

## Comparing Food Security Status between Sana'a and Taiz Governorates, Yemen

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### Abstract

**Background:** As a result of the conflict and aggression on Yemen since 2015, the majority of the Yemeni families have become unable to obtain and provide the food necessary for the continuation of life due to high prices, interruption of salaries, lack of job opportunities and deteriorating agricultural production, which in turn leads to a deterioration of the living conditions of the Yemeni families. Household food security is an important measure of well-being. Food security encompasses three dimensions: availability; access and utilization. Although it may not encapsulate all dimensions of poverty, the inability of households to obtain access to enough food for a productive healthy life is an important component of their poverty. **Objective:** The aim of study is to compare the Food Consumption Pattern (FCP) by Sana'a and Taiz Governorates (Govs), Yemen. **Methods:** Data was taken from a comprehensive survey that was conducted by the UNICEF during 2016 with a total sample of 921 and 1458 households in Sana'a and Taiz Govs, respectively. The FCP was measured by Household Dietary Diversity Score (HDDS). Descriptive statistics were used to calculate the consumption rate of Food Groups Consumed (FGC) by two Govs. **Results:** The findings show cereals, miscellaneous and sugar honey were the most frequently consumed in Taiz Gov, while oils, sugar honey and dairy were the most frequently consumed in Sana'a Gov. Households in Sana'a Gov were more likely to consume meat and fruits than those in Taiz Gov. However, households in Taiz Gov were likely to consume seafood and eggs as compared to Sana'a households. Based on the income of household, more than 60% of households (in each Gov) were living on the three first income quintiles. The HDDS cut-off points were used to classify households into sufficient food or not sufficient. Approximately 21% of households in each Gov were consumed three or four or five FGC. Alternatively, HDDS were classified as average number of FGC. The findings indicate that about 62% of households were consumed at least one of seven FGC. **Conclusion:** HDDS based on average number of FGC should be suggested and lead to realistic results.

**Keywords:** HDDS, FGC, income quintiles, food secure, Sana'a and Taiz governorates.

**المخلص: خلفية الدراسة:** نتيجة الصراع والعدوان على اليمن منذ عام ٢٠١٥، أصبحت غالبية الأسر اليمنية غير قادرة على الحصول على توفير الغذاء اللازم لاستمرار الحياة لارتفاع الأسعار وانقطاع الرواتب ونقص فرص العمل وتدهور الزراعة، الأمر الذي أدى بدوره إلى تدهور الأوضاع المعيشية للأسر اليمنية. ويعد الأمن الغذائي الأسري مقياساً مهماً للرفاهية والذي يمكن تحديد أبعاده من خلال: توافر الغذاء، الوصول للغذاء وكيفية استخدام الغذاء. وبالرغم من أنه لا يشمل جميع أبعاد الفقر، فإن عدم قدرة الأسر على الحصول على ما يكفي من الغذاء لحياة صحية منتجة هو عنصر مهم في فقرهم. **هدف الدراسة:** مقارنة نمط الاستهلاك الغذائي (FCP) بين محافظتي صنعاء وتعز في اليمن. **الطريقة:** تم أخذ البيانات من المسح الشامل الذي أجرته منظمة اليونيسيف خلال عام ٢٠١٦ لعينة إجمالية من ٩٢١ و ١٤٥٨ أسرة في محافظتي صنعاء وتعز على التوالي. تم قياس مؤشر استهلاك الأسر للغذاء (FCP) من خلال استخدام التنوع الغذائي الأسري (HDDS) خلال ٢٤ ساعة. واستخدام الإحصاء الوصفي لحساب معدل استهلاك المجموعات الغذائية المستهلكة (FGC) في المحافظتين. **النتائج:** أظهرت النتائج أن مجموعة المواد الغذائية من إنتاج الحبوب والعسل والسكر أكثر استهلاكاً في محافظة تعز، في حين كانت مجموعة الزيوت والسكر والعسل والألبان الأكثر استهلاكاً في محافظة صنعاء. كما أن الأسر في محافظة صنعاء أكثر ميلاً لاستهلاك اللحوم والفواكه من تلك الأسر في محافظة تعز. ومع ذلك، فإن الأسر في محافظة تعز تميل لاستهلاك المأكولات البحرية والبيض بالمقارنة مع الأسر في صنعاء. وبالنسبة لدخل الأسرة، أكثر من ٦٠% من الأسر (في كل محافظة) تعيش في الفئات الثلاث الأولى حسب التصنيف الخماسي للدخل. تم تصنيف الأسر إلى (لديها طعام كافٍ أم لا)

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حسب مؤشر HDDS، إنما يقارب من ٢١% من الأسر في كل محافظة تم استهلاك ثلاثة أو أربعة أو خمسة مجموعات غذائية. بدلاً من ذلك، تم تصنيف مؤشر HDDS حسب متوسط عدد المجموعات الغذائية المستهلكة، وأشارت النتائج أن حوالي ٦٢% من الأسر استهلكت واحدة على الأقل من سبع مجموعات غذائية في اليوم. الاستنتاج: يجب أن يتم تصنيف مؤشر HDDS على أساس متوسط عدد المجموعات الغذائية التي تستهلكها الأسرة في اليوم والتي تؤدي إلى نتائج واقعية.

## 1. Introduction

Yemen is a country in a serious food security and humanitarian crisis, due to many factors such as political instability, civil insecurity, an intensified war, and localized conflicts [1]. More than four years, Saudi-backed coalition offensive and airstrikes on Yemen resulted in a major conflict in Yemen which led to increase displacement, economic warfare, food and fuel price rises and resulting in increasingly difficult access providing services food and health [2].

The UNDP Yemen 2016 reported that the population had lived on US\$1.06 per day and Yemen ranked 168 among 177 nations on the Human Development Index [3]. So, 42% of population is poor [4.1] and the economic status of 78% Yemeni households (HHs) is worse than in the pre-crisis period which were living below the national poverty line in 2016 [2, 5].

An estimated 80% of the population (24.1 million people) in Yemen would be in need of urgent action to humanitarian food assistance. Out of them 1.18 million and 2.58 million people in Sana'a and Taiz governorates (Govs) were classified as people in need, respectively. Further, 46% and 81% of people in Sana'a and Taiz Govs also were considered as acute people in need, respectively [2, 5, 6].

