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# Nutrition security is an integral component of food security

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**ABSTRACT**

This review argues that nutrition is an integral component of food security, and should be embedded within all four of its dimensions – availability, access, utilization, and stability. The review highlights current food insecurity in the Middle East and North Africa (MENA) region, as exacerbated by the triple burden of malnutrition, where undernutrition, micronutrient deficiencies, and overweight/obesity coexist. Previous efforts to address food security in MENA have focused on food availability, overlooking the other three dimensions and leaving nutrition considerations aside. Meanwhile, the literature has recognized the need to highlight nutrition as fundamental, and opted for the term 'food and nutrition security'. To achieve food and nutrition security in MENA, a nutrition lens must be applied across all four dimensions – from assessment, to policy and programming, to capacity building. For example, MENA countries can adopt policies and programs including well-structured food subsidies, dietary guidelines, public awareness, and education campaigns to increase availability and accessibility of nutritious and safe foods, and stimulate consumer demand for those. To accomplish this, MENA needs to build stakeholders' capacity and equip them to address the challenges that are hindering the achievement of food and nutrition security now and into the future.

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## Background

### *Definition and dimensions of food and nutrition security*

In 1996, the World Food Summit in Rome defined food security as existing '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' (FAO 2009, p. 1).

From this definition, four key dimensions of food security can be identified: availability, access, utilization, and stability. Food availability means the physical existence of a sufficient quantity of food of appropriate quality, and is determined by domestic food production, domestic stocks, food imports, and/or food aid. Food access can be achieved through adequate income or resources that allow the purchase or acquisition of appropriate food products for a nutritious diet. However, adequate food supply does not necessarily guarantee household or individual level food security, as lack of access to food is often a greater problem than availability, particularly for the most malnourished (World Bank 2007). As for food utilization, it refers to the process through which the body utilizes various nutrients in the food. It also requires proper food preparation and hygiene practices, sound eating habits, a diverse diet which necessitates availability of all essential nutrients, and proper intra-household distribution of food. By ensuring sufficient calorie and nutrient intake as well as safe food, food utilization may significantly influence the nutritional status of individuals. Finally, food stability strives to secure the dimensions of food availability, access and utilization over time. For example, access to food should remain unaffected even during sudden shocks such as war, climate events, or economic crises. Ultimately, to achieve food security, all four dimensions must be fulfilled simultaneously.

The need to secure access to an appropriately nutritious diet, comprising all essential nutrients and water, coupled with a sanitary environment and adequate health services and care to ensure a healthy and active life for all household members has been defined by the

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Food and Agriculture Organization (FAO) as nutrition security, hence emphasizing the health component and reflecting the nutritional status of the individual or community in question (FAO 2012).

The relationship between food security and nutrition security is complex, as illustrated by the malnutrition outcomes of overweight and obesity. Data reveal that obesity is more prevalent in food insecure populations for multiple reasons. For example, a lack of adequate resources for healthy foods can result in weight gain through several channels. Low-income families may seek to maximize their limited incomes by consuming low-cost, energy-dense foods, instead of more expensive, nutrient-dense foods (Darmon et al. 2002). Evidence shows that food insecure households sacrifice food quality or variety in favor of food quantity, in order to avoid a state of absolute hunger (Radimer et al. 1992). This can result in nutrition insecurity in presence of abundance of calories, if households cannot afford a consistent and adequate diet, and/or if food is available or accessible only at certain times, whereby individuals may cope by over-consuming food when it is available or accessible, hence contributing to overweight and obesity (Polivy 1996; Townsend et al. 2001).

In fact, food security cannot be achieved without nutrition security, and vice versa. Nutrition security is an essential element of food security, as sound nutrition requires more than just enough energy for every man, woman, and child. Human needs can only be satisfied through a diversity of macro- and micronutrients to ensure good health and prevention from disease. Experts have recognized this fundamental connection and are increasingly using the term *food and nutrition security*, which merges both concepts to emphasize both the food and health requirements for populations (Weingartner 2005).

