



AGRICULTURAL UNIVERSITY OF ATHENS
DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
MSC IN FOOD SCIENCE AND HUMAN NUTRITION
HUMAN NUTRITION, PUBLIC HEALTH AND POLICIES

Master Thesis

Nutrition transition in the post-economic crisis Greece:
Assessing the nutritional gap of food insecure individuals.
A case-control study.

Μεταπτυχιακή Διατριβή

«Αξιολόγηση της διατροφικής πρόσληψης
και των διατροφικών συνήθειων ατόμων
σε συνθήκες τροφικής επισφάλειας στην Ελλάδα
(συμμετέχοντες στο πρόγραμμα επισιτιστικής βοήθειας
του Ταμείου Ευρωπαϊκής Βοήθειας σε Απόρους)»

CHATZIVAGIA P. ELENI

Supervisor: Prof. Kapsokefalou Maria

Laboratory of Chemistry & Food Analysis

Athens 2019



AGRICULTURAL UNIVERSITY OF ATHENS
DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
MSC IN FOOD SCIENCE AND HUMAN NUTRITION
HUMAN NUTRITION, PUBLIC HEALTH AND POLICIES

Μεταπτυχιακή Διατριβή

«Αξιολόγηση της διατροφικής πρόσληψης
και των διατροφικών συνήθειων ατόμων
σε συνθήκες τροφικής επισφάλειας στην Ελλάδα
(συμμετέχοντες στο πρόγραμμα επισιτιστικής βοήθειας
του Ταμείου Ευρωπαϊκής Βοήθειας σε Απόρους)»

Master Thesis

Nutrition transition in the post-economic crisis Greece:
Assessing the nutritional gap of food insecure individuals.
A case-control study.

Chatzivagia Eleni

Evaluation committee:

- A) Maria Kapsokefalou, Professor, Agricultural University of Athens
- B) Antonis Zampelas, Professor, Agricultural University of Athens
- C) Salome Papaspyrou, Assistant Professor, Rutgers University

Περίληψη

Εισαγωγή: Η επισιτιστική ασφάλεια υπάρχει όταν όλοι οι άνθρωποι, σε όλες τις στιγμές, έχουν φυσική, κοινωνική και οικονομική πρόσβαση σε επαρκή, ασφαλή και θρεπτική τροφή που καλύπτει τις διατροφικές τους ανάγκες και προτιμήσεις για μία ενεργή και υγιή ζωή.¹ Όταν τα άτομα δεν έχουν επαρκή τροφή, όταν συνεχώς αναγκάζονται να διαλέγουν φτηνά, χαμηλής ποιότητας προϊόντα ή όταν βιώνουν χρόνιο στρες για το που θα μπορέσουν να βρουν το επόμενο γεύμα τους, η υγεία τους υποφέρει. Τα άτομα που βιώνουν επισιτιστική ανασφάλεια έχουν μεγαλύτερο κίνδυνο για νόσο από ασθένειες που σχετίζονται με τη διατροφή, όπως ο διαβήτης τύπου 2, η αυξημένη αρτηριακή πίεση, τα καρδιαγγειακά νοσήματα και η παχυσαρκία.² Από την αρχή της λιτότητας στην Ελλάδα το 2009, σημειώθηκε αύξηση κατά 40% της επισιτιστικής ανασφάλειας σε ολόκληρη την Ευρώπη.³ Στην Ελλάδα, το 36% του πληθυσμού κινδύνευε από φτώχεια ή κοινωνικό αποκλεισμό το 2015.⁴ Αυτή είναι η πρώτη μελέτη για την αξιολόγηση των διατροφικών συνηθειών των ατόμων με επισιτιστική ανασφάλεια στην Ελλάδα και αξιολογεί την αποτελεσματικότητα του εμβληματικού προγράμματος επισιτιστικής βοήθειας ΤΕΒΑ (Ταμείο για την Ευρωπαϊκή Ενίσχυση προς τους Άστερους).

Στόχος: Συνολικά, σε αυτή την έρευνα μελετάμε τη διατροφική συμπεριφορά του πληθυσμού με επισιτιστική ανασφάλεια (συμμετέχοντες ΤΕΒΑ) σε σύγκριση με τον γενικό πληθυσμό. Στόχος μας είναι να αξιολογήσουμε τη διατροφική πρόσληψη και τις διατροφικές συνήθειες του πληθυσμού που στοχεύει το ΤΕΒΑ. Συγκεκριμένα, εξετάζουμε τα δημογραφικά τους δεδομένα, τα ποσοστά υπερβαρότητας και παχυσαρκίας και τα ιδιαίτερα χαρακτηριστικά τους στη λήψη μακροθρεπτικών. Η κατανάλωση των ομάδων τροφίμων τόσο για τα επισφαλής άτομα όσο και για τον γενικό πληθυσμό υπολογίστηκε και συγκρίθηκε με τον Ελληνικό Διατροφικό Οδηγό και τις συστάσεις του ΠΟΥ για την Ανατολική Μεσόγειο. Αναλύσαμε επίσης τις διατροφικές τους συνήθειες, τη συχνότητα κατανάλωσης γευμάτων και πρωινού. Η έρευνα αυτή δίνει μια εικόνα του πληθυσμού που λαμβάνει επισιτιστική βοήθεια από το μόνο εθνικά συντονισμένο πρόγραμμα επισιτιστικής βοήθειας στην Ελλάδα, ενώ διενεργεί έμμεση αξιολόγηση της αποτελεσματικότητας του ΤΕΒΑ.

Μεθοδολογία: Μία μελέτη ασθενών - μαρτύρων διεξήχθη από τον Δεκέμβρη του 2017 έως το Δεκέμβρη του 2018, αφού έλαβε την έγκριση της Επιτροπής Βιοηθικής του Γεωπονικού Πανεπιστημίου Αθηνών. Συνολικά 499 συμμετέχοντες του προγράμματος ΤΕΒΑ σε ολόκληρη την Ελλάδα συμμετείχαν στη μελέτη (περιπτώσεις ατόμων σε επισιτιστική ανασφάλεια) παράλληλα με μια ομάδα ελέγχου από τον γενικό πληθυσμό (n = 545). Οι κοινωνικό - δημογραφικές μεταβλητές καταγράφηκαν. Η υπερβαρότητα και η παχυσαρκία ορίστηκαν ως δείκτης μάζας σώματος $24,9-29,9 \text{ kg} / \text{m}^2$ και $> 29,9 \text{ kg} / \text{m}^2$, αντίστοιχα. Οι διατροφικές συνήθειες του παρελθόντος μήνα αξιολογήθηκαν μέσω ενός επικυρωμένου ημι-ποσοτικού⁵ ερωτηματολογίου συχνότητας κατανάλωσης τροφίμων (FFQ). Το FFQ περιλαμβάνει επίσης πληροφορίες για όλες τις κύριες ομάδες τροφίμων που καταναλώνονται. Για να υπολογίσουμε τη θρεπτική πυκνότητα κάθε μεταβλητής του Ερωτηματολογίου Συχνότητας Κατανάλωσης Τροφίμων, δημιουργήσαμε το δικό μας πίνακα σύνθεσης τροφίμων. Ως επαρκή πρόσληψη ενέργειας χρησιμοποιήσαμε μια ελάχιστη ημερήσια πρόσληψη $<1.950 \text{ Kcal}$ και ο

πρωτεϊνικός υποσιτισμός ορίστηκε ως ημερήσια πρόσληψη $\leq 0.75\text{gr} / \text{kg}$ σωματικού βάρους⁶. Η συνολική κατανάλωση πρωτεΐνης διαχωρίστηκε σε Πρωτεΐνη από φυτικές πηγές και Πρωτεΐνη από ζωικές πηγές. Μια ανάλυση των μακροθρεπτικών συστατικών ως ποσοστό της ενέργειας διεξήχθη. Στη συνέχεια, το συνολικό λίπος διακρίθηκε σε πολυακόρεστα, μονοακόρεστα και κορεσμένα λιπαρά, ως ποσοστό της ενέργειας. Η ταξινόμηση σε ομάδες τροφίμων πραγματοποιήθηκε με σκοπό την σύγκριση με τον Εθνικό Διατροφικό Οδηγό. Οι κανονικά κατανεμημένες συνεχείς μεταβλητές θα παρουσιάζονται ως Μέση τιμή \pm τυπική απόκλιση (μέση \pm SD), ενώ οι κατηγορικές μεταβλητές ως απόλυτες και σχετικές συχνότητες ξεχωριστά για τους δύο πληθυσμούς. Το διάγραμμα P-P και το ιστόγραμμα χρησιμοποιήθηκαν για να εκτιμηθεί η κανονικότητα. Για τον προσδιορισμό των διαφορών μεταξύ των μεταβλητών χρησιμοποιήθηκε ανεξάρτητο t-test και δοκιμή U-Mann-Whitney. Οι διαφορές μεταξύ των ομάδων υπολογίστηκαν με το chi-squared. Όλες οι αναφερόμενες τιμές p συγκρίνονται με επίπεδο σημαντικότητας 5%.

Αποτελέσματα: Οι δύο πληθυσμοί έχουν αντίστοιχη ηλικία ($47,53 \pm 13,1$ έναντι $47,82 \pm 13,6$). Η πλειοψηφία όλων των συμμετεχόντων ήταν παντρεμένοι και το 76% των επισιτιστικά ανασφαλών ήταν άνεργοι σε σύγκριση με το 16% του γενικού πληθυσμού ($p < 0,001$). Επιπλέον, οι επισιτιστικά ανασφαλείς είχαν λιγότερα έτη εκπαίδευσης ($10,98 \pm 8,5$ έναντι $12,66 \pm 3,6$, $p < 0,001$) και ήταν πιο πιθανό να έχουν 2 ή περισσότερα παιδιά ($p < 0,001$). Συνδέθηκαν επίσης με υψηλότερο ποσοστό υπέρβαρου και παχυσαρκίας (υπέρβαροι 44,0% έναντι 37,5% και παχύσαρκοι 25,4% έναντι 18,0%), με μόλις το ένα τέταρτο να έχει φυσιολογικό δείκτη μάζας σώματος - BMI (28,1%). Όσοι ζούσαν σε επισιτιστική ανασφάλεια κατανάλωναν λιγότερη ενέργεια, περισσότερους υδατάνθρακες, περισσότερη πρωτεΐνη και λιγότερο λίπος. Χρησιμοποιώντας τις 1950 θερμίδες ανά ημέρα ως δείκτη επαρκούς ενεργειακής πρόσληψης, μόνο το 58% όσων βρίσκονταν σε επισιτιστική ανασφάλεια λάμβαναν επαρκή πρόσληψη σε σύγκριση με το 77% του γενικού πληθυσμού. Το εύρος ατόμων που καταναλώνουν λιγότερο από 1950 kcal / ημέρα για κάθε ομάδα παρουσιάζεται σε ένα boxplot (Εικόνα 12.B). Οι αποδέκτες του προγράμματος επισιτιστικής ανασφάλειας FEAD συνέχισαν να παρουσιάζουν υποσιτισμό πρωτεΐνης (18,6%), σε αντίθεση με το 5,0% του γενικού πληθυσμού. Ως ποσοστό της ενέργειας, η κατανάλωση κορεσμένων λιπαρών ήταν παρόμοια και στις δύο ομάδες και υπερέβαινε κατά πολύ το συνιστώμενο μέγιστο 10% της συνολικής ενέργειας ανά ημέρα. Στις περισσότερες ομάδες τροφίμων, η κατανάλωση σε γραμμάρια ανά ημέρα μεταξύ των δύο ομάδων είχε στατιστικά σημαντική διαφορά. Η κατανάλωση χυμών φρούτων, ελαιόλαδου και ξηρών καρπών, κρέατος, ψαριών και θαλασσινών, ζαχαροπλαστικής και παγωτού και οίνοπνεύματος ήταν υψηλότερη στον γενικό πληθυσμό σε σύγκριση με τον πληθυσμό που βρίσκεται σε επισιτιστική ανασφάλεια. Ο τελευταίος βρέθηκε ότι καταναλώνει περισσότερα όσπρια και πατάτες την ημέρα. Στατιστικά σημαντική διαφορά διαπιστώθηκε όταν ο αριθμός γευμάτων ανά ημέρα και η συχνότητα πρωινού συγκρίθηκε μεταξύ των δύο ομάδων ($p < 0,001$). Ο πληθυσμός με επισιτιστική ανασφάλεια φαίνεται να παρακάμπτει το πρωινό συχνότερα από τον γενικό πληθυσμό (58,8% έναντι 38,8%) και σχεδόν ποτέ δεν καταναλώνει περισσότερο από έξι γεύματα την ημέρα (συμπεριλαμβανομένων των σνακ).

Συμπεράσματα: Σχεδόν δέκα χρόνια μετά το ξέσπασμα της οικονομικής κρίσης στην Ελλάδα, ακόμη υπάρχουν ανισότητες στην πρόσβαση σε τροφή. Το “διπλό φορτίο” της κακής θρέψης είναι ολοφάνερο στους ευαίσθητους πληθυσμούς, παρόλη τη συμμετοχή τους σε προγράμματα επισιτιστικής βοήθειας. Η μη επαρκής πρόσληψη ενέργειας και πρωτεΐνης παραμένει ένα ζήτημα για αυτούς που ζουν σε επισιτιστική ανασφάλεια. Ενώ η ιδέα ότι η επισιτιστική ανασφάλεια αυξάνει τον κίνδυνο για παχυσαρκία μπορεί να είναι αμφιλεγόμενη, όλο και περισσότερες έρευνες δείχνουν προς αυτό το συμπέρασμα. Το πρόσωπο της επισιτιστικής ανασφάλειας αλλάζει και ενώ αρχικά ήταν συνδεδεμένο με την υποθρεψία, υπάρχουν πλέον ενδείξεις που το σχετίζουν με το υπέρβαρο και την παχυσαρκία. Τα ευρήματα αυτής της μελέτης καταδεικνύουν τη σημασία της αύξησης πρόσβασης σε προσιτές υγιεινές τροφές για όλους τους ενήλικες, γεγονός που υποδηλώνει την ανάγκη βελτίωσης των εθνικών πολιτικών στην Ελλάδα ή / και την εφαρμογής τους.

Λέξεις κλειδιά: επισιτιστική ανασφάλεια, κακή θρέψη, επισιτιστικά προγράμματα, ΤΕΒΑ

Abstract

Background: 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.¹ The application of this concept to the family level is household food security, with individuals within households as the focus of concern.¹ When people do not have enough food, when they consistently need to choose inexpensive low-quality calories or experience chronic stress about where they can get their next meal, their health can suffer. People experiencing food insecurity are at a higher risk for diet-related diseases such as type 2 diabetes, high blood pressure, heart disease, and obesity.² Moreover, when an individual or family cannot afford enough nutritious food they sometimes adopt coping strategies and trade-offs that work in a short-term, to avoid hunger. However, over time this can increase the risk for diet-related disease and make it more challenging to manage. Since the beginning of austerity in 2009, there has been a 40% increase in the prevalence of food insecurity across Europe.³ In Greece, 36% of the population was at risk of poverty or social exclusion in 2015.⁴ This is the first study to assess the eating habits of food insecure individuals in Greece and evaluate the effectiveness of the flagship food assistance program, FEAD (Fund for European Aid to the Most Deprived).

Objective: Overall, in this research we study the nutritional behavior of food insecure population (FEAD recipients) in comparison to the general population. We aim to assess the nutritional intake and dietary habits of FEAD-targeted population. Specifically, we examine their demographic data, rates of overweight and obesity and their specific characteristic in macronutrient intake. Food groups consumption for both food insecure and general population was calculated and compared to Greek Food Based Dietary Guidelines and WHO East Mediterranean recommendations. We also analyzed their dietary habits, the meal and breakfast frequency consumption. This research gives a picture of the population receiving food aid from the only nationally coordinated food assistance program in Greece, while conducting an indirect evaluation of FEAD effectiveness.

Methods: A case control study was carried out during December 2017 – December 2018, after obtaining the approval of the Ethics Committee of Agricultural University of Athens. A total of 499 recipients of the FEAD program across all Greece were enrolled in the study (cases-food insecure individuals) alongside an age-matched control group (n=545). Socio-demographic variables that were recorded and overweight and obesity were defined as body mass index $24.9-29.9\text{kg/m}^2$ and $>29.9\text{kg/m}^2$, respectively. Dietary habits of the past month were assessed through a validated semi-quantitative⁵ FFQ. The FFQ also includes information of all main food groups that are consumed. To calculate the nutritional density of each food variable of the Food Frequency Questionnaire, we created our own Food Composition Border. As energy cut off we used a minimum daily intake <1.950 Kcal and protein malnutrition was defined as daily intake $\leq 0,75\text{gr/kg}$ body-weight⁶. Total protein consumption was divided by source into Protein from plant sources and protein from animal sources. An analysis of macronutrients as percent of energy was conducted. Then, total fat distinguished into polysaturated, monosaturated and saturated fat, as percent of energy. Classification into food groups of the food items

evaluated in FFQ for comparison with the GFBGDG was conducted. Normally distributed continuous variables will be presented as mean values \pm standard deviation (mean \pm SD), while categorical variables as absolute and relative frequencies separately for cases and controls. P-P plots and histograms were used to assess normality. Independent sample t-test and Mann-Whitney U-test were used to determine differences between variables. Differences between groups were calculated with chi squared test. All reported p-values are compared to a significance level of 5%.

Results: The two populations are age matched (47.53 \pm 13.1 vs. 47.82 \pm 13.6). The majority of all the participants were married, and 76% of the food insecure were unemployed compared to 16% of general population ($p < 0.001$). Moreover, the food insecure had less years of education (10.98 \pm 8.5 vs. 12.66 \pm 3.6, $p < 0.001$) and were more likely to have 2 or more children ($p < 0.001$). Being food insecure was associated with higher prevalence of overweight and obesity (overweight 44.0% vs. 37.5 and obese 25.4% vs. 18.0%) with barely a quarter of the food insecure having a normal range BMI (28.1%). Food insecure consumed less total energy, more carbohydrates, more protein, and less fat. Applying the 1950 kcal per day cut off, only 58% of food insecure receive adequate intake compared to 77% of the general population. The range of individuals consuming less than 1950 kcal/day for each group is illustrated in a boxplot (Figure 12.B). FEAD recipients continued to experience protein malnutrition (18.6%), whereas general population's rate was 5.0%. As calculated percent of energy the consumption of saturated fat was similar in both groups and far exceeded the 10% recommended max of total energy per day. In most food groups the grams per day consumption between food insecure and the general population has statistically significant difference. The consumption of fruit juices, olive oil and nuts, meat, fish and seafood, confectionary and ice cream and alcohol were higher in the general population in comparison to the food insecure. Moreover, the food insecure population consumes more legumes and potatoes per day. Statistically significant difference was found when meals per day and breakfast frequency was compared between the two groups ($p < 0.001$). The food insecure population seems to skip breakfast more often than the general population (58.8% vs. 38.8%) and almost never consume more than six meals per day (including snacks).

Conclusions: About ten years after the outburst of the economic crisis in Greece, disparities in food access continue to exist. The double burden of malnutrition is becoming evident in vulnerable populations, despite being enrolled in a food assistance program. Inadequate energy intake and protein malnutrition remains an issue for those living under food insecurity. While the idea that food insecurity increases the risk of obesity may be counterintuitive, more and more studies point that way. Food transition was primary connected with underweight, but indications may lead to the changing face of food insecurity that is connected with overweight and obesity. The findings of this research address the importance of increasing access to affordable healthy foods for all adults, suggesting the need for improvements in national policies in Greece and/or their implementation.

Keywords: food insecurity, malnutrition, transition, food assistance, FEAD

Acknowledgements

Firstly, I would like to express my sincere gratitude to my advisor Prof. Kapsokefalou Maria for the continuous support of my Master thesis and related research, for her motivation and immense knowledge. Also, I would like to thank the rest of my thesis committee: Assistant Professor Papaspyrou Salome and Professor Zampela Antoni.

I wish to thank various people for their contribution to this project; Dr. Antonis Vlassopoulos for the hard questions which incited me to widen my research from various perspectives; Dr. Malisova Olga for the statistics manipulation; Filippou Konstantina for her encouragement throughout my research. Their guidance and help gave me inspiration to improve the quality of this study.

Last but not the least, I would like to thank my family and friends for their patience and continuous encouragement throughout the process of researching and writing this thesis.

Acronyms

WHO	World Health Organization
FAO	Food and Agriculture Organization
UN	United Nations
US	United States
EU	European Union
UNICEF	United Nations International Children's Emergency Fund
NCD	Noncommunicable Cash
SDG	Sustainable Development Goals
FNS	Food and Nutrition Service
SNAP	Supplemental Nutrition Assistance Program
FEAD	Fund for the European Aid for the Most Deprived
WIC	Women, Infants and Children
FIES	Food Insecurity Experience Scale
FAPs	Food Assistance Programmes
GDPR	General Data Protection Regulation
PoU	Prevalence of Undernourishment
GFBDG	Greek Food-Based Dietary Guidelines
FFQ	Food Frequency Questionnaire

Context Table

1.	Introduction	5
1.1.	Food security as a multi-dimensional phenomenon	5
1.2.	Links between food insecurity and malnutrition	8
1.3.	The interrelationship between food security and sustainability	10
1.4.	Food aid projects and programs	11
1.5.	Trends in food security and progress towards nutrition improving -Prevalence of undernourishment worldwide	13
1.5.1.	Food insecurity in Africa	14
1.5.2.	Food insecurity in Asia	17
1.5.3.	Food insecurity in America.....	18
1.5.4.	Food insecurity in Europe	19
1.5.5.	The case of Greece	22
1.6.	Research aim and objectives	24
2.	Methodology	25
2.1.	Research Design and study sample.....	25
2.2.	Socio-demographic statistics and anthropometry.....	25
2.3.	Dietary assessment	25
2.4.	FEAD satisfaction survey	28
2.5.	Statistical Analysis.....	28
3.	Results.....	29
4.	Discussion.....	36
5.	Limitations and Future Research	40
6.	Conclusion.....	41
7.	References	42
8.	Appendices	46
8.1.	Appendix A: Consumption (gr/day) of Food Groups.....	46
8.2.	Appendix B: Energy deficit of individuals with Inadequate Energy Intake	47
8.3.	Appendix C: Semi-quantitative questionnaire (cases)	48
8.4.	Appendix D: Semi-quantitative questionnaire (controls)	52
8.5.	Appendix E: Food Composition Table	56

1. Introduction

1.1. Food security as a multi-dimensional phenomenon

The concept of food security first appeared years ago during a global human crisis.⁷ In the early 1970s, turbulence in the currency and energy markets, alongside a number of other unfavorable circumstances, resulted in extreme instability of agricultural commodity prices. This early version of the term food security focused on food availability and ensuring global and local price stability for basic foods. At the 1st World Food Conference food security was defined as ‘the availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices’.⁸ Since then, a lot of alternative definitions have been reported, highlighting the importance of food security and its multi-dimensional nature. Notably, there are more than 190 different studies on the concept and definition of food security.⁹ Many academic disciplines have engaged with it, including agriculture, and numerous national and international governmental and nongovernmental agencies.

The definition that acquired the broadest acceptance is 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”.¹ The application of this concept to the family level is household food security, with individuals within households as the focus of concern. Food security analysts look at the combination of the following three main elements: food availability, food access and food utilization.¹⁰

“Food availability” refers to the availability of food in enough quantities and on a consistent basis. It includes the stock and the production in a given area and the capacity to bring in food from elsewhere, through trade or aid.¹¹ “Food access” exists when people are able to regularly acquire adequate quantities of food, through purchase, home production, barter, gifts, borrowing or food aid. Finally, “food utilization” relates to the nutritional impact that consumed food must have on people. It entails cooking, storage and hygiene practices, individuals’ health, water, and sanitation, feeding and sharing practices within the households. These are the three main domains of food security (Figure 1)¹². Food insecurity, instead, exists when people do not have adequate physical, social or economic access to food as defined above.¹ Thus, when food availability, access, and utilization do not exist, people are food insecure. Food insecurity typically affects those who are most socioeconomically disadvantaged and can sometimes be classified into two categories; transitory and chronic. When people move in and out of food insecurity as their circumstances change, food insecurity is transitory. However, increasingly, people are also experiencing chronic food insecurity.¹³

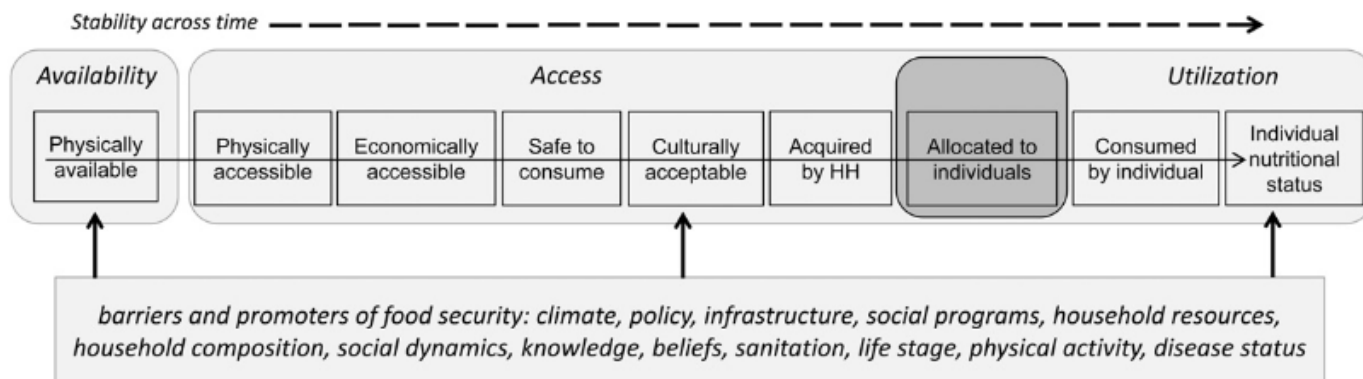


Figure 1: The loci within the food security conceptual pathway by domain of food security

Source : Jones AD, Ngure FM, Pelto G, Young SL. What Are We Assessing When We Measure Food Security? A Compendium and Review of Current Metrics. *Advances in Nutrition*. 2013;4(5):481-505.

The US Department of Agriculture (USDA) defines food insecurity as “a household-level economic and social condition of limited or uncertain access to adequate food”, and it is an important national health problem and an underrecognized social determinant of health.¹⁴ Based on that, the environmental circumstances of people’s life determines whether people are healthy or not. The determinants of health include the social and economic environment, the physical environment, and the person’s individual characteristics and behaviors.¹⁵ To a large extent, factors such as where a person lives, the state of its environment, genetics, its income, and education level, and the relationships with friends and family all have considerable impacts on health and consequently to food security.

The United Nations Food and Agriculture Organization (FAO) has undertaken a project named as Voices of the Hungry (VoH) to develop a survey-based experiential measure of access to food¹⁶ known as the Food Insecurity Experience Scale (FIES). FIES estimates moderate or severe food insecurity derived from responses to a standard set of questions (Table 1) that focuses on the respondents (or their households) access. Based on corresponding answers to conditions and behaviors, a classification in levels is determined. The classification by FIES can potentially be more up to date than other measures because the collection and the analysis of the data can be easy and quick.

Food insecure people may have to choose between meals and medicine, between paying their rent and filling lunch boxes. They lack consistent access to enough nutritious food for an active, healthy life and they cannot always stretch their household budget to meet their basic needs. Therefore, a food insecure person can have serious long-term effects on health.

Table 1: The Food Insecurity Experience Scale¹⁷

	Standard label	Question wording
1	WORRIED	During the last 12 MONTHS, was there a time when You were worried you would not have enough food to eat because of a lack of money or other resources?
2	HEALTHY	Still thinking about the last 12 MONTHS, was there a time when you were unable to eat healthy and nutritious food because of a lack of money or other resources?
3	FEWFOODS	Was there a time when you ate only a few kinds of foods because of a lack of money or other resources?
4	SKIPPED	Was there a time when you had to skip a meal because there was not enough money or other resources to get food?
5	ATELESS	Still thinking about the last 12 MONTHS, was there a time when you ate less than you thought you should because of a lack of money or other resources?
6	RANOUT	Was there a time when your household ran out of food because of a lack of money or other resources?
7	HUNGRY	Was there a time when you were hungry but did not eat because there was not enough money or other resources for food?
8	WHOLEDAY	During the last 12 MONTHS, was there a time when you went without eating for a whole day because of a lack of money or other resources?

Healthy bodies and minds at every age require nutritious meals.¹⁸ First, when people do not have enough food, when they consistently need to choose inexpensive low-quality calories or experience chronic stress about where they can get their next meal, their health can suffer. People experiencing food insecurity are at a higher risk for diet-related diseases such as type 2 diabetes, high blood pressure, heart disease, and obesity.² Moreover, when an individual or family cannot afford enough nutritious food they sometimes adopt coping strategies and trade-offs that work in a short-term, to avoid hunger. However, over time this can increase the risk for diet-related disease and make it more challenging to manage.

This reality can lead to a circle of poor health, as shown in Figure 2. The circle begins when an individual or family is not able to afford enough nutritious food. Importantly, the combination of financial stress and inadequate nutrition can result in poor disease management. Additionally, time and money that are needed to respond to this worsening health crisis further drain the household budgets leaving insufficient amount of money for essential nutrition and medical care. This causes the cycle to continue as food insecurity has negative impacts on the lives of future generations. Children at risk of hunger are more likely to be in poor health and struggle in school.¹⁹ For some, it may have negative lifelong implications that could prevent a growing child from reaching their full potential.

Cycle of Food Insecurity & Chronic Disease



Figure 2: A Conceptual Framework - Cycle of Food Insecurity & Chronic Disease

Source: *Hunger and Health - Feeding America*

1.2. Links between food insecurity and malnutrition

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients.²⁰ The term malnutrition covers two broad groups of conditions:

- 'Undernutrition' encompassing stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals).
- Overweight, obesity and diet-related noncommunicable diseases (such as heart disease, stroke, diabetes, and cancer).

Malnutrition and poor diets constitute one of the most important reasons of the global burden of disease.²¹ High rates of different forms of malnutrition coexist in many countries. Undernutrition, overweight and obesity are possible outputs of food insecurity. Many countries have a high prevalence of more than one form of malnutrition.²² The coexistence of multiple forms of malnutrition can occur not only within countries and communities but also within households²² – and can even affect the same person over their lifetime. The coexistence of undernutrition (stunting, wasting, vitamin and mineral deficiency) along with overweight and obesity, or diet-related NCDs constitutes the double burden of malnutrition. Furthermore, the coexistence of undernutrition, micronutrient deficiencies, and obesity represent the triple burden of malnutrition that can lead to a range of major health, social and economic challenges.²³

A person can primarily be affected by undernutrition and micronutrient deficiencies and then, in rapidly growing rates, develop overweight and obesity. This phenomenon of undernourishment, micronutrient deficiencies, and obesity coexistence is called hidden hunger. Additionally, the multiple burden of malnutrition is concentrated among the poor and can more often be detected in low-, lower-middle and middle-income countries. Specifically, poor access to food can lead to undernutrition as well as overweight, obesity and the access to healthy food. This process/interaction increases the risk of low birth weight, childhood stunting and anemia in women of reproductive age, and it is linked to overweight in school-age girls and obesity among women, particularly in upper-middle- and high-income countries. Figure 3 illustrates two main pathways with the results of food insecurity: the first leads to undernutrition and the second to overweight and obesity. However, there are secondary pathways showing that inadequate food access can lead to multiple forms of malnutrition.

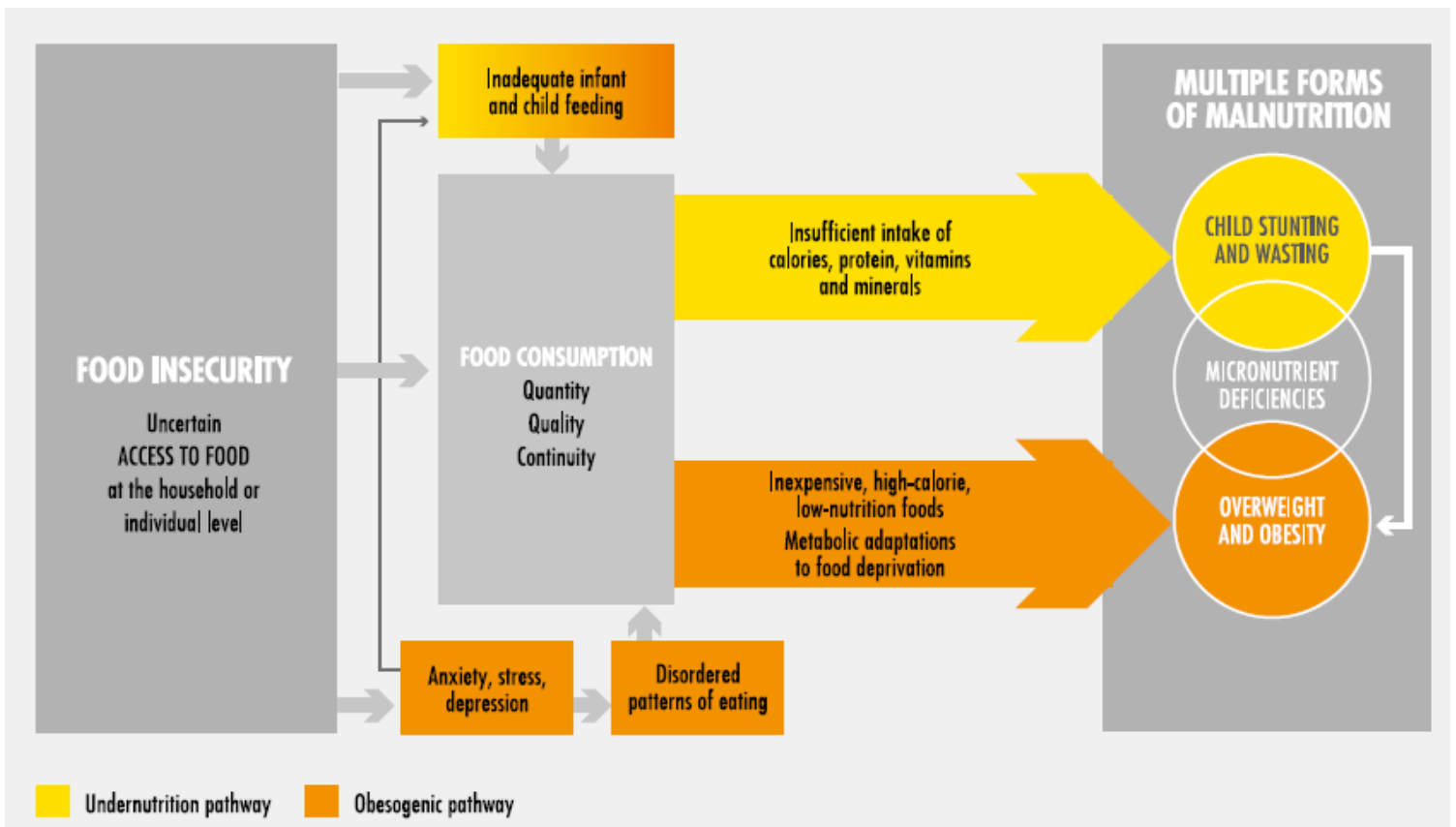


Figure 3: Multiple forms of malnutrition as a consequence of inadequate food access

Source: 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.

The pathway from food insecurity to undernutrition is easily understood. Diets characterized by insufficient intake of calories, proteins, vitamins, and minerals will eventually have a negative effect on nutritional status. On the other hand, the second pathway leads from food insecurity to overweight and obesity. Although it may appear as a paradox, there is a clear link between these two conditions and it passes through diets affected by the cost of food. In the context of globalized food markets where the relative cost of foods that are high in fats and sugar is low compared to fresh products such as fruits, vegetables, and legumes, the prioritization of cost for food-insecure families may result in high in energy and low in diversity, micronutrients and fibre.²² Families in food insecurity have many distressing factors in their daily lives, such as the economic weakness to buy higher in cost nutritious foods, the stress of living with food insecurity and the phenomena of social exclusion. It is therefore clear, that they may have a greater risk to develop overweight and obesity. Overweight and obesity are associated with increased total mortality and increased risk of disease or death from cardiovascular diseases, diabetes, and several types of cancer.²⁴ It does so by increasing high blood pressure, blood cholesterol, insulin resistance, and inflammation.²⁵

The existence of overweight and obesity have harmful effects in the individual and in the state and community level. Given that the risk of NCDs (heart disease, hypertension, stroke, diabetes, cancer) is increased, as mentioned above, recent studies suggest that the existence of NCDs can worsen poverty. In particular, the implications of being overweight and obese go beyond higher health care costs both for the individual and for the health care system (direct costs) to include costs related to decreased work productivity, disability, and higher mortality (indirect costs).²⁶

Furthermore, the lack of awareness about healthy diets can also contribute to the increasing prevalence of overweight and obesity across the various income groups. Over recent years, nutritional patterns have changed. Globally, calories obtained from meat, sugars and oils and fats have been increasing during recent decades²⁷, and those from fibre-rich foods such as whole grains, pulses, and roots have been declining. In parallel, consumption of processed and convenience foods continues to rise rapidly.²⁵ This nutrition transition affects dietary patterns and nutrient intake, which influence the risk of developing NCDs.

1.3. The interrelationship between food security and sustainability

The 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals (SDGs), include new global objectives that succeeded the Millennium Development Goals on 1 January 2016.²⁸ The SDGs will shape national development plans at least the next 15 years. With a deeper look at the objectives, we see that natural resources, food, and agriculture are at the heart of the 2030 Agenda.

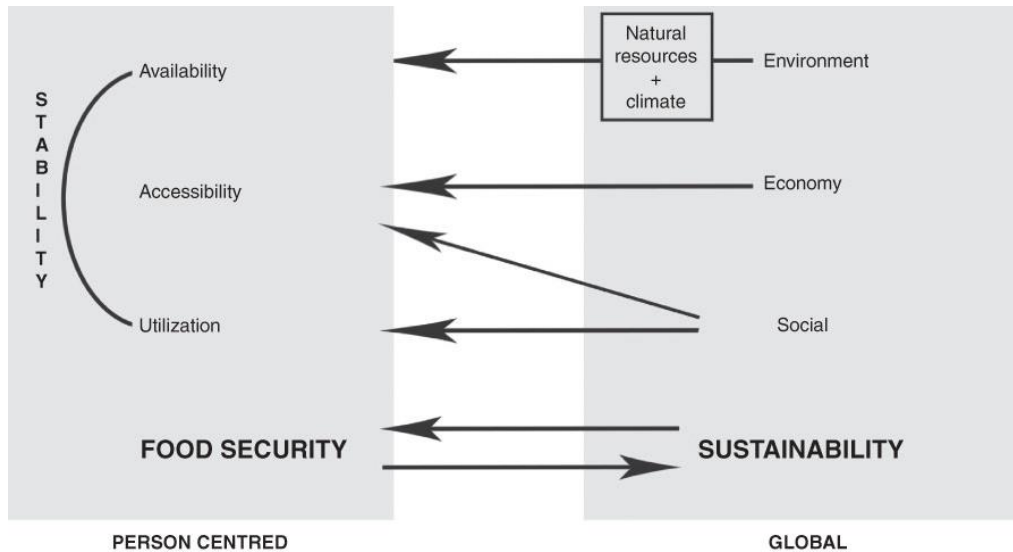


Figure 11: The interrelationships between food security and sustainability⁷

The 17 Sustainable Development Goals for sustainable development have a strong focus on hunger eradication (Zero Hunger, SDGs No2). The need to deal with these problems, and in particular the phenomenon of food insecurity, has the implementation of food aid programs as action plan. Several attributes are being shared between the two concepts of food security and sustainability. They have been designed to frame and constitute common objectives for the international community and, as such, they have been developed by international negotiations, although in different areas.⁷ Over the past years, there has been increasing agreement that sustainability is very relevant to food security,^{7,29} but its position in the food security framework has yet to be formulated. So, food security plays a crucial role in sustainability, as shown in Figure 11. Food insecurity is person-centered, while sustainability is global. The environment, and natural sources and climate, are related to availability in food security, for the long-term sustainability of food production. Social factors are linked both to utilization and to accessibility, which of course is also influenced by economic factors.

1.4. Food aid projects and programs

The objective of food assistance policies and programs is to reduce hunger, undernutrition and/or food insecurity.³⁰ Access to safe, nutritious and sufficient food must be framed as a human right, with priority given to the most vulnerable. Policies that promote nutrition-sