

FOOD SECURITY AND PROPER NUTRITION: A PUBLIC HEALTH AND HUMANITARIAN PRIORITY IN PRE- AND POST-CBRN EVENTS

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ABSTRACT

The use of chemical, biological, radiological, and nuclear (CBRN) agents during armed conflicts, as an act of terrorism or when accidents involve them, is a threat to any society. In recent years, the occurrence of different kind of disasters and emergencies has risen worldwide, resulting in large numbers of communities affected, causing victims, food crisis, refugees and people displaced. CBRN events can have devastating impacts on the four dimensions of food security (availability, access, utilization and stability) and health (morbidity and mortality patterns), impacting health services and living environment. As a direct result, impaired or jeopardized nutritional status of population is likely to occur, feeding a vicious circle of malnutrition and outbreaks of infectious diseases, ending into famine and mortality. When the access to and the use of natural resources – i.e. food, water, land – are restricted, people start to move to seek for safer environment and stability to survive, increasing the number of refugees and people displaced. Those vulnerable people are directly dependent of food aids, and much more exposed to food insecurity and outbreaks of infectious diseases, especially in crowded refugee camps. Ensuring proper nutrition, health services and secure environment after exposure to CBRN events is therefore a difficult task that needs consideration throughout the world. On the other hand, food access is a key aspect to conflict escalation and terrorism: famine and starvation create the basic conditions for discontent and extremism, increasing the risk of further CBRN attacks around the world. Food war includes the use of hunger as a weapon in active conflict, leading to food insecurity and increased need of humanitarian and health assistance. Therefore, the right to food access, secure and safe, and more generally to proper nutrition, is one of the public health and humanitarian priorities to be considered and not underestimated by CBRN advisors both pre-and post-CBRN events.

Keywords: CBRN events; food security; humanitarian aids; nutrition; public health.

1. INTRODUCTION

It is indisputable that after chemical, biological, radiological, and nuclear (CBRN) events, such as those occurring during armed conflicts, massive losses in all the aspects of a civil society occur (Ciparisse *et al.*, 2016; Malizia & 2013/2014 CBRNe Masters Group, 2016; Abate *et al.*, 2016). As a multi-dimensional phenomenon, food security is one of the first sectors affected. In 1996, during the World Food Summit, the Food and Agriculture Organization-FAO claimed that “food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. Countries affected by CBRN events especially during armed conflicts show higher levels of chronic and acute food insecurity and undernutrition: food production is disrupted through destruction and plundering of crops, livestock and food reserves; economic investments are discouraged; occupation is suppressed; food exchanges are interrupted; human capital is destroyed. These kinds of situations push food prices higher in both local and international markets. National military allocations inevitably draw investments away from sustainable development and redirect people from peaceful to destructive pursuits (Messer *et al.*, 2002). Most of the population become unable to meet their daily needs, due also to high food prices and food shortages. Those conditions can last even long after, especially when protracted armed conflicts occur, because assets have been destroyed, people killed or displaced, environment damaged, with health, education and social services shattered (FAO, 2002). In addition, food can be also used as a weapon against population. An example was Iraq, where in 2016,

production levels continued to fall as a large part of the cereal production belt was directly under the control of rebel forces, affecting access to agriculture inputs, cereal harvest and post-harvesting activities.

Beyond such devastation, the armed conflict directly impact on the supply of health services and can indirectly cause biological threats, such as epidemics of infections that spread through vulnerable populations. Many of the countries with internal conflicts experienced severe outbreaks of cholera in 2017, such as Yemen, Democratic Republic of Congo, South Sudan, Borno state in Nigeria and Somalia, which raised the levels of malnutrition. When displacements occur, it is more difficult to contain and treat diseases, which perpetuate the rise of malnutrition level in the population (FSIN, 2018).

On the other hand, food insecurity can be one of the root causes triggering and exacerbating conflicts and related consequences. As an example, the 2011 protests across North Africa and the Middle East were in part a response to higher food and energy prices (Perez, 2013). Protracted crises area are most likely in food insecurity area, generating a vicious cycle in which significant proportions of the population are acutely vulnerable to hunger, diseases and disruptions to livelihoods over prolonged periods. For example, 7 years of civil war in the Syrian Arab Republic have led to massive losses in all the sectors, from human capital to socio-economic drivers. FAO currently identifies 19 countries with a protracted crisis situation, with 14 of these being in this category since 2010. Almost all have experienced periods of low-intensity conflicts combined with periods of higher-intensity wars (FAO *et al.*, 2017).