### *Food and nutrition security challenges for the Middle East and North Africa (MENA) region*

Examining the food security status of the MENA region, it appears to be most vulnerable to food insecurity. Most countries of the region rely disproportionately on imports of staple foods to satisfy the demands of a growing population. For example, the United Nations Economic and Social Commission for Western Asia (UN ESCWA) has calculated the ratio of wheat imports to total merchandise exports across different countries, and found that the average ratio for the Arab countries (a close proxy for the MENA region) was nearly five times higher than the world average over the period 2000–2011 (UN ESCWA 2015). The International Food Policy Research Institute (IFPRI) combines two metrics, the ratio of food imports to total exports plus net remittances as well as the prevalence of child stunting, to classify all countries in the MENA region at moderate to high risk of food insecurity, except for the Gulf States which display a low risk given high performance on the first metric (Breisinger et al. 2012).

MENA countries have adopted measures to address gaps in food security, but these efforts have generally overlooked nutrition considerations. Policies and programs focused on the availability component of food security and directed their efforts to increase agricultural production and food distribution to feed populations and prevent extreme outcomes such as hunger and famine. Indeed, improvements in production technology, processing, and transportation have helped to make food more available, affordable, and convenient, while overlooking the quality of the food supply, or the distribution, allocation, and diversity of the food consumed by the population (Meerman et al. 2013). Moreover, many policies, programs, and strategies related to food security are skewed toward agricultural production, technological approaches, and food availability; however, the accessibility and quality of the food consumed by the population has received less attention, leaving initiatives to tackle nutrition security only partially realized and hence food security compromised to date. As a result, diets have become less diverse and less nutritious, with perversely negative impacts on human health.

In parallel, MENA countries are suffering from a nutrition transition characterized by a shift away from a traditional, more seasonal, and more diverse diet rich in whole grains, fruits, and vegetables; toward a 'Westernized' diet high in refined cereals, animal protein, fats, sugar, and salt (Johnston et al. 2014). Data on changes in food availability highlight a shift toward an increasingly energy-dense diet and high intake of fat, coupled by a parallel decrease in complex carbohydrate availability (FAOStat 2015). For example, data for selected MENA countries including Kuwait and Lebanon from the 1960s through 2003 show a dramatic increase in the proportion of energy obtained from vegetable oils, and a significant decrease in the proportion of energy from fruits and

vegetables. Factors driving this transition include economic growth and increased incomes, globalization of trade and marketing, and rapid urbanization– all which affect food production and consumption (Sibai et al. 2010).

Concomitant with the nutrition transition, a triple burden of malnutrition exists in the region, characterized by the simultaneous occurrence of undernutrition, micronutrient deficiencies, and overweight or obesity (Johnston et al. 2014), within a country, region, household, or even individual. While the rate of undernutrition and levels of stunting, wasting, and underweight, particularly among under-five children, have been on the decline in some MENA countries; there has been a parallel, dramatic increase in the prevalence of overweight and obesity and diet-related non-communicable diseases (NCDs), such as diabetes, cardiovascular disease (CVD), and cancers in the region (Popkin 2000). For example, four MENA countries – Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates – were ranked in the top 20 for highest obesity worldwide in 2014 (NCD Risk Factor Collaboration 2016); three of these countries (Saudi Arabia, Kuwait, and Qatar) were also among the top 10 in diabetes prevalence worldwide in 2013, and are expected to remain so in 2035 (International Diabetes Federation 2013). Moreover, these relatively wealthy Gulf States also suffer from a high prevalence of micronutrient deficiencies (anemia, iodine, and vitamin D deficiency), as well as stunting (Micronutrient Initiative 2009), even though they have been classified as low on food insecurity.

More recently, national intakes of harmful and protective foods in countries of the MENA region were evaluated using 2010 consumption data (Afshin et al. 2015). A strong association has been reported between high consumption of harmful food components (processed meat, red meat, trans fatty acids, sugar-sweetened beverages, and sodium), low consumption of other protective foods (fruits, vegetables and beans, nuts and seeds, whole grains, and seafood omega-3 fatty acid), and increased mortality from cardio-metabolic diseases (diabetes, systolic blood pressure, body mass index, fasting plasma glucose, and total cholesterol) across all countries of the region, thus making such food consumption patterns strong predictors of these diseases. In addition, the dietary energy supply from the different food groups (harmful and protective) shows that the traditional diet has been modified, such that all MENA countries experience higher than recommended per capita consumption of harmful food components; and most, if not all, MENA countries experience insufficient per capita consumption of protective foods (Afshin et al. 2015).

In sum, excess caloric intake manifested by high rates of overweight and obesity does not guarantee and should not be considered as an indicator of food and nutrition security. On the contrary, both rich and poor countries in the MENA region exhibit evidence of the triple burden of malnutrition, and therefore food and nutrition insecurity.

## How is food and nutrition security measured?

Food security is typically measured at the national level or at the household/individual level, with a range of measures existing at each level.

At the national level, national indicators of food security include (a) the Global Food Security Index (GFSI) developed by the Economist Intelligence Unit, which incorporates 28 unique indicators related to affordability, availability, as well as quality and safety of food (GFSI date unknown); and (b) the Maplecroft Food Security Risk Index developed by the Maplecroft firm, which assesses food security on the basis of 18 indicators related to health status, as well as availability, stability, and access to food (Maplecroft Food Security Index and interactive global map date unknown).

At the household/individual level, measures of food security include (a) the Global Hunger Index (GHI) developed by IFPRI, which is a composite measure of three indicators: the proportion of undernourished population, the prevalence of underweight and mortality rate in under-five children (IFPRI 2014); (b) the Arab Family Food Security Scale (AFFSS) and (c) the Household Food Insecurity Access Scale (HFIAS). Both (a) and (b) were adapted by researchers at the American University of Beirut (AUB) from tools originally developed by the United States Agency for International Development (USAID). The AFFSS and HFIAS rely on survey responses, anthropomorphic measurements, and dietary intake information (Naja et al. 2014; Sayhoun et al. 2014).

### *The example of Lebanon: varying food and nutrition security status according to different indices*

Due to the complexity and diversity of food security assessments, there is no single consensus as to food and

nutrition security status in many parts of the MENA region. The example of Lebanon reflects this lack of consensus. Three different national assessments conducted by IFPRI have found that Lebanon, as a whole, is subject to moderate food and nutrition insecurity (Breisinger et al. 2010; Yu et al. 2010; Ahmed et al. 2013). It is worth noting, however, that these assessments were conducted at the national level, and were performed before the onset of the Syrian Crisis and resulting inflows of significant Syrian refugee populations into Lebanon. On the other hand, Lebanon was classified as scoring well on the 2014 GHI, with a reported index of $< 5$ indicating a low-hunger status (IFPRI 2014).

With regard to assessment tools and food and nutrition security measures that have been tested and applied in the field, these have provided a range of estimates of food and nutrition (in)security, and have shown to be largely consistent. In Lebanon, for example, the AFFSS determined that 42% of Lebanese citizens living in the south of the country were food and nutrition insecure, and 62% of Palestinian refugees living in Lebanon were food and nutrition insecure (Sayhoun et al. 2014). Such elevated levels are relatively consistent with findings from the HFIAS, which showed that nearly 52% of Lebanese households in the Bekaa Valley are food and nutrition insecure (Naja et al. 2014) (Table 1).

**Table 1.** Food security prevalence among Lebanese subpopulations.

| | AFFSS (South Lebanon) (%) | AFFSS (Palestinian refugees) (%) | HFIAS (The Bekaa Valley) (%) |
|---|---|---|---|
| Food secure | 58 | 38 | 48.3 |
| Mildly food insecure | – | – | 17.7 |
| Moderately food insecure | 32 | 42 | 12.9 |
| Severely food insecure | 10 | 20 | 21.1 |
| Total | 100 | 100 | 100.0 |

## Recommendations and conclusions

### *Nutrition at the core of all four dimensions of food security*

In face of the challenges that shape the high level of food and nutrition insecurity in the region, and the triple burden of malnutrition which is aggravating the situation, the MENA region has failed to develop effective policies to achieve food and nutrition security, mainly because current programs and strategies have been skewed toward agricultural production and food production, while disregarding more crucial elements such as the accessibility and quality of food consumed by the population.

In this paper, we propose that nutrition should constitute an integral part of all four dimensions of food security. Accordingly, the availability, accessibility, utilization, and stability of both macro- and micronutrients should be incorporated into all four dimensions of food security as applied to analysis, policy, and programming in the MENA region.

With regard to food availability, enhancements can be made to improve the quality and quantity of nutrients within foods. For example, bio-fortified rice which contains beta-carotene has been developed and promoted as one means to improve the nutritional status of populations with vitamin A deficiency (International Rice Research Institute date unknown). Government policies can be structured to support such fortification programs.

Food accessibility can similarly be improved by explicitly focusing on access to nutritious food. Improvements to a farmer's own production, to the purchase of food, or to food received through assistance programs should focus on the provision of safe and nutritious food. For example, subsidy reforms that improve both energy consumption and nutrient diversity constitute an important step toward food and nutrition security.

Food utilization is clearly tied to the issue of nutrition and, accordingly, food security policies and programs should ensure that every individual can consume safe and nutritious foods. For example, nutrition education programs like community-based interventions targeting school-aged children and adults can emphasize the selection of safe and nutrient-dense foods and help individuals make optimal, healthy food choices. Programs targeting infants and young children should promote good nutrition practices for optimal growth and development, such as breastfeeding with timely, nutritionally adequate and safe complementary feeding, which offer protection from under- and over-nutrition that can progress into adult-onset chronic diseases. Promoting nutritious food to consumers can thereby inform agriculture by demanding increased production of nutritious foods.

Moving forward, it will be important not only to place greater emphasis on the nutrition components of food security, but also to shift focus to include an

element of sustainability in providing dietary recommendations. This includes viewing food consumption patterns through a sustainability lens; considering sustainable food consumption and production simultaneously; adopting public policies to support sustainable consumption and discourage food waste; and revising food-based dietary guidelines to promote sustainable consumption (Hwalla et al. 2015).

Finally, with regard to food stability, nutrition considerations including the macro- and micronutrient content of food must be taken into account. For example, emergency feeding programs should work to provide needy individuals with food baskets and/or voucher-based assistance that can deliver essential macro- and micronutrients that are vital for human health and well-being. Providing refugees or the underprivileged with staple foods such as oil, sugar, and flour may help meet energy needs but does not directly deliver protein and micronutrient diversity needed for adequate growth and maintenance, and could potentially contribute to nutrient deficiencies that impact growth of children and health of adults. Questions over which nutrients to provide are clearly related to the wider questions of how to achieve a balance between delivering food choices to beneficiaries that meet their preferences as well as ensuring dietary diversity for optimal health.

### *Capacity building in food and nutrition security*

Food and nutrition security is an ongoing challenge for the MENA region. There is a clear need for expanded and updated data covering the multiple dimensions of food and nutrition security, to support evidence-based policies and programs. The region also demands experts who are equipped to gather, assess, and apply such data and thereby address this challenge, now and into the future. However, the region generally lacks appropriately qualified specialists. For example, agricultural experts often lack basic knowledge of nutrition concepts and so are unprepared to work within interdisciplinary teams to address food and nutrition security. To move forward, capacity building in food and nutrition security should focus attention on research to explore technical challenges from an interdisciplinary perspective; endorse academic programs and degrees to help leaders build capacity in the region; foster community-based initiatives to ensure food security at national levels; and sponsor/support conferences on a regular basis to address the urgency of the regional food and nutrition security situation and facilitate partnerships.

Food and nutrition insecurity is considered one of the main drivers of the Arab uprisings, and will continue to be a problem for countries in the MENA region for years to come. 'Comprehensive, country-specific food security strategies and their implementation are key for development and peace' (Breisinger 2013). Therefore, generating reliable and comprehensive data and information around food and nutrition security and building capacity will be essential to provide the right abilities and processes for evidence-based decisions to address this challenge now and into the future.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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