In June 2016, 60% of the Yemeni population (17 million people) did not have enough to eat and were classified as food insecure [2, 5, 7, 8].

As compared to the pre-crisis (2014), food consumption indicators were significantly deteriorated. The results of the EFSNA (2016) and IPC (1 March-31 July 2017) revealed that the prevalence of food insecurity among populations in Sana'a and Taiz Govs were 79.7% and 69.7%, respectively [5, 9]. Further, sixty-seven districts in Yemen show the convergence of high levels of food insecurity and high numbers of cholera, among of the districts are in Sana'a and Taiz Govs [10, 11].

OCHA (2014) has reported that Yemen was the poorest country in the Arab world and had a national global acute malnutrition rate (GAM) with 12.7% [12]. The State of Security and Nutrition in the World 2018 Report has stated that 34.4% of the total population of Yemen was undernourishment [13]. In Taiz (Gov), the GAM rates were 17% in Taiz city, 14.4% in Highland and 25.1% in Lowland, while it was found 5.6% in Sana'a Gov [5, 14, 15, 16]. Clearly, Taiz was exceeding the WHO 'critical' threshold of the severity classification [9].

Therefore, about 27% and 33% of population in Taiz Gov were considered as crisis (IPC Phase 3) and emergency (IPC Phase 4), respectively, while 36% and 18% of population in Sana'a Gov as crisis (IPC Phase 3) and emergency (IPC Phase 4), respectively [5,17]. However, 18% and 15% of people were considered as Phase 4 in Taiz and Sana'a Govs, respectively [18].

As a result of the conflict, food prices had increased up to 25%, high inflation and exchange rate fluctuations in October/November 2018 as compared to the pre-crisis levels [11]. Therefore, millions were displaced, populations greatly had restricted to access to food, cash and paid work and aggravating food insecurity, which may lead to famine in Yemen [2, 7]. Further, all major food

crises reported that food security conditions may further deteriorate which lead to a high risk of famine [7].

Food security of HHs can be addressed in either able to produce their own food or able to purchase or access to it. The quantity and quality of food are important to household (HH) [19]. For the present study, it focuses on the quality rather than the quantity of food.

These statistics are to show how life in Yemen has been enormously deteriorating, and as we crossing the end of 2019, surely these statistics are expected to be much worse. So, everyone, every family or community has the right to live in an environment that provides him/her with safety, food and health services in order to lead a dignified life and be effective and productive in society.

In a previous work, we were investigating the relationship between Food Consumption Pattern (FCP) and its impact on the nutritional status of 6-59 months children in Sana'a Gov, Yemen [20]. Recently, also it was investigated the impact of the FCP on women's health of 15-49 years in Sana'a Gov, Yemen [21].

Later, another question was raised; how FCP affects on HHs in Sana'a and Taiz Govs? So, the objective of the present study is to compare the effect of FCP represented by household dietary diversity score (HDDS) in two Govs.

## Materials and Methods

### Study Design, Sampling and Data Collection Process

Data of the present investigation were extracted from a comprehensive survey done by the UNICIF Yemen between May 21st to June 2nd, 2016 as part of other surveys planned to cover all the Yemeni Govs among of them Sana'a and Taiz. The survey was a cross-sectional study with a representative sample of the HHs among them women in the reproductive age 15-49 years. The survey was conducted in the two ecological zones of Sana'a Gov, the Sana'a Temperate (ST) and the Sana'a Dry (SD). 11 districts were composing the ST, Jehanah, Al Teyal, Khawlan, BaniMatar, Hamdan, Arhab, BaniHoshaish, Nehm, Bilad Al Roos, Sanhan&BaniBahlul and Al Hesn, while only 5 districts were composing the SD, BaniDhabian, Al Haymah Al Dakheliah, Sa'fan, Manakhah and Al Haymah Al Kharijiah. All unsafe zones have been excluded from the frame before the selection of clusters. A two-staged cluster cross sectional study was conducted. The methods used, including sampling design and sample size determination followed SMART approach [22]. The sample size calculated for the ST was higher in the anthropometry than in mortality, while for the SD, it was higher in mortality than in anthropometry. The calculated sample sizes of HHs in the two strata of the ST and SD were 465 and 456 respectively [22]. The survey has taken place in 30 clusters in each stratum. The number of HHs in each cluster was calculated as 15 HHs in both ST and SD. The source of the sample frame used in this survey was taken from Sana'a Gov Health Office. The frame contains a list of villages with a projection of population that is made based on the CSO (Central Statistical Organization) 2004 Census [23].

The survey was also conducted in three strata of Taiz Gov, Taiz City (TC), Taiz Highlands (TH) and Taiz Coastal Lowlands (TL). Three districts composing the TC stratum, Al-Modhaffar, Al-Qaherah and Sala. TH districts were Al-Shamaitain, Al-Selow, Al-Mesrakh, Al-Ma'afer, Al-Mawaset, Jabal Habashi, Haifan, Samea', Sharab Al-Rawna, Sharab Al-Salam, Saber Al-Mawadem, Mashra'ah Wa Hadnan, Al-Taiziah, Khadeer, Mawiah and 26 Ozlas of Maqbanah District, while only 5 districts were composing the TL, Al-Makha, Dobab, Mawza', AlWazeiah and 3 Ozlas of Maqbanah District. In addition, a two-staged cluster cross sectional study was conducted. The methods used, including sampling design and sample size determination following SMART approach [24].

The sample size calculated for the three strata were higher in the anthropometry than in mortality. The calculated sample sizes for HHs in the three strata of the TC, TH and TL were 421, 552 and 485 respectively.

The survey has taken place in 30 clusters in each stratum. The number of HHs in each cluster was calculated as 14 HHs in TC, 18 HHs in TH and 19 HHs in TL. The source of the sample frame

used in this survey was Taiz Gov Health Office. The frame contains a list of villages with a projection of population that is made based on that of the CSO 2004 Census [23].

### **Definitions:**

#### **Food Security:**

Food security has been defined by different researchers according to their research agendas. More than 190 different studies focusing only on the concept and definition of food security [25]. The majority of definitions attempt to answer the common questions: who should get what, when, how, how much, and what kind of food? The measurement of food security stays a debatable issue due to the selection and sequence of these questions [26]. Access to food, consumption, nutrition and health is one of the most important issues for families and individuals [27]. Food security can be described and measured according to a variety of definitions, dimensions, timeframes, and units of analysis.

According to the progressive changes in the concern regarding issues that are central to food security, the definition of food security has been developed over time [27, 28, 29].

In 1990, the American Institute of Nutrition defined the food security as "Access by all people at all times to enough food for an active, healthy life, which includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways" [30, 31, 32].

FAO defined food security as: "Food security exists when all people, at all time, 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" [29, 33, 34].

So, food security was determined by food availability, food access, food utilization [28, 35] and stability [36].

#### **Food insecurity:**

Food insecurity is the opposite of food security, which appears through hunger or vulnerability to hunger [29]. When people lack secure access to sufficient amounts of safe and nutritious food for their growth, an active and healthy life, they were considered as food insecure [34].

Food insecurity is a concept that refers to the social and economic problem of lack of food due to economic deprivation, not voluntary fasting or dieting or for other reasons [30].

WFP defines food insecurity as "a condition in which people lack the required nutrients, both macro and micro for fully productive, active and healthy lives" [36].

Food insecurity is "Limited or uncertain availability of nutritionally adequate and safe foods or Limited or uncertain ability to acquire acceptable foods in socially acceptable ways" [30, 32].

This definition means that food insecurity is experienced when there is (1) uncertainty about future food availability and access, (2) insufficiency in the amount and kind of food required for a healthy lifestyle, and/or (3) the need to use socially unacceptable ways to acquire food [37, 38, 39, 40, 41, 42].

### **Why Measure Food Security?**

The deprivation of basic needs for life is undesirable, which leads to the creation of nutritional and therefore health problems for individuals, families and thus societies. Monitoring and assessment food security assist leaders, policy makers and service providers in knowing the situation of individuals and food families, to understand and identify their basic needs, and to provide the appropriate and effective programs for them. Food security assessment is an indispensable tool for identifying and planning the needs of the population [32].

### **How Is Food Security Measured?**

Data collected on HH food access or individual dietary intake can be consuming time consuming and expensive, and requires a high level of technical skills in data collection and analysis [43].

As defined by the USAID, food security has three components; availability, access, and utilization [35]. Food Availability is concerned with food supply. Food Access is the ability of an individual or HH to get sufficient quality and quantity of food. Food Utilization refers to the individual's biological capacity to make use of food for a productive life [35, 44]. In addition, stability has to deal with unlimited availability and access to food, and unlimited utilization of the food [36].

In light of the need of HH food access impact indicators, the USAID Office of Food for Peace (FFP), the Food and Nutrition Technical Assistance Project (FANTA) and the FAO have developed a simple tool to assess the quality of HH food access, namely, 'Household Dietary Diversity Score' (HDDS) which has been focused on the desired outcome of improved HH food consumption [44, 45]. The HDDS reflects, in a quick form, the economic ability of an HH to access a variety of foods and the nutritional quality of the diet [43, 44]. Studies had supported that an increasing in dietary diversity has a positive relation with the socio-economic status and HH food security [46].

HDDS is defined as the number of food groups consumed (FGC) by an HH or the individual respondent over the 24 hours [43, 44].

To get an HDDS, twelve food groups are used to calculate HDDS, namely; Cereals, White tubers and roots, Vegetables, Fruits, Meats, Eggs, Fish and other seafood, Legumes, nuts and seeds, Milk and milk products, Oils and fats, Sweets (Sugar Honey) and Miscellaneous (Spices, condiments and beverages) [43, 44, 45]. Each group was coded as 1 or 0. Score 1 is indicated to HH consumed one various of food in food groups, while zero score denoted to HH was not consumed which had been identified by FAO.

Only foods consumed in the home are counted in this indicator, and each food group is equally weighted, for a total possible score ranging from 0 to 12 [43, 44].

The HDDS was classified into three categories: low if consumption was  $\leq 3$  various of food, moderate if consumption was 4-5 various of food and high if consumption was  $\geq 6$  various of food [19, 44].

An increase in the average number of different FGC provides a quantifiable measure of improved HH food access. In general, any increase in HH dietary diversity reflects an improvement in the HH's diet [44].

### Statistical Analysis

Data analysis was done using Excel and SPSS (version 24.0). Some descriptive statistics including frequencies and percentages were produced for the assigned variables.

### Results and Discussion

According to the food groups classification of HDDS, Table 1 presents the distribution of FGC by Govs. It reveals that the main foods consumed for more 80% of HHs (where in which governorate) are oil, sugar honey, dairy and cereals, while the opposite in Taiz Gov where cereals and miscellaneous are the main food followed by sugar honey and oils. In fact, the Ministry of Agriculture and Irrigation in Yemen (MAI) reported that Taiz Gov has produced more cereals and honey than Sana'a Gov during 2012 to 2016 [47].

It has been found that most of the HHs' Sana'a Gov (90.3%) are likely depending on dairy as compared to those in Taiz Gov (54.8%). The national level revealed that almost half (48%) of HHs are holding livestock for using to agriculture and dairy consumption [9].

For meat, vegetables and fruits groups, clearly, there are significant differences between the two Govs. It was noted that 31.2% of HHs in Sana'a Gov were eating meat as compared to 19.1% in Taiz Gov. It should be noted to observe that the production of sheep numbers in Sana'a Gov is more than Taiz Gov [47]. However, Taiz Gov has produced more goats, cows and camels numbers than Sana'a Gov [47].

Although the livestock production in Taiz Gov is more than in Sana'a Gov [47], the HHs were less likely to consume of protein meals (meat).

On the other side, Sana'a Gov produced vegetables less than Taiz Gov [47] but HHs were more likely consumed vegetables, where 54.7% of HHs in Sana'a Gov compared to 45.3% in Taiz Gov.

Likewise for fruits group, significant differences were found between the two Govs, where 28% of HHs in Sana'a Gov were likely to consume fruits compared to 19.5% in Taiz Gov. This result may be due to the production of fruits in Sana'a Gov is about 4.6 times than in Taiz Gov [47].

With respect to legumes or roots tubers groups, HHs of Sana'a Gov were more consumed but the differences are small between the two Govs. The production of pulses in Sana'a Gov was more than in Taiz Gov [47].

By contrary, almost third of HHs in Taiz Gov were depending on seafood or eggs as compared to those in Sana'a Gov. In fact, Taiz Gov overlooks the Red Sea, so the people who are living on the coastal plains (Lowland) work in fishing. It was noted that miscellaneous group is the most consumed among HHs in Taiz Gov.

The central highlands, the southern uplands and the western coastal areas of Tihama are the core areas for the production of sorghum, millet, vegetables, fruits, and other cash crops in Yemen [5, 9].

Table 1: Distribution of the FGC (Food Groups Consumed) by Govs

Gov	Sana'a		Taiz	
	n	%	N	%
<b>Oils</b>	<b>883</b>	<b>95.9</b>	<b>1281</b>	<b>87.8</b>
<b>Sugar Honey</b>	<b>873</b>	<b>94.8</b>	<b>1407</b>	<b>96.5</b>
<b>Dairy</b>	<b>832</b>	<b>90.3</b>	<b>805</b>	<b>55.2</b>
<b>Cereals</b>	<b>791</b>	<b>85.9</b>	<b>1455</b>	<b>99.8</b>
<b>Miscellaneous</b>	<b>693</b>	<b>75.2</b>	<b>1446</b>	<b>98.2</b>
<b>Legumes</b>	<b>555</b>	<b>60.3</b>	<b>855</b>	<b>58.6</b>
<b>Roots Tubers</b>	<b>531</b>	<b>57.6</b>	<b>766</b>	<b>52.5</b>
<b>Vegetables</b>	<b>504</b>	<b>54.7</b>	<b>665</b>	<b>45.6</b>
<b>Meat</b>	<b>288</b>	<b>31.3</b>	<b>281</b>	<b>19.3</b>
<b>Fruits</b>	<b>258</b>	<b>28.0</b>	<b>286</b>	<b>19.6</b>
<b>Seafood</b>	<b>134</b>	<b>14.5</b>	<b>525</b>	<b>36.0</b>
<b>Eggs</b>	<b>126</b>	<b>13.7</b>	<b>443</b>	<b>30.4</b>
<b>Total</b>	<b>921</b>	<b>100.0</b>	<b>1458</b>	<b>100.0</b>

As results of escalating conflict, soaring prices of basic commodities, lack of food availability and access challenges, all these factors lead to 62% of the Yemeni HHs had forced to adopt food-related coping strategies (rCSI) such as reducing number of meals and limiting portion sizes, compared to 48% in 2014 [9, 48].

In 2016, 69.1% of the population of Sana'a Gov and 83.2% of the population of Taiz Gov were utilizing consumption related negative mechanisms [9, 18].

In urban districts, there are some pros and cons in living. Access to education, healthcare, clean water, sanitation and better economic opportunities are among the positive impacts, while crime, low physical activity and poor dietary habits are among the negative impacts [49]. To distinguish the contribution of income level in creating these patterns, Table 2 shows the distribution of income quintiles in the two Govs. Obviously, the distribution of income quintiles seems similar in the two Govs with slight improvement in Taiz Gov specially in Q5 and with slight unimproved in Sana'a Gov in Q2. There are many studies that document similar results [50, 51, 52].

It observed that less than half of HHs lived in the first two income quintiles (precisely, 48.5% in Sana'a Gov, 46.3% in Taiz Gov). This result was had documented by other studies [9, 53].

Table 2: Income Quintiles by Govs: \*YR: Yemeni Rial

Sana'a			Taiz		
Income Quintiles	n	%	Income Quintiles	n	%
Q1 (<=19000*)	184	20.0	Q1 (<=12000)	291	21.8
Q2 (19001-30000)	262	28.5	Q2 (12001-24000)	327	24.5
Q3 (30001-40000)	160	17.4	Q3 (24001-36000)	213	16.0
Q4 (40001-60000)	157	17.1	Q4 (36001-52200)	236	17.7
Q5 (60001-550000)	156	17.0	Q5 (52201-1200008)	266	20.0
<b>Total</b>	<b>919</b>	<b>100.0</b>	<b>Total</b>	<b>1333</b>	<b>100.0</b>

According to the 2018 Human Development Report, Yemen was classified as a low-income, food-deficit country, ranked 178th out of 189 countries [54].

In Yemen, the agricultural sector is critically important to both overall economic performance and poverty alleviation. The majority (60%) of the HHs in Yemen practice agriculture (crop and livestock production) and consider it as their main source of income [5, 9].

The highest percentages of cultivating HHs were found in Al-jawf (76%), Shabwa (74%), Al-Mahweet (72%), Amran (71%), and Sana'a Govs (71%) [9].

Limited access to food is compounded by several factors, including the effects of low incomes, the depreciation of the Yemeni currency, uncertainty of access to Yemen's Red Sea ports, large family sizes, high unemployment rates, and the irregular or non-payment of salaries of many civil servants [54]. Table 3 presents the distribution of income quintiles by FGC it two Govs.

The findings assured what found in Table 1. In general, it was noted that the proportions of HHs tend to increase with the improvement in the level of income quintiles. Actually, for all quintiles, the fruits, meat, eggs and seafood groups are normally more expensive than the other food groups in both Govs and HHs were less likely consumed. The HHs in Sana'a Gov were likely better

to consume oils, sugar honey, dairy, cereals, legumes, miscellaneous, roots tubers, followed by vegetables in their nourishment than those in Taiz Gov for all income quintiles categories. However, the HHs in Taiz Gov were more likely to nourish cereals, miscellaneous, sugar honey, oils, dairy, legumes, followed by roots tubers foods than those in Sana'a Gov.

For all income quintiles, less than 48% of HHs in Sana'a Gov were better likely to consume meat or fruits as compared to those HHs in Taiz Gov (less than 36%). On the other hand, less than 43% of HHs in Taiz Gov were better likely to nourish seafood or eggs as compared to those HHs in Sana'a Gov (less than 22%).

Table 3: Percentages of FGC by Income Quintiles and Govs

Gov	Sana'a					Taiz				
	Income Quintiles					Income Quintiles				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
FGC	%	%	%	%	%	%	%	%	%	%
Cereals	82.1	90.8	87.5	85.4	80.8	100.0	99.7	100.0	99.2	100.0
Roots Tubers	46.7	50.0	63.8	63.1	72.4	45.0	48.0	58.2	54.2	66.2
Vegetables	44.0	54.6	55.0	56.7	65.4	35.1	41.3	48.8	53.0	58.3
Fruits	31.5	18.3	28.8	28.0	38.5	8.6	15.6	20.7	24.6	33.5
Meat	21.7	25.6	33.1	33.8	47.4	6.5	13.8	20.2	29.2	36.1
Eggs	7.1	9.9	15.6	19.7	19.9	23.0	27.5	33.8	35.6	41.7
Seafood	13.0	7.3	15.0	21.7	21.2	34.0	35.8	33.3	39.0	42.9
Legumes	59.8	51.9	57.5	65.0	72.4	46.7	52.0	62.9	69.5	72.9
Dairy	89.1	87.0	92.5	91.1	94.2	50.2	52.9	59.2	58.1	61.7
Oils	95.7	94.3	96.3	97.5	96.8	81.1	84.7	89.7	94.1	96.2
Sugar Honey	90.8	93.5	96.3	96.8	98.1	96.6	96.6	97.7	94.9	97.7
Miscellaneous	69.6	83.6	78.8	72.6	67.3	98.6	98.8	100.0	99.6	99.2
Total	919					1333				

For both Govs, in the first two quintiles, the HHs were less likely to have roots tubers, vegetables, fruits, meat, eggs or legumes than those in the other quintiles.

In the first two quintiles, about 50% of HHs in Sana'a Gov were eating fruits as compared to 24.2% of HHs in Taiz Gov. Furthermore, 47.3% in Sana'a Gov had meat in their foods as compared to those in Taiz Gov (20.3%).



In deep analysis, it is noted that all HHs in all quintiles are equally depending on cereals, miscellaneous, sugar honey or oils groups in Taiz Gov, while the HHs are nearly depending on oils, sugar honey, dairy or cereals groups in Sana'a Gov.

On the other side, about half or 69.8% of HHs in Taiz Gov were having eggs or seafood in their nutrition as compared to 17% or 20.3% in Sana'a Gov, respectively.

For all income quintiles, more than 70% of HHs in Taiz Gov, the main FGC were cereals, miscellaneous, sugar honey followed by oils. However, oils, sugar honey, dairy, cereals followed by miscellaneous were the main FGC of HHs in Sana'a.

Five years after the conflict dramatically escalated in Yemen, the commodity prices of basic food was rising, labour opportunities were reduced, wages plummeting and agricultural production dwindling, more HHs are depending on humanitarian assistance for their survival [55].

Food insecurity is more severe in the areas with active fighting. This is particularly affecting the host communities to access essential services and to conduct livelihood activities. 11 districts are classified in the IPC Phase 4 (Emergency) among them were in Taiz Gov (6 districts, Alazrq is the worst affected) [55].

High food prices contributed to the HHs employing different food coping strategies such as shifting to less preferred and cheaper food or reducing the number of meals. Limited job opportunities and decreased wages and salaries of different segments of the society affected the HH income, thereby diminishing purchasing power and impacting negatively on food access [56].

In Yemen, the agriculture sector employs more than 50% of the workforce in the country and agricultural production, which covers around 25-30% of the country needs either from cereal and/or from horticulture production to cater food requirement [9].

The total production of cereals in 2016 was around 37% compared to pre-crisis. So, about 40% of all farming HHs had testified a decline in cereal production [57]. Therefore, more than 50% of the HHs had to buy food on credit and around 80% were in debt [48].

Around 65% of Yemen's population live in rural areas [58]. Over 70% of them rely on local markets for their daily food requirements, yet it is estimated that more than 50% of rural HHs do not have a market in their area [59].

In Yemen, the EFSNA (2016) reported the second important farming system is livestock, only practiced by 40% of the agricultural HHs. The main types of livestock raised by most of the HHs are small ruminants (sheep and goats) [9]. Crop production is the third farming system and the highest number of HHs practicing crops only farming system were found in Govs of Ibb (50,436 HHs) followed by Dhamar (23,270 HHs) and Sana'a Gov (19,469 HHs) [9].

Fishing in the coastal governorates is highly affected due to insecurity, shortage of fuel and electricity, which is affecting the traditional type of fishing and causing spoilage and reducing quality supplied to the market [14].

According to the agricultural production assessment conducted in 2017 by the MAI, the national production has decreased by 20% to 30% compared to 2016 and is expected to be worse in 2018. According to the assessment, this has affected all agricultural sectors (crop farming including horticulture, livestock keeping and fishing) which account for about 25% of the national food basket. Fishing opportunities in the Red sea and Arabian Sea have also been affected by natural weather phenomenon such as cyclones and hurricanes [56].

Table 4 displays the distribution of the HDDS by Govs. The minimum of HDDS is two in Sana's Gov and one in Taiz Gov. the mean and median are 7 with standard deviation 1.81 in Sana'a Gov and 2.04 in Taiz Gov. Both distributions look normally distributed. Currently, in the absence of

Humanitarian food Assistance, it is estimated that 20.1 million of the Yemeni people are facing severe acute food insecurity (IPC Phase 3+) and in need of urgent action [56].

Table 4: Distribution of HDDS by Govs with some Descriptive Statistics

Sana'a			Taiz		
HDDS Scores	n	%	HDDS scores	n	%
			1	1	0.1
2	6	0.7	2	3	0.2
3	12	1.3	3	39	2.7
4	38	4.1	4	103	7.1
5	135	14.7	5	186	12.8
6	181	19.7	6	318	21.8
7	199	21.6	7	256	17.6
8	157	17.0	8	215	14.7
9	103	11.2	9	149	10.2
10	60	6.5	10	108	7.4
11	27	2.9	11	52	3.6
12	3	0.3	12	28	1.9
<b>Total</b>	<b>921</b>	<b>100.0</b>		<b>1458</b>	<b>100.0</b>
<b>Mean</b>	<b>7.02</b>			<b>7.01</b>	
<b>Median</b>	<b>7.00</b>			<b>7.00</b>	
<b>Mode</b>	<b>7</b>			<b>6</b>	
<b>St.d</b>	<b>1.812</b>			<b>2.036</b>	

Table 5 shows the distribution of the HDDs classification by Govs. Clearly, 2% and 2.9% of HHs likely consumed less than four FGC in Sana'a and Taiz Gov, respectively. Further, nearly 19% of HHs in the two Govs are consuming four or five FGC. Therefore, as the results of the conflict and under such current difficult circumstances, the outcomes of using the HDDS classification were misleading or unrealistic.

Alternatively, the average number of the FGC is suggested as a cut-off point to the classifications of the HDDS (Table 5). Obviously, the results of this classifications are more realistic, where 62% of HHs in two Govs were consumed at least one of 7 FGC.

Table 5: Distribution of HDDS categories by Govs

Indicators	Sana'a			Taiz	
	Categories	n	%	N	%
HDDS Classification	<=3	18	2.0	43	2.9
	4 - 5	173	18.8	289	19.8
	>=6	730	79.3	1126	77.2
	<b>Total</b>	<b>921</b>	<b>100.0</b>	<b>1458</b>	<b>100.0</b>
HDDS by Mean	<=7	571	62.0	906	62.1
	8 - 10	320	34.7	472	32.4
	> 10	30	3.3	80	5.5
	<b>Total</b>	<b>921</b>	<b>100.0</b>	<b>1458</b>	<b>100.0</b>

Universally, there is no cut-off point which classifies HH consumed sufficiently food or not. Many studies were using 4 FGC as a critical value to classify the population into food secure or not secure status [44, 52, 60].

Table 6 reveals the food secure status of HHs in the two Govs by HDDS secure. 6.1% and 10% of the HHs were food insecure in Sana'a and Taiz Govs, respectively. However, when the mean of HDDS was used as a cut-off, 62% HHs were classified as food insecure which is close to the estimation of the EFSNA (2016) and IPC (1 March-31 July 2017) [5, 9].

Table 6: Secure Status of HHs in two Govs by HDDS Secure

Indicators	Food security status	Sana'a		Taiz	
		n	%	N	%
HDDS Secure Classification	Insecure (<=4 groups)	56	6.1	146	10.0
	Secure (> 4 groups)	865	93.9	1312	90.0
	<b>Total</b>	<b>921</b>	<b>100.0</b>	<b>1458</b>	<b>100.0</b>
HDDS Secure by mean	Insecure (<=7 groups)	571	62.0	906	62.1
	Secure (> 7 groups)	350	38.0	552	37.9
	<b>Total</b>	<b>921</b>	<b>100.0</b>	<b>1458</b>	<b>100.0</b>

The MAI (2016) in Yemen reported that agricultural production was significantly decreasing in the governorates during 2012-2016 [47]. This result may be due to:

- Families depend on humanitarian food aid that provided by organizations,
- The high wages of agricultural workers,
- The return of agricultural production does not cover the costs spent on it,

- Immigration of citizens and lack of security due to the war.

Due to the ongoing conflict, scarcity and high prices of fuel have resulted in high costs of irrigation, transportation, and marketing of agriculture products, making the revenues from these products less than the production cost, and thereby forcing farmers to reduce cultivated areas by 38% in 2016 as compared to 2014 (pre-crisis) [5, 9, 13].

In addition, Crop production in the 2016-cultivation season experienced several constraints related to lack of agricultural inputs such as seeds, fertilizer, pesticides, fuel for irrigation, and others [5].

As result of conflict, limited access to animal feed, disease control due to the collapse of the disease control services, livestock holders have been forced to sell their animals to cover family basic needs, the livestock production, particularly small ruminants, decreased by more than 35% in 2016 compared to the pre-crisis period [5]. Furthermore, IPC (October-December 2020) reported that 39% and 28% of people in Sana'a and Taiz Govs are facing acute food insecurity (IPC Phase 3) [61].

## Conclusion

As the results of conflict and war in Yemen, about 62% of HHs in two Govs were considered as food insecure and only 19% of HHs were consumed four or five FGC.

Due to the conflict and hostilities intense in Taiz Gov, 6 districts were classified as IPC 5 (catastrophe) and acute food insecurity [62].

The food consumption differed from one to another and it may be differ from one community to another in the same country. Thus, any food study should take the habitual dieting into consideration before any analysis.

In the present study, there are some differences in the habitual dieting between Sana'a and Taiz Govs . Food consumption pattern (FCP) was measured via the Household Dietary Diversity Scores (HDDS) over the 24 hours [43, 44].

So, using international measures to describe the FCP of any nation or community is almost irrational and the results are unacceptable.

The study aimed to compare the food consumption pattern (FCP) in Sana'a and Taiz Govs, Yemen. Data of the study were extracted from a comprehensive survey conducted by the UNICEF during 2016 with a total sample of 921 HHs in Sana'a Gov and 1458 HHs in Taiz Gov.

In general, the HHs in the two Govs were less likely to consume protein and fruits. HHs of Sana'a Gov were less likely to nourish seafood or eggs than the HHs of Taiz Gov, whereas the HHs of Taiz Gov were less likely to consume meat or fruit than HHs of Sana'a Gov. More than 60% of the HHs lived under the third income quintile in the two Govs.

## References

- [1] Nkunuzimana, T., Custodio E., Thomas, A.C., Tefera, N., Perez, H.A. and Kayitakire, F. (2016). Global analysis of food and nutrition security situation in food crisis hotspots; EUR 27879. doi:10.2788/669159.
- [2] ACAPS Yemen Scenarios report (2019). Access to Basic Needs in Yemen: SCENARIOS, Possible developments affecting Yemeni's access to basic needs and services in 2020. October

- 2019.<https://reliefweb.int/report/yemen/access-basic-needs-yemen-scenarios-possible-developments-affecting-yemenis-access-basic>.
- [3] UNDP (2016). Human Development Report 2016, Human Development for Everyone, United Nations Development Programme, One United Nations Plaza, New York, NY 10017.  
[www.undp.org](http://www.undp.org).
- [4] OCHA (2015). Humanitarian Bulletin Yemen, 15 October 2015  
<http://reliefweb.int/sites/reliefweb.int/files/resources/Yemen%20Humanitarian%20Bulletin-%202015%20October%202015.pdf>.
- [5] IPC Yemen (2017). Integrated Food Security Phase Classification: Evidence and Standards for Better Food Security Decisions, 1 March – 31 July 2017  
[http://www.ipcinfo.org/fileadmin/user\\_upload/ipcinfo/docs/IPC\\_Yemen\\_AcuteFI\\_Situation\\_March-July2017\\_ENversion.pdf](http://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Yemen_AcuteFI_Situation_March-July2017_ENversion.pdf).
- [6] HNO (Humanitarian Needs Overview) (2019). Yemen. Dec 2018  
<https://reliefweb.int/report/yemen/yemen-2019-humanitarian-needs-overview-enar>.
- [7] FSIN (Food Security Information Network) (2017). Global Report on Food Crises 2017, Executive summary, A global effort to strengthen food and nutrition security evidence-based analysis and decision making, March 2017. <http://www.fao.org/3/a-br323e.pdf>.
- [8] FEWS NET (2019) (Famine Early Systems Network) Yemen. Yemen Food Security Outlook Update, August 2019. [fewsinqury.yemen@fews.net](mailto:fewsinqury.yemen@fews.net).
- [9] EFSNA (2016). Yemen Emergency Food Security and Nutrition Assessment (EFSNA) – 2016, Preliminary Results for public release, WFP, FAO, UNICEF, Yemen Food Security and Agriculture Cluster, 26 January 2017.  
[https://reliefweb.int/sites/reliefweb.int/files/resources/efsna\\_preliminary\\_results\\_public\\_final1.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/efsna_preliminary_results_public_final1.pdf)
- [10] UN Yemen Periodic Monitoring Review Jan–April 2017, P.14.
- [11] FAO (2019). Yemen Famine Prevention Plan January–June 2019, Contributing to improved food security and nutrition. Rome. 20 pp. Licence: CC BY-NC-SA 3.0 IGO.  
<https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode/legalcode>
- [12] OCHA (2014).  
<https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/Yemen%20Humanitarian%20Snapshot%20%28Malnutrition%29%20August%202014.pdf>. OCHA August 2014,
- [13] FAO, IFAD, UNICEF, WFP and WHO (2018). The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition. Rome, FAO. Licence: CC BY-NC-SA 3.0 IGO.
- [14] IPC (2016). Evidence and Standards for Better Food Security Decisions, Yemen: Acute Food Insecurity Situation June - September 2016, Summary Findings. ACF, CARE, CILSS, EC-JRC, EU, FAO, FEWSNET, FSC, IGAD, Oxfam, Save the Children, SICA and WFP. Created on: June-30 September 2016.  
[http://www.ipcinfo.org/fileadmin/user\\_upload/ipcinfo/docs/IPC\\_Yemen\\_AcuteFI\\_Situation\\_2016June.pdf](http://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Yemen_AcuteFI_Situation_2016June.pdf)
- [15] World Bank, IDA (2017). Project paper about the proposed additional grant, For the emergency health and nutrition project in Yemen. Document of the World Bank, No. of Report: PAD2112, UNICEF and WHO, 7 May 2017.  
<http://documents.worldbank.org/curated/en/541581497981796334/PAD2412-ARABIC-ArabicFinalProjectPaperP.docx>

- [16] Yemen Nutrition Cluster Bulletin, April-June 2018, issue 6.  
[https://reliefweb.int/sites/reliefweb.int/files/resources/2018\\_yemen\\_nutrition\\_cluster\\_bulletin\\_issue\\_6\\_english.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/2018_yemen_nutrition_cluster_bulletin_issue_6_english.pdf)
- [17] IPC (2016). Yemen Food Security Information System (FSIS) Development Program, IPC, Analysis Findings. FAO and EU with MoPIC/FSTS, Sana'a- Yemen, June 2016.  
[https://fscluster.org/sites/default/files/documents/fsac\\_ipc\\_june\\_2016\\_presentation.pdf](https://fscluster.org/sites/default/files/documents/fsac_ipc_june_2016_presentation.pdf)
- [18] IPC (2018). Evidence and Standards for Better Food Security and Nutrition Decisions, Acute Food Insecurity Analysis, Yemen. IPC Global Partnership - Action Against Hunger, CARE, CILSS, EC-JRC, FAO, FEWSNET, Global Food Security Cluster, IGAD, Oxfam, SICA, Save the Children, UNICEF and WFP. December 2018-January 2019, Issued on 7 December 2018.
- [19] Baliwati, Y.F., Briawan, D. and Melani, V. (2015). Validation Household Dietary Diversity Score (HDDS) to Identify Food Insecure Households in Industrial Zone. Pak J Nutr 14 (4): 234-238.
- [20] Al Mansoob, M.A.K. and Masood, M.S.A. (2018). Food consumption pattern and its impact on the nutritional status of 6-59 months' children in Sana'a Governorate, Yemen. American Journal of Food and Nutrition 6(2): 37- 45.
- [21] Al Mansoob, M.A.K. and Masood, M.S.A. (2019). The Impact of Food Consumption Pattern on Women's Health at Sana'a Governorate, Yemen Glob J Nutri Food Sci. 2(2): 2019. GJNFS.MS.ID.000535. DOI: 10.33552/GJNFS.2019.02.000535
- [22] UNICEF (2016). Nutrition Survey of Sana'a Governorate 2016, Final Report, Ministry of Public Health and Population, Primary Health Care Sector, Family Health General Directorate, Nutrition Department, Yemen.
- [23] CSO (Central Statistical Organization) (2005). Population Projection Based on 2004 Census. Sana'a, Yemen.
- [24] UNICEF (2016). Nutrition Survey of Taiz Governorate 2016, Final Report, Ministry of Public Health and Population, Primary Health Care Sector, Family Health General Directorate, Nutrition Department, Yemen.
- [25] Maxwell, S. and Frankenberger, T. (1992). Household food security: Concepts, indicators, measurements: A technical review. IFAD/UNICEF, Rome, Italy.
- [26] McKeown, D. (2006). Food security: implications for the early years. Background paper, Public Health, Toronto, Canada. (online available at [http://www.toronto.ca/health/children/pdf/fsbp\\_final.pdf](http://www.toronto.ca/health/children/pdf/fsbp_final.pdf))
- [27] Maxwell, S. (2001). The Evolutionary Thinking about Food Security. In Devereux S, Maxwell, S. (Ed). Food Security in Sub-Saharan Africa. ITDG Publishing, London, pp. 13 - 27.
- [28] Babu, S.C. and Sanyal, P. (2009). Food Security, Poverty and Nutrition Policy Analysis: Statistical Methods and Applications. ELSEVIER: Burlington.
- [29] Mboya, R. (2011). A study of the effects of Storage Methods on the Quality of Maize and Household Food Security in Rungwe District, Tanzania. Ph.D, School of Agricultural Sciences and Agribusiness, University of Kwazulu-Natal.
- [30] Anderson, S.A. (1990). Core Indicators of Nutritional State for Difficult-to-Sample Populations. Journal of Nutrition 120:1557-1600.
- [31] USDA (United State Department of Agriculture) (1995). Food Security Measurement and Research Conference: Papers and Proceedings. Alexandria, VA: U.S. Department of Agriculture, Food and Consumer Service, Office of Analysis and Evaluation.

- [32] Bickel, G., Mark, N., Cristofer, P., William, H. and John, C. (2000). Guide to Measuring Household Food Security, Revised 2000. U.S. Department of Agriculture, Food and Nutrition Service, Alexandria VA. March, 2000.
- [33] FAO (2010). The State of Food Insecurity in the World. Addressing Food Insecurity in Protracted Crises. FAO, Rome.
- [34] FAO, WFP and IFAD (2012). The State of Food Insecurity in the World 2012. Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition. Rome, FAO.
- [35] USAID Policy Determination (1992). Definition of Food Security, April 13, 1992.
- [36] WFP (World Food Programme) (2009). World Hunger Series: Hunger and Markets, third ed. Earthscan, London.
- [37] Hamelin, A.M., Habicht, J.P. and Beaudry, M. (1999). Food insecurity: Consequences for the household and broader social implications. *Journal of Nutrition* 129:525-528.
- [38] Quandt, S.A. and Rao, P. (1999). Hunger and food security among older adults in a rural community. *Human Organization* 58(1):28-35.
- [39] Quandt, S.A., McDonald, J., Arcury, T.A., Bell, R.A. and Vitolins, M.Z. (2000). Nutritional self-management of elderly widows in rural communities. *Gerontologist* 40(1):86-96.
- [40] Quandt, S.A., Arcury, T.A., McDonald, J., Bell, R.A. and Vitolins, M.Z. (2001). Meaning and management of food security among rural elders. *Journal of Applied Gerontology* 20(3):356-376.
- [41] Hamelin, A.M., Beaudry, M. and Habicht, J.P. (2002). Characterization of household food insecurity in Quebec: Food and feelings. *Social Science and Medicine* 54:119-132.
- [42] Wolfe, W.S., Frongillo, E.A. and Valois, P. (2003). Understanding the experience of elderly food insecurity suggests ways to improve its measurement. *Journal of Nutrition* 133:2762-2769.
- [43] Kennedy, G., Ballard, T. and Dop, M.C. (2013). Guidelines for measuring household and individual dietary diversity. Nutrition and Consumer Protection Division, Food and Agriculture Organization of the United Nation, Italy.
- [44] Swindale, A. and Bilinsky, P. (2006). Household dietary diversity score (HDDS) for measurement of household food access: indicator guide, Version 2. Food and Nutrition Technical Assistance (FANTA) Project, Academy for Educational Development, Washington, D.C.: FHI 360/FANTA.
- [45] Vaitla, B., Coastes, J. and Maxwell, D. (2015). Comparing Household Food Consumption Indicators to Inform Acute Food Insecurity Phase Classification. Washington, DC: FHI 360/Food and Nutrition Technical Assistance III Project (FANTA). [fantamail@fhi360.org](mailto:fantamail@fhi360.org)
- [46] Hoddinott, J. and Yohannes, Y. (2002). Dietary Diversity as a Household Food Security Indicator. Washington, D.C.: FANTA, FHI,360.
- [47] MAI (2016) (The Ministry of Agriculture and Irrigation), Yemen. Report. <http://agricultureyemen.com/page.php?id=488>
- [48] FAO (2017). Yemen – Emergency Livelihoods Response Plan. p. 2.
- [49] Janjua, N.Z., Mahmood, B., Bhatti, J.A. and Khan, M.I. (2015). Association of household and Community Socioeconomic Position and Urbanicity with Underweight and Overweight among Women in Pakistan, *PLOS ONE* 10(4): e0122314.
- [50] Müller, O. and Krawinkel, M. (2005). Malnutrition and health in developing countries. *CMAJ* 173(3): 279-286.
- [51] Bryce, J., Coitinho, D., Darnton, H., Pelletier, I., Pinstруп, D. and Andersen P. (2008). Maternal and child undernutrition: effective action at national level. *Lancet* 371(9611): 510-526.

- [52] Babiker, A.A., Kabbar, R.F. (2018). Use of Household Dietary Diversity Score (HDDS) in Measuring Food Security Status in Bindizi Locality of Central Darfur, Sudan, Africa.
- [53] Mistry, S.K., Hossain, B. (Md.) and Arora, A. (2019). Maternal nutrition counselling is associated with reduced stunting prevalence and improved feeding practices in early childhood: a post-program comparison study. *Nutrition Journal* (2019),18:47. <https://doi.org/10.1186/s12937-019-0473-z>
- [54] WFP Yemen Country Brief (2019). Saving Lives, Changing Lives, June 2019. [www.wfp.org/countries/Yemen](http://www.wfp.org/countries/Yemen)
- [55] IPC (2019). Yemen: Hotspot Analysis: Severe Acute Food Insecurity Persists in 29 Districts in Yemen for July-September 2019. Acute Food Insecurity Analysis, Issued in July 2019.
- [56] IPC (2018). Yemen: Food Security Situation Remains Dire Despite Substantial Humanitarian Food Assistance for December 2018-January 2019. IPC Acute Food Insecurity Analysis. 20 Dec 2018. [http://www.ipcinfo.org/fileadmin/user\\_upload/ipcinfo/docs/IPC\\_Yemen\\_AcuteFI\\_2018Dec2019Jan.pdf](http://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Yemen_AcuteFI_2018Dec2019Jan.pdf)
- [57] OCHA (2017). Yemen Crisis Overview. Op.cit.
- [58] World Bank data (2016). [https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?name\\_desc=true](https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?name_desc=true)
- [59] OXFAM (2017). Briefing Note, Missiles and Food, Yemen's man-made food security crisis. © Oxfam International December 2017. [www.oxfam.org](http://www.oxfam.org).
- [60] Steyn, N.P., Nel, J.H., Nantel, G., Kennedy, G., and Labadarios, D. (2006). Food variety and dietary diversity scores in children: are they good indicators of dietary adequacy? *Public Health Nutr* 9(5): 644-650.
- [61] IPC (2020), Yemen: Acute Food Insecurity Situation October-December 2020 and Projection for January-June 2021. Conflict, high food prices, depreciation of local currency and disrupted livelihoods are the major drivers of acute food insecurity. <http://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1152947/>
- [62] ACAPS (2019). Yemen Analysis Hub: Drivers of Food Insecurity in Yemen. 12 April 2019.