Most of the time those countries do not have the capacity to respond alone to such massive emergencies (WHO, 1999), but request humanitarian assistance, defined as an emergency situation where significant external assistance and resources are required and where a multi-sectoral response is needed, with the engagement of a wide range of international actors and experts (IASC, 2007). In 2017, almost 124 million people across 51 countries and territories faced crisis levels of acute food insecurity and required urgent humanitarian actions, with specific regards for populations living in conflict area of north-east states of Nigeria, South Sudan, Somalia and Yemen (FSIN, 2018). The 2017 UN World Humanitarian report stated that 38 extremely violent political conflicts were ongoing in 2016, increasing the number of refugees and people forcibly displaced: 65.6 million people globally. Most of the world's refugees came from Afghanistan, Somalia, South Sudan, Sudan and Syria. The global number of internally displaced persons-IDPs (40.3 million) continued to be approximately double the number of refugees (22.5 million). Of these countries, the number of refugees from South Sudan increased the most, growing by 64% during the second half of 2016 (UNOCHA, 2017). It is estimated that displaced people spend an average of more than 17 years in camps or with host communities (Von Grebmer *et al.*, 2015).

Therefore, since a CBRN event can be both a direct or indirect threat to any civil society, CBRN advisors should not neglect that food security, proper nutrition, food aid and health services are the minimum essential standards to be ensured to the population in pre and post-CBRN events.

2. FOOD SECURITY IN POST-CBRN EVENTS

2.1 Problem Statement

The first short-term effect of a CBRN event during armed conflicts is loss in human lives. In 2016, 70% of deaths and injuries resulting from explosive weapons were civilian. In populated areas it reached 92%. The use of explosive weapons also results in explosive remnants of war (ERW), which pose a continuing lethal threat, and a major obstacle to reconstruction and the return of displaced persons. In 2016, 86% of deaths and injuries from mines and ERW were civilian (UNOCHA, 2017), but humanitarian aid workers are also exposed to the same risks. Despite the international humanitarian law prohibits attacks, harassment, intimidation and arbitrary detention of humanitarian relief personnel, the global number of aid workers killed, injured, assaulted and arrested increased in 2016 compared with 2015. In 2016, the greatest number of incidents of aid workers killed, injured or kidnapped occurred in Syria, with at least 132 documented incidents. Of the documented weapons used in incidents where aid workers got involved, the use of explosive weapons experienced the greatest increase between 2015 and 2016, moving from 38 to 133 incidents (UNOCHA, 2017). It is clear that attacks against aid workers indirectly affect access to health care

for civilians. Furthermore, in some armed conflicts, health and humanitarian facilities have become targets: clinics have been destroyed, access to hospital restricted, water treatment plants turned to rubble, vaccines and other lifesaving drugs intentionally blocked from reaching civilians. An example has happened in Syria and neighbouring countries where the onset of the civil war led to the complete deterioration of the health infrastructure through the wide destruction of facilities, the shortage in health care personnel and medicines, the lack of secure routes and transportation (Sharara & Kanj, 2014).

Simultaneously, a major emergency results in lack of adequate and safe food and proper nutrition. Impact can be direct (affecting directly food stocks and productive assets) or indirect (driven by economic, social, political and institutional changes). Food security can be threatened from short to long-term by disruption of normal livelihoods and workforce, limited delivery of health and nutrition services, discouragement of economic investments, dependence on emergency aids, displacement and rise in numbers of migrants in both neighbourhood and more distant countries. Access to food or relief foods starts to be scarce: crops can be destroyed and households' movement towards fields restricted, so that farmers are forced to relocate. This highly impacts on food production, trade and access (United Nations, 1993), especially when CBRN events occur in countries mostly based on agriculture. It crowds out normal economic activity such as food production, destroys infrastructure and cuts off access to food supplies, with blocking of food access often used as a tool of political terror (Messer *et al.*, 2002; Collier *et al.*, 2003). Within the households, purchasing power decreases, as well as access to water and fuel for cooking, negatively affecting food preparation, feeding practices and food allocation, all of which contribute to extreme acute food insecurity. Moreover, the increase in military spending and the domestic use of military force will lead to deterioration of food security (Scanlan & Jenkins, 2001).

