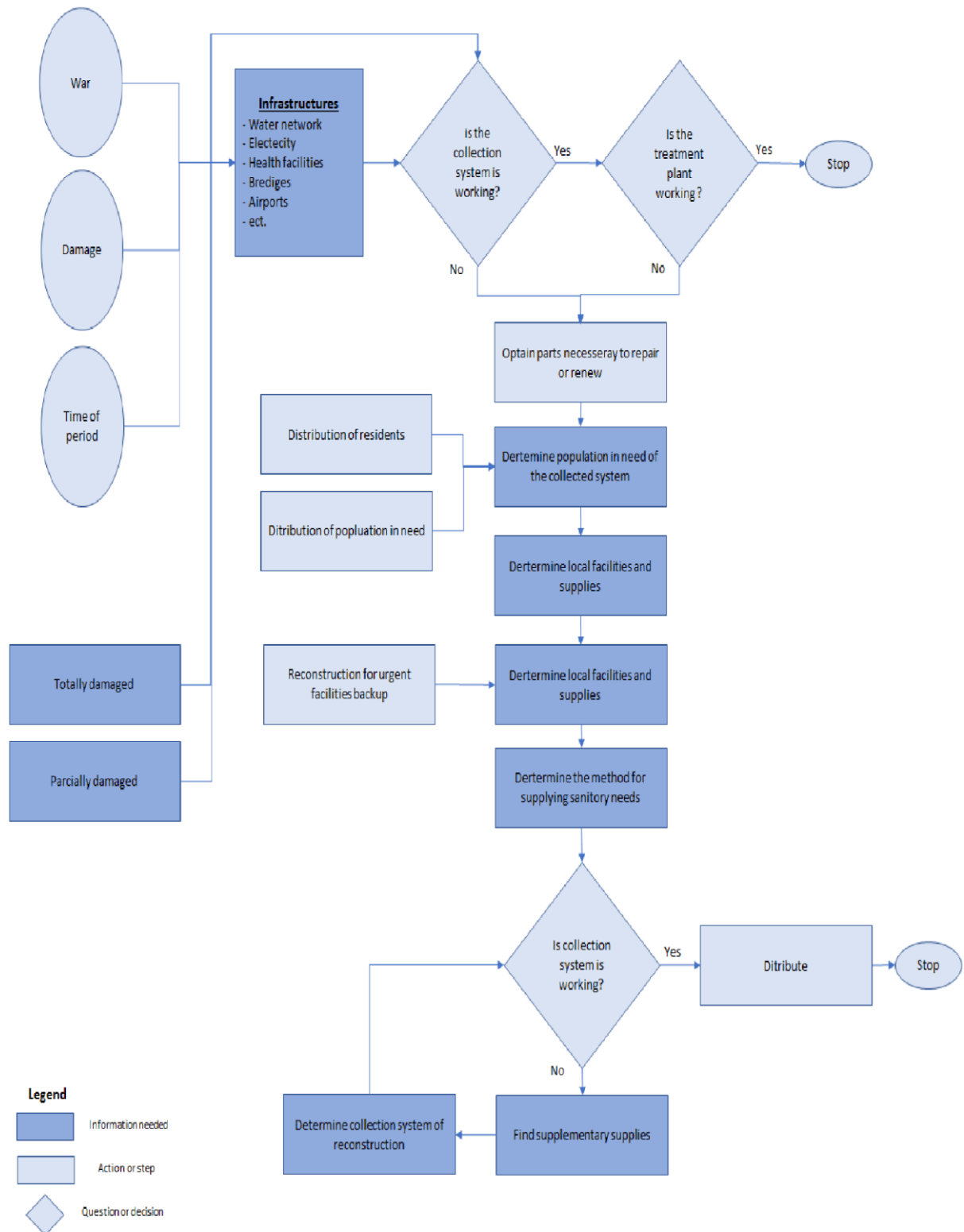
Source: Author

Figure 23 - schema of the reconstruction of health care post-disaster and war.



Source: Author

Figure 24 - schema of the reconstruction of infrastructures post-disaster and war



Source: Author

5.5 Evaluate model

According to our model the evaluation process comes later in the process. First data and information is collected, some urgent things are taken care of to create relief, studies must take off to make plans for redevelopment. After that, the reconstruction and rebuilding can start. While the redevelopment takes place and plans are finally in the implementation phase, cross checks must be carried out during and after implementation.