In these precarious conditions of food shortage, the nutritional emergency suddenly occurs with impaired or jeopardized nutritional status of the population, increased risk of malnutrition and famine. In 2016, the prevalence of undernourishment in countries affected by conflicts was almost 4% higher than countries not affected by conflicts: 489 million out of a total of 815 million chronically undernourished in 2016. This difference is even more pronounced for children: almost 122 million of chronically under age five malnourished children live in countries affected by conflict, with 6% difference in average prevalence between conflict and non-conflict affected countries.

It is also important to consider that a CBRN event can occur accidentally in those emergency contexts, as direct consequence of poor public health strategy, response and services during armed conflict. Medical infrastructures are usually crippled, health system is paralyzed, and the access to facilities is restricted or when referring to crowded refugee camps, infectious diseases and outbreaks could spread quickly, becoming a threat both inside the country and across borders. The infectious diseases worsen even more the already compromised nutritional status of the people affected, with excessive mortality becoming almost inevitable. In Yemen, for example, the targeting of hospitals, clinics, water treatment plants, and sanitation facilities has caused the largest cholera outbreak in the world, with 5,000 new infections every day, more than 200,000 people infected, and 1,300 died before the end of 2017. Refugees and internally displaced persons are particularly vulnerable to risk of infectious disease outbreaks and epidemics, especially in crowded refugee camps with unhygienic conditions (Brinkman & Hendrix, 2011). For example, in the aftermath of the Rwanda crisis in 1994, outbreaks of cholera caused at least 48,000 cases and 23,800 deaths within one month in the Goma refugee camps in Congo.

2.2 The Role of CBRN Advisors

Throughout the last decades, International Organizations (World Health Organization-WHO, United Nations High Commissioner for Refugees-UNHCR, The United Nations Children's Fund-UNICEF, and World Food Programme-WFP) and several non-governmental organizations (NGOs, such as Medecins Sans Frontieres-MSF) have published manuals and guidelines to assist those concerned with preparing for emergencies (WHO, 1999; WHO, 2000; MSF, 1995). "Preparedness" requires that CBRN advisors have knowledge to be effectively ready and capable to respond to those disasters, by guaranteeing the minimum humanitarian and health standards for the affected population.

The Sphere Project Handbook (2001), launched by a group of NGOs, the Red Cross and Red Crescent movement, is a manual designed for humanitarian workers to respond to different situations including natural disasters, conflict, slow and rapid-onset events, rural and urban environments, and complex political emergencies in all countries. This handbook establishes minimum standards for delivering interventions in different contexts (including food and nutrition), with particular regards to the most vulnerable and exposed people, especially when displaced, and refugees. Early identification and caring of the most vulnerable group is in fact essential during first response. Safety nets, by giving basic income support to individuals who were casualties of certain risks, are critical instruments that can mitigate the effect of short-term spikes in food prices on food insecurity, helping to prevent violent conflict and contribute to long-term development (ILO, 2003).

At the beginning of 2013, UN International Agencies and different partners launched the Nutrition Cluster Handbook aimed to provide those involved in nutrition coordination at different levels (i.e. UN agencies, NGOs, national authorities, donors and affected communities) with relevant tools, guidance, information and resources to support their roles in facilitating predictable, coordinated and effective preparation for, and responses to, nutrition needs in humanitarian emergencies. The handbook aims to be applicable across a range of country contexts and different types of emergency, providing guidance in relation to emergency preparedness, activation of the emergency response, and transition out of the emergency phase (The Global Nutrition Cluster, 2013).

In the initial stages of any disaster, there is instability, acute shortage, and mass movement of people, with victims totally dependent on aid. For example, the international humanitarian assistance in the four countries most affected by famine (Nigeria, South Sudan, Somalia and Yemen), contributed to prevent deterioration in food security and nutrition. However, in 2017, almost 32 million food-insecure people were reported to be still in need of urgent assistance across the same four countries (FSIN, 2018). Critical gaps in emergency preparedness result in a cascade of failures, such as interruptions in the chain of delivery for food, water, medicine, and other primary supplies. There are often inevitable delays in evaluation, planning, donations, transport, and formation of distribution system (Singh, 2010). Delayed actions will severely threaten and increase the risk of malnutrition, disease and death. CBRN advisors should be ready to consider and manage the emergence of food insecurity after CBRN events, at short and long-term, trying to facilitate access to food aids and health assistance for curing the malnourished, promoting adequate distribution of food, preventing malnutrition among the most vulnerable. Rapid nutrition assessment followed by systemic surveys and continued monitoring of nutritional conditions (surveillance) are basic activities to food relief programs and further plan (MSF, 1995). Distribution of cooked or ready-to-use food is usually the first short-term measurement, but for longer-term plans there are a lot of aspects to consider other than merely food distribution, such as the availability of necessary arrangements of hygienic environments to prepare and dish out food, or culturally appropriate practices that might not cause offence.

3. FOOD SECURITY IN PRE-CBRN EVENTS

3.1 Problem Statement

Despite the causes of conflicts are multiple and complex, price spikes in food and civil unrest are correlated. With the increasing level of hunger and undernutrition in countries in fragile situations and those affected by conflicts, it is imperative to have a clearer understanding of the relationship between hunger, conflicts and peace (FAO *et al.*, 2017). In fragile states where socio-economic instability exists, food insecurity can both trigger armed conflicts. Examples of this can be seen throughout history: in 2011, the Arab Spring, which toppled governments in Tunisia, Egypt and Libya, had in food price (sugar, oil, and flour) a consistent motivating factor. The protests in Tunisia, which signaled the start of the Arab Spring domino effect, were initially demonstrations against high bread prices. While public outrage over high food prices was not the only cause, it is actually perceived as an important one (Maystadt *et al.*, 2012). Moreover, a situation of food insecurity contributes both to protract armed conflicts. This is what happened in the Horn of Africa in the 1970s, 1980s, and 1990s, when droughts devastated the already food-insecure and politically-oppressed populations, triggering chronic famines into civil wars.

On the other hand, food can be used as leverage during conflicts: food war is a concept which includes the use of hunger as a weapon in active conflict and leading as a consequence to food insecurity and need of humanitarian assistance. During the so called “Age of Extremes” from World War I to the end of the Cold War, calamitous famines were caused by totalitarian systems and wartime leaders routinely used starvation as a weapon. Combatants frequently use hunger as a weapon: they use siege to cut off food supplies and productive capacities, starve opposing populations into submission, and hijack food aid intended for civilians (Messer *et al.*, 2002). An example is the Ethiopian famines of the 1980s, where the food insecurity of the victims was part of a deliberate Ethiopian state policy of forced resettlement of the opposition, using the food aid selectively as a political tool to reward followers and let others starve (Clay *et al.*, 1988). Hunger can often be a critical element, and rebel groups can offer an alternative livelihood to protect household food security through incentives and promises of improved conditions (FAO *et al.*, 2017). Despite the description of food insecurity as leading to conflict, it is not the whole story, as famine and starvation create and feed the conditions for extremism. Terrorist organizations like al-Qaeda have used food insecurity to recruit and promote their political objectives. As the food crisis worsens, countries such as Somalia, Pakistan, Syria, Nigeria, Iraq, Libya, Lebanon, Egypt, and many others will become more at risk to terrorism and political instability (American Security Project, 2017), a major concern not only for countries directly affected but also a worldwide threat. Famine and starvation create a vicious cycle for conflict, extremism and terrorism that increases the risk of CBRN deliberate attacks or indirect events around the world. Swaminathan (1994) claims that “hunger anywhere threatens peace everywhere”. Despite limited knowledge in regards to the role that food security and nutrition can play in preventing or mitigating conflicts and in potentially contributing to sustaining peace, there is no doubt that a peaceful and stable environment in every country is a fundamental condition for the attainment of sustainable food security (FAO, 2016). It is highly unlikely that food security will improve until there is a resolution to the conflict. Considering things from this prospective, the right to food security could be a key for prevention of armed conflicts, CBRN attacks and their related events.

3.2 The Role of CBRN Advisors

In case of any food emergency, data preparedness is essential to prevent CBRN events. “Preparedness” refers to a minimum set of information standards, tools, sources, partnerships and forums to enable effective and immediate information management. It allows management and use of information immediately following an emergency. Countries that face ongoing emergencies are more likely to have some level of data preparedness, though it is also important to address this issue in countries prone to natural disasters or with a high risk of future crisis (The Global Nutrition Cluster, 2013). There are several systems, databases, and software for early warning of state of food security, such as the FAO GIEWS, the US FEWS NET and the WFP mVAM. Improved early warning and response tools, with technically-advanced use of geographic information systems and satellites plus on-the-ground informants, are part of a deliberate international political strategy to prevent food insecurity and consequent famine, infectious disease outbreaks and civil disruption.

The FAO Global Information and Early Warning System (GIEWS) classifies and regularly updates the list of countries requiring external assistance for food, dividing them into three categories according to the predominant driver: countries with an exceptional shortfall in aggregate food production and supplies, widespread lack of access to food and severe localized food insecurity.

The Famine Early Warning Systems Network (US FEWS NET) is a leading provider of early warning and analysis on acute food insecurity, created in 1985 by the US Agency for International Development (USAID). The NET provides monthly reports and maps detailing current and projected food insecurity; timely alerts on emerging or likely crises.

Both the GIEWS and FEWS NET are based on the Integrated Food Security Phase Classification (IPC). IPC is a set of standardized tools intended to provide a ‘common currency’ for classifying the severity and magnitude of food insecurity emergencies. It is based on a consensus-building process to provide decision makers with a rigorous analysis of food insecurity along with objectives for response in both emergency and development contexts. IPC describes the severity of food emergencies, with five-phase scale to help

governments and other humanitarian actors quickly understand a crisis (or potential crisis) and take action (Figure 1).

PHASE 1 Minimal	More than four in five households (HHs) are able to meet essential food and nonfood needs without engaging in atypical, unsustainable strategies to access food and income.	
PHASE 2 Stressed	Even with any humanitarian assistance at least one in five HHs in the area have the following or worse: Minimally adequate food consumption but are unable to afford some essential non-food expenditures without engaging in irreversible coping strategies.	
PHASE 3 Crisis	Even with any humanitarian assistance at least one in five HHs in the area have the following or worse: food consumption gaps with high or above usual acute malnutrition OR are marginally able to meet minimum food needs only with accelerated depletion of livelihood assets that will lead to food consumption gaps.	URGENT ACTION REQUIRED ! Phase classification would likely be worse without current or programmed humanitarian assistance.
PHASE 4 Emergency	Even with any humanitarian assistance at least one in five HHs in the area have the following or worse: large food consumption gaps resulting in very high acute malnutrition and excess mortality OR extreme loss of livelihood assets that will lead to food consumption gaps in the short term.	
PHASE 5 Famine	Even with any humanitarian assistance at least one in five HHs in the area have an extreme lack of food and other basic needs where starvation, death, and destitution are evident. Evidence for all three criteria (food consumption, acute malnutrition, and mortality) is required to classify Famine.	

Figure 1: IPC area phase classification (Source: FEWS NET, 2017).

The WFP Mobile Vulnerability Analysis and Mapping (WFP mVAM) is a real-time food security delivering data system through mobile technology. It is currently a tool for monitoring food security through phone calls to key informants and households. Respondents are asked short questions on demographics, market prices, food availability, food assistance, household food consumption and nutrition, negative coping strategies, and primary food sources. Respondents are also given the opportunity to report on the food security situation in their households and communities.

The WFP mVAM and the FAO GIEWS initiated a joint project in 2009 and developed the Shock Impact Simulation Model (SISMod) to assess the food security situation in low-income food deficit countries. SISMod is a macroeconomic modelling system which brings new possibilities to allow timely quantitative assessments on the ex-ante and ex-post impact of various types of shocks (market, economic, climatic) on livelihood and food security. It identifies and profiles the vulnerable groups, and estimates to what extent they are in need, providing early estimates of the impacts of shocks before field assessments are carried out, informing the initial development of response scenarios. For example, in 2015 it was used to model most likely scenario for the conflict in Yemen in the near future. The model predicted that the depth of hunger for 2016 would have increased by 110%, and the food-insecure population would have reached 16.6 million, 47% more than before the crisis and up by 2.5 million compared to the latest IPC. The worst-case scenario estimated that the food-insecure population would have been increased by 89%, leaving 21 million people (77% of the population) food insecure, with the depth of hunger tripling: not so far from recent data of 60% of the entire population reported at the beginning of 2017.

4. EVIDENCES FROM THE FIELD

4.1 The Case of South Sudan

In 2018, South Sudan's civil war entered its fifth year. Armed conflict is destroying rural livelihoods, forcing many farmers to relocate, decimating assets, deepening poverty and increasing the vulnerability of millions of people (FAO *et al.*, 2017). Since the start of the conflict, almost 2 million people have been internally displaced, and another 2 million have sought refuge in neighbouring countries with more than 230,000 people sheltering in UN countries (Human Right Watch, 2017). The delivery of health and nutrition services have been disrupted, several aid agencies have been forced to relocate. The Government has declared the state of emergency: emergency humanitarian assistance continues to be delivered to around 2.5 million people a month and this assistance is preventing more extreme outcomes in many areas, although the reach of assistance is under 50% of the estimated population in need.

The UN described South Sudan as one of the world's most dangerous places for aid workers: at least 83 killed since the conflict started in December 2013, 16 in 2017 (Human Right Watch, 2017). Despite an agreement for the Cessation of Hostilities (COH) was signed in December, armed conflicts continue in most of the area. Crisis (IPC Phase 3) and Emergency nutrition (IPC Phase 4) outcomes persisted in all regions of South Sudan in January 2018, with some households declaring famine, with serious risk of Catastrophe (IPC Phase 5) in a worst-case scenario of an extended absence of humanitarian assistance. In fact, it is expected most households to deplete their stocks three months earlier than was typical in pre-crisis years. Famine (IPC Phase 5) has occurred with at least 20% of households having extreme lack of food.

4.2 The Case of Syrian Arabic Republic

The Syrian crisis has entered the seventh years, claiming hundreds of thousands of lives and injuring countless civilians. It is a complex, internationalized conflict, with various armed groups in control of much of the country. Food security in Syria has plummeted since the beginning of the conflict in 2011. Formerly a vibrant middle-income economy, 85% of the population now live in poverty, of which 69% live in extreme poverty, meaning they are unable to cover their basic needs, including food (UNOCHA, 2016). Numbers of people already declared food-insecure or those at risk of food insecurity rise day after day. In 2016, an estimated 6.7 million people were acutely food insecure and in need of urgent humanitarian assistance, while the prevalence of acute malnutrition was at increased levels in most areas (7 %). Over the course of 2017, an average of 5.2 million people benefitted from UN food assistance on a monthly basis. Years of conflict have had a cumulative destructive effect on the economy, infrastructure, agricultural production, food systems and social institutions. Many food markets are controlled by powerful groups, leading to steadily increasing prices: in the besieged city of Deir Ezzur, a bag of sugar has reached the cost of over US\$450. These have resulted in people adopting negative coping strategies: some 50% of Syrian households have reduced the number of daily meals and more than 30% have restricted the consumption of adults to prioritize children (FSIN, 2018). Families are forced particularly to cut out protein-rich and dairy products from their diets, and most have to reduce portion sizes, eating only one or two meals a day (FAO *et al.*, 2017). The overall food consumption deteriorated in the first half of 2018, where 30% of the surveyed Syrian households (almost one in three) reported poor and borderline food consumption. At governorate level, the sharpest increase in inadequate food consumption was seen in Dar'a, from 21% in May to 40% in June (WFP Syria, 2018).

As safety nets were not provided for these farmers, the only recourse for most became migration to urban areas. As a results, the largest increases in food insecurity numbers were reported for the governorates of Quneitra, Dar'a, Damascus, Idleb and Aleppo, all affected by large population movements since late 2015 due to an escalation of conflict, as well as by market price changes and food shortages. In mid-2016, Aleppo alone registered a 24% increase in the number of people at risk of food insecurity. Particularly acute food insecurity conditions among people living in besieged and hard-to-reach areas, where food supplies are extremely limited and where the population largely relies on food assistance. In late September 2016, the humanitarian and security situation in Eastern Aleppo City (EAC) became extremely worrying following an unprecedented escalation of violence: the number of civilian casualties increased drastically as well as damaged civilian infrastructure, including hospitals. Humanitarian aids could not have access to the EAC or provided assistance since July 2016: in November 2016 an estimated 275,000 people were trapped inside EAC (FSIN, 2017).

Concerns for hunger and malnutrition are growing nationwide since it can affect anyone, from the thousands of people still trapped in the besieged enclave, to people who managed to leave. In fact, since 2011, there has been a continuous exodus of Syrians seeking to escape the conflict: more than 6 million people remain displaced inside the country, with another 5 million Syrian refugees living in the nearest countries (Egypt, Iraq, Jordan, Lebanon, Turkey). The majority of Syrian refugees in the five main host countries rely on humanitarian assistance to meet their basic needs, and assistance is their primary source of food. After almost seven years of displacement, assessments reveal an alarming deterioration in refugee food security. In Lebanon, 36% of refugees are food insecure; in Turkey almost 30%; in Egypt 61% of households are severely economically vulnerable; in Jordan 72% of Syrian refugees are either food insecure or vulnerable to food insecurity (FAO *et al.*, 2017).

4.3 The Case of Iraq

Although in December 2017 the Government of Iraq declared victory over the Islamic State of Iraq and the Levant -ISIL, the impact of the protracted conflict on food insecurity remains severe: 3.2 million people are facing hunger, especially those depending on agriculture for their livelihoods (FAO *et al.*, 2017). Conflict has damaged the food security of the Iraqi population in different ways: the loss of assets, disruption to livelihoods and lack of employment opportunities represent the major drivers. People were forced to abandon farms, damaging harvests, equipment, supplies, livestock, seeds, crops and stored food. Infrastructures such as water supplies for agricultural and domestic use have been damaged or destroyed. A large part of the cereal production belt is now directly under the control of rebel forces, affecting access to agricultural activities. In addition to food shortages, the escalating conflict has caused severe fuel scarcity, damaging market functionality and sustaining higher local prices, limiting food access for the most vulnerable. Families report limited livelihood opportunities, which reduce their purchasing power and restricts their access to the social safety net that entitles Iraqis to receive rations of flour, rice and cooking oil from the government. Heavy contamination of retaken areas with unexploded ordnance and improvised explosive devices poses immediate and long-term risks for the environment and the people.

According to WFP's mVAM monitoring system, food insecurity is higher in districts affected by conflict and displacement: since violence erupted, over 3 million people have become internally displaced. Most IDPs are in camps to the east and south of Mosul in Ninewa, Erbil and Anbar governorates and in host communities. Employment and livelihood opportunities are more challenging for people living inside camps compared to those in host communities. The International Organization for Migration in Iraq estimates that, since the start of the crisis in 2014, more than 3 million were displaced (IOM Iraq, 2017). As of 31 August 2018, there are more than 4 million Iraqis -670 thousand families- who have returned to their home location and still nearly 2 million IDPs -320 thousand families identified (IOM Iraq, 2018).

Humanitarian needs will remain severe, particularly for displaced families inside and outside the camps, for vulnerable residents of retaken communities and people fleeing intense fighting. Meanwhile, security issues will continue to hamper access for humanitarian assistance to those in need, further diminishing their food security. Vulnerable residents of newly retaken areas are also expected to face severe shortages of basic goods and medical services (FAO *et al.*, 2017). In the long term, access to agricultural land will be reduced by the high number of unexploded ordnance and mines laid by ISIL, even in liberated areas. Violent clashes between Iraqi and Kurdish forces could escalate even more in the territories disputed between the Kurdistan Region of Iraq (KRI) and the Iraqi central government in Baghdad. The potential for localized violence will remain until Iraqi authorities and the Kurdistan Regional Government resolve the status of the contested territories and the disputes over oil revenues. The planned humanitarian response for 2018 includes assisting up to 400,000 newly or repeatedly displaced people fleeing asymmetric attacks and unstable areas, but it is highly likely that additional people will require humanitarian assistance (FSIN, 2018).

4.4 The Case of Yemen

Since the breakout of conflict in Yemen in March 2015, over 10,000 people have been killed, approximately 4,000 of them civilians, and more than 3 million Yemenis are internally displaced as of January 2017 (IPC, 2017). The Yemen ongoing conflict is having devastating effects on food security, population displacement, economy, agricultural- including for the fisheries and livestock sectors, disruption of infrastructure, services, markets and livelihoods. The conflict-induced crisis has been devastating for the country, aggravating the already fragile socio-economic context and causing unprecedented levels of undernutrition. Before the outbreak of the conflict, more than 50% of the Yemeni population was already living under the national poverty line, but after the beginning of the conflict, the entire social protection system has collapsed, with a suspension of safety nets to 1.5 million beneficiaries through the Social Welfare Fund since 2015 (WFP, 2016). A 20% increase in food insecurity has been registered from June 2016 and a 47% from June 2015 (IPC, 2017), with an estimated 17 million people experiencing severe food insecurity in March 2017 (IPC Phases 3 and 4) and requiring urgent humanitarian assistance. An additional 8.2 million people were estimated to be in Phase 2 Stressed in 2016 (FSIN, 2017).

The Yemen Emergency Food Security and Nutrition Assessment (WFP/FAO/UNICEF Joint EFSNA, 2016) confirmed that acute malnutrition was at alarming levels in 2015, with 10 out of the 22 governorates classified under emergency phase IPC 4. The last FAO Yemen country report (2017) claims that more than 60% of households have adopted strategies such as reducing portions, eating less favoured foods or skipping meals altogether; more than 80% of Yemenis are in debt, and more than 50% of households are buying food on credit. Chronic child undernutrition (stunting) has been a serious problem for a long time, but acute undernutrition (wasting) has peaked in the last three years, reaching above the emergency threshold of 15% (FAO *et al.*, 2017).

The alarming level of food insecurity is expected to deteriorate further: Yemen relies on imports for more than 90% of its staple foods, but port infrastructure, essential for ensuring food imports and humanitarian assistance, are seriously threatened by the worsening conflict. Restrictions coupled with fuel shortages have reduced the availability of essential commodities. The annual inflation rate has increased to over 30%, pushing average consumer prices 70% above pre-crisis levels. With both urban and rural communities relying on markets on a daily basis, increases in the cost of food, cooking fuel, water and medicine heavily undermine food access and utilization. The nutrition situation has been aggravated by the dramatic breakdown of the health care system and its infrastructure: an outbreak of cholera and other epidemics started in 2016 has affected several governorates and was still continuing in 2017 (WHO, 2015).

5. CONCLUSION

Ensuring food security is a complex and timely operation, often underestimated or taken too late into consideration in pre and post-CBRN events. Eliminating hunger is not just a moral imperative: it also makes economic sense, have impact on political stability, nationally and internationally and can be one of the key to prevent CBRN events.

Unfortunately, up to now food security has not been at the centre of the conversation as to how to prevent and deal with CBRN events, therefore this matter will continue to be a critical issue. In all the countries where conflicts will be the primary drivers of food security crises during 2018, in addition to direct loss of life, disruption of agricultural production, trade and market is expected, requiring the intervention of even more humanitarian assistance. Moreover, vulnerable people will continue to be internally displaced and to seek refuge in neighbouring countries increasing the risk of malnutrition and infectious diseases outbreaks, especially when overcrowding occurs.

Considering this complex context, well trained CBRN advisors, with specific competence in nutrition and public health, are essential for prevention, management and restoration of unintentional and intentional food security and health related CBRN events. This opens the door to a necessary and concrete debate among the experts in the field, since CBRN advisors need to be prepared and set specific strategy for early recovery by guaranteeing the minimum humanitarian and health standards, and also to reduce future risks in all different scenarios involving food security in pre and post-CBRN events.

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