If the results will not be satisfactory and do not match its requirements, then it is necessary to make some analysis and evaluations, to take corrective actions. The final evaluation must be done after the model is implemented completely and tested for consistency and the results should be saved for future needs.

Nevertheless, the evaluation process is done when the model is implemented first. For our current situation evaluations cannot be carried out as the war is still ongoing and no implementations will be carried out before the war is over.

6 Conclusion

This thesis is describing the war and emphasize the destruction either totally or partially due to the massive attacked important infrastructure in Yemen. However, the aim of thesis is how the reconstruction will be built up upon methodical instruction: Define problem, collect data, analyze data, build model and evaluate model.

The aim of this thesis was to evaluate the available data sources and to design the data set that would help to redevelopment and recover the regions and countries affected by a forced conflict, such as Yemen, to help development after the war stops to know where to start the redevelopment of the country and to have a clear idea where needs more attention and what are the priorities when it come to the reconstruction of key sectors of the economy of the country.

Literature review provided us with a clear understanding of the geographical as well as the demographical information about Yemen, also some economic indicators to know the economic performance of the country. Unfortunately, some very much appreciated data was not available. This is mostly because there are almost no official government information and statistics about the country since the war started, nevertheless some useful data and information were found throw international repositories and organizations such as CIA and OCHA (Office for the Coordination of Humanitarian Affairs), which are considered as reliable sources.

In this work, data was collected from reliable sources and analyses were made to find out where to start reconstruction after the war in Yemen. For this purpose, the findings were compared between cities and different key sectors to find out which sector and in which city immediate actions are required.

According to the key sectors, the highest number of people in need and acute need belongs to the health sector as many health facilities are destroyed partially or totally; after that the biggest need of the people is the need for clean water and sanitation, followed by people's need for food and shelter, and the last but not the least education as their facilities were destroyed or damaged.

The most damaged health facilities are in the city of Sa'ada (23 hospitals were destroyed completely and 2 hospitals were partially destroyed), and then in the city of Hajja (14 hospitals were destroyed completely and 6 hospitals were partially destroyed), and in Taizz 7 hospitals were destroyed completely and one was partially destroyed.

Based on these findings and the information that are demonstrated in tables 2 and 3, we can conclude that the priority to relief and recover, reconstruct and rebuild is in the health sector and then clean water sources, and especially in the governorate of Sa'ada which had severe damages.

However, it is very important to note that the war is still not over and some of these numbers and indicators might change and therefore the priorities will change accordingly as well. Nevertheless, this thesis could be a nice guideline to define the priorities for the redevelopment of the country after a disaster such as the ongoing forced war.

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Appendix



process map flow
chart thesis.xlsx

No.	Date	Name of Health Facility	Location	Damage
1	27 Mar 2015	48 Namoothiji Hospital	Hizair, Sanaa	Total Destruction
2	27 Mar 2015	48 Namoothiji Hospital	Sanhan, Sanaa	Total Destruction
3	31 Mar 2015	Medical Compound/Center	Yarim, Ibb	Total Destruction
4	1 Apr 2015	Adra Hospital	Hajjah	Total Destruction
5	2 Apr 2015	Darim Hospital	Monnabbih, Saada	Total Destruction
6	5 Apr 2015	Al Noor Civil Hospital	Razih, Saada	Partial Destruction
7	12 Apr 2015	Sirwah Hospital	Sirwah, Maarib	Total Destruction
8	12 Apr 2015	48 Namoothiji Hospital	Sanaa	Total Destruction
9	16 April 2015	Rahmah Hospital & Compound	Saada	Total Destruction
10	19 Apr 2015	Health Unit - Sirwah	Sirwah, Maarib	Total Destruction
11	20 Apr 2015	Al Tiryaaq Pharmacy	Faj Attan, Sanaa	Partial Destruction
12	20 Apr 2015	Dr. Nabil Hajar Dental Center	Faj Attan, Sanaa	Partial Destruction
13	20 Apr 2015	Al Thahabi Specialist Hospital	Faj Attan, Sanaa	Partial Destruction
14	20 April 2015	Saudi German Hospital	Faj Attan, Sanaa	Partial Destruction
15	1 May 2015	Al Safa Hospital	Harad, Hajja	Total Destruction
16	1 May 2015	Ibn Al Haytham Hospital	Harad, Hajja	Total Destruction
17	1 May 2015	Maydani Hospital	Dimnat Khadir, Taiz	Total Destruction
18	9 May 2015	Al Qufila Hospital	Amran	Total Destruction
19	9 May 2015	Al Saqee Hospital	Taiz	Total Destruction
20	9 May 2015	Shabwa Hospital	Ataq, Shabwa	Total Destruction
21	9 May 2015	Ataq Hospital	Ataq, Shabwa	Total Destruction
22	11 May 2015	Health Unit	Haydan, Saada	Total Destruction
23	11 May 2015	Um wa Altifl Hospital	Alsafia, Amanat	Partial Destruction
24	11 May 2015	Althawra General Hospital	Azal, Amanat	Partial Destruction
25	11 May 2015	Alnasser Hospital	Alsafia, Amanat	Partial Destruction
26	11 May 2015	German Hospital	Alsafia, Amanat	Partial Destruction
27	11 May 2015	Military General Hospital	Azal, Amanat	Partial Destruction
28	11 May 2015	Al Thawra Hospital–External Clinics	Azal, Amanat	Partial Destruction
29	22 May 2015	Al Shurta Al Qadeem Hospital	Hadda, Sanaa	Partial Destruction
30	25 May 2015	Al Majma Al Sihi	Bani Hushaish, Sanaa	Partial Destruction

No.	Date	Name of Health Facility	Location	Damage
31	26 May 2015	Health Unit - Saqayn	Saqayn, Saada	Total Destruction
32	26 May 2015	Merkiz Al Ghaseel Alkilawy	Harad, Hajja	Total Destruction
33	26 May 2015	Al Merkiz Alsihi – Al Isha	Al Isha, Amran	Total Destruction
34	27 May 2015	70 Lilamooma wa Al Tafoola Hospital	Sabeen, Amanat	Partial Destruction
35	27 May 2015	Health Unit – Al Malaheedh	Al Malaheedh, Saada	Total Destruction
36	27 May 2015	Dhamar General Hospital	Dhamar, Dhamar	Partial Destruction
37	29 May 2015	Al Majma Al Sihi	Bani Hushaish, Sanaa	Total Destruction
38	29 May 2015	Al Jamhoori Hospital	Hajja, Hajja	Partial Destruction
39	30 May 2015	Mustawsif Al Talh	Al Talh, Saada	Total Destruction
40	1 Jun 2015	Al Noor Hospital	Osaifera, Taiz	Partial Destruction
41	3 Jun 2015	Dhamar General Hospital	Dhamar	Partial Destruction
42	5 Jun 2015	Al Maahed Al Sihi – Health Inst.	Ataq, Shabwa	Total Destruction
43	5 Jun 2015	Ataq Al Jadeed Hospital	Ataq, Shabwa	Partial Destruction
44	6 Jun 2015	Merkiz Bakil Al Mir Al Sihi	Bakil Al Mir, Hajja	Partial Destruction
45	6 Jun 2015	Al Merkaz Al Sihi	Hajja	Total Destruction
46	8 Jun 2015	70 Lilamooma wa Al Tafoola Hospital	Sabeen, Sanaa	Total Destruction
47	9 Jun 2015	Al Ordhi Hospital	Bab Al Yemen, Sanaa	Partial Destruction
48	10 Jun 2015	Mustafa Abdulla Al Aghseb Clinic	Amran	Partial Destruction
49	13 Jun 2015	General Hospital	Lahj	Total Destruction
50	13 Jun 2015	Health Center	Lahj	Total Destruction
51	21 Jun 2015	Health Center	Abs, Hajja	Total Destruction
52	25 Jun 2015	Health Unit	Al Dhaher, Saada	Total Destruction
53	25 Jun 2015	Health Unit	Saada	Total Destruction
54	25 Jun 2015	Haradh Hospital	Haradh, Hajja	Partial Destruction
55	26 Jun 2015	Health Center – Al Jaamala	Jaamala, Saada	Total Destruction
56	26 Jun 2015	Alreefi Hospital	Hodeida	Partial Destruction
57	1 Jul 2015	Health Unit	Al Nadhair, Saada	Total Destruction
58	6 Jul 2015	Health Unit	Barakan, Saada	Total Destruction
59	6 Jul 2015	Health Unit	Al Jedaan, Maarib	Partial Destruction
60	6 Jul 2015	Health Unit	Sirwah, Maarib	Total Destruction

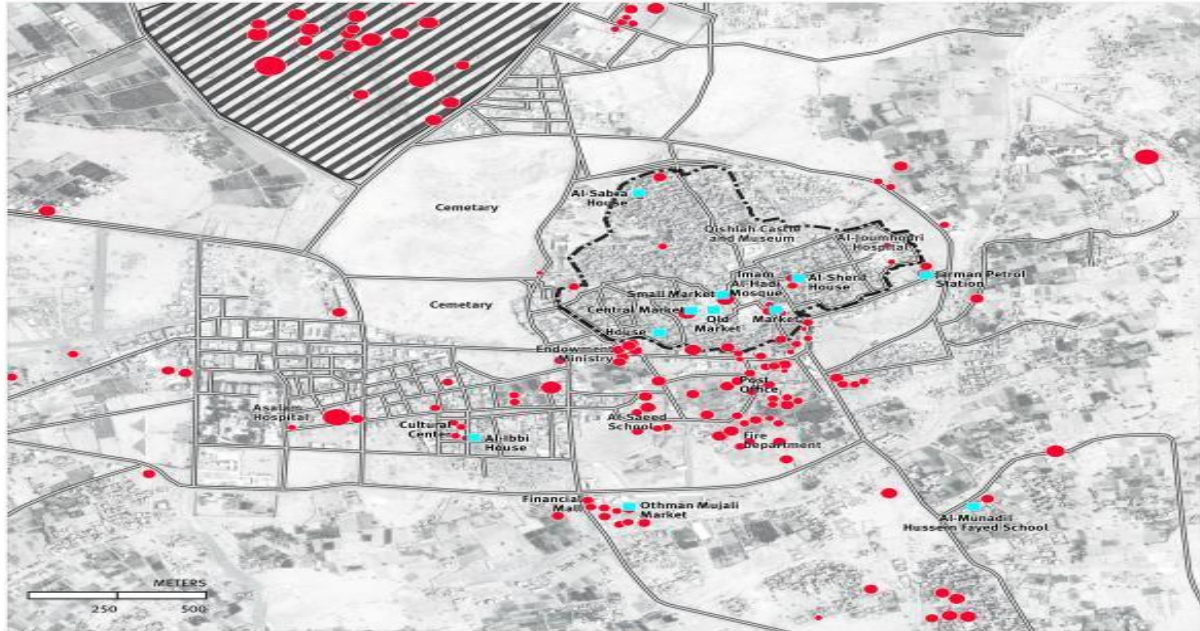
No.	Date	Name of Health Facility	Location	Damage
61	7 Jul 2015	Haradh German Hospital	Haradh, Hajja	Partial Destruction
62	11 Jul 2015	External Clinics of Military Hospital	Sawan, Amanat	Partial Destruction
63	12 Jul 2015	Medical Residential Compound	Haradh, Hajja	Total Destruction
64	13 Jul 2015	Health Unit	Al Ishma, Amran	Partial Destruction
65	14 Jul 2015	Medical Center	Al Ishma, Amran	Partial Destruction
66	14 July 2015	Haradh Hospital	Haradh, Hajja	Partial Destruction
67	15 July 2015	Haradh Hospital	Haradh, Hajja	Total Destruction
68	16 Jul 2015	Medical Center	Munabih, Saada	Total Destruction
69	16 Jul 2015	Ba Suhieb Hospital	Al Tawahi, Aden	Total Destruction
70	22 Jul 2015	German Hospital	Haradh, Hajja	Partial Destruction
71	24 Jul 2015	Haradh Hospital - Premises	Haradh, Hajja	Total Destruction
72	25 Jul 2015	German Hospital	Ahim, Hajja	Total Destruction
73	26 Jul 2015	Ba Suhieb Hospital	Al Tawahi, Aden	Total Destruction
74	26 Jul 2015	Health Center	Mustaba, Hajja	Total Destruction
75	27 Jul 2015	Health Unit	Mustaba, Hajja	Total Destruction
76	4 Aug 2015	Health Unit	Baqim, Saada	Total Destruction
77	5 Aug 2015	Health Unit	Majez, Saada	Total Destruction
78	7 Aug 2015	Health Center for Malaria	Hees, Hodeida	Total Destruction
79	7 Aug 2015	Health Unit	Saqayn, Saada	Total Destruction
80	10 Aug 2015	Health Center – Bait Marran	Arhab, Sanaa	Partial Destruction
81	18 Aug 2015	Alreefi Hospital	Baqim, Saada	Total Destruction
82	19 Aug 2015	Baqim General Hospital	Baqim, Saada	Total Destruction
83	21 Aug 2015	Health Unit	Nihm, Sanaa	Total Destruction
84	22 Aug 2015	Al Hadheera Hospital & Compound	Mejzar, Maarib	Total Destruction
85	22 Aug 2015	Health Unit	Al Sawadiya, Al Baydha	Total Destruction
86	25 Aug 2015	Health Unit	Al Otayfayn, Saada	Total Destruction
87	26 Aug 2015	Health Center	Bait Al Faqeeh, Hodeida	Total Destruction
88	4 Sep 2015	General Hospital – Razih	Razih, Saada	Partial Destruction
89	4 Sep 2015	Al Ordhi Hospital	Old Sanaa, Amanat	Total Destruction
90	5 Sep 2015	Al Quds Hospital	Sabeen, Amanat	Partial Destruction

No.	Date	Name of Health Facility	Location	Damage
91	5 Sep 2015	Clinic	Shabwa	Total Destruction
92	6 Sep 2015	70 Lilamooma wa Al Tafoola Hospital	Sabeen, Amanat	Partial Destruction
93	6 Sep 2015	Haradh Hospital	Haradh, Hajja	Total Destruction
94	6 Sep 2015	German Hospital	Haradh, Hajja	Total Destruction
95	8 Sep 2015	Health Unit	Saada, Saada	Total Destruction
96	8 Sep 2015	German Hospital	Haradh, Hajja	Total Destruction
97	9 Sep 2015	Health Unit	Ghafera, Saada	Total Destruction
98	12 Sep 2015	Mogasi Hospital	Osalan, Shabwa	Total Destruction
99	16 Sep 2015	Health Center – Al Fas	Bakil Al Mir, Hajja	Total Destruction
100	19 Sep 2015	Al Sihab Hospital	Al Thawra, Amanat	Partial Destruction
101	19 Sep 2015	Health Unit	Saqayn, Saada	Total Destruction
102	19 Sep 2015	Al Ameen Medical Hospital	Al Thawra, Amanat	Partial Destruction
103	21 Sep 2015	Health Unit	Haydan, Saada	Total Destruction
104	21 Sep 2015	Military Hospital – External Clinics	Shaoub, Amanat	Total Destruction
105	22 Sep 2015	Sep 26 Hospital	Bani Matar, Sanaa	Partial Destruction
106	1 Oct 2015	Health Unit	Ghurban, Dhamar	Total Destruction
107	6 Oct 2015	Al Kandahi Hospital	Al Jahmaliya, Taiz	Total Destruction
108	9 Oct 2015	Al Thawra General Hospital	Hodeida, Hodeida	Partial Destruction
109	9 Oct 2015	Al Thawra Hospital Compound	Hodeida, Hodeida	Total Destruction
110	11 Oct 2015	Al Jamhoori Hospital – Eastern part	Al Jahmaliya, Taiz	Total Destruction
111	17 Oct 2015	Anees Medical Complex	Mokha, Taiz	Total Destruction
112	23 Oct 2015	Health Unit	Majez, Saada	Total Destruction
113	25 Oct 2015	Al Nasser Specialist Hospital	Bir Abeed, Amanat	Partial Destruction
114	26 Oct 2015	Haydan Hospital - MSF	Haydan, Saada	Total Destruction
115	9 Nov 2015	Health Center for Polio Vaccine	Sahar, Saada	Total Destruction
116	14 Nov 2015	Al Najjar Specialist Hospital	Demt, Al Dhale	Total Destruction
117	14 Nov 2015	Al Najjar Hospital Pharmacy	Demt, Al Dhale	Total Destruction
118	25 Nov 2015	Al Sarari Hospital	Dhubab, Taiz	Total Destruction
119	3 Dec 2015	Medical Clinic	Khadeer, Taiz	Total Destruction
120	4 Jan 2016	70 Lilamooma wa Al Tafoola Hospital	Sabeen, Amanat	Partial Destruction

No.	Date	Name of Health Facility	Location	Damage
121	4 Jan 2016	70 Lilamooma wa Al Tafoola Hospital	Al Safia, Amanat	Partial Destruction
122	10 Jan 2016	MSF Supported Hospital and Clinics	Razih, Saada	Total Destruction
123	11 Jan 2016	Government Hospital	Al Sawadiya, Al Bayda	Total Destruction
124	13 Jan 2016	Yemen International Hospital	Salah, Taiz	Partial Destruction
125	15 Jan 2016	Al Shaheed Saif Al Bawadi Hospital	Al Sawadiya, Al Bayda	Total Destruction
126	15 Jan 2016	Al Hayat Medical Center	Saqayn, Saada	Total Destruction
127	17 Jan 2016	MSF Supported Hospital & Clinics	Razih, Saada	Total Destruction
128	18 Jan 2016	Health Center	Baqim, Saada	Total Destruction
129	18 Jan 2016	Al Mahjar Medical Building	Mokha, Taiz	Total Destruction
130	23 Jan 2016	Health Unit	Harf Sufyan, Amran	Total Destruction
131	27 Jan 2016	Owmsan Medical Center	Sabeen, Amanat	Partial Destruction
132	27 Jan 2016	Basheer Anwar Alwan Dental Clinic	Sabeen, Amanat	Partial Destruction
133	28 Jan 2016	Almadina Alhadeeth Hospital Al Hada	Al Wihda, Amanat	Partial Destruction
134	28 Jan 2016	Maghrabi Hospital	Al Wihda, Amanat	Partial Destruction
135	30 Jan 2016	Medical Emergency Clinic	Baqim, Saada	Total Destruction
136	15 Feb 2016	Regional Hospital	Haifan, Taiz	Total Destruction
137	21 Feb 2016	Dhubab Hospital	Dhubab, Taiz	Total Destruction
138	24 Feb 2016	Health Center	Bedbeda, Maarib	Total Destruction
139	2 Mar 2016	Health Center	Kishr, Ahim, Hajja	Total Destruction
140	3 Mar 2016	Midi Rural Hospital	Midi, Hajja	Total Destruction
141	3 Mar 2016	Health Center	Baqim, Saada	Total Destruction
142	13 Mar 2016	Yemen International Hospital	Salah, Taiz	Partial Destruction
143	26 Mar 2016	Al Matoon Hospital	Bab Al Mandeb, Taiz	Partial Destruction
144	27 Mar 2016	Dhubab Hospital	Dhubab, Taiz	Total Destruction
145	4 Apr 2016	Husn Shaddad Hospital	Zinjibar, Abyan	Total Destruction
146	12 Apr 2016	Health Center	Al Hoota, Lahj	Total Destruction
147	19 Sep 2016	Medical Clinic	Al Safra, Saada	Total Destruction
148	22 Sep 2016	Al Thawra Hospital	Bani Harith, Amanat	Partial Destruction
149	1 Oct 2016	Al Mahjar Al Baydari	Mokha, Taiz	Total Destruction

AIRSTRIKE LOCATIONS IN SAADA CITY, YEMEN
MARCH 29 – MAY 19, 2015

● Airstrike impact location ● Human Rights Watch report location - - - - Old City wall ▨ Military base



SOURCES: Air Strike locations: Human Rights Watch; Transportation: OSM; Satellite imagery: Pléiades-1; Satellite Image: © CNES 2015 / Distribution Airbus DS.



REUTERS





Saudi-led air strikes have destroyed parts of Sanaa's Old City, a Unesco World Heritage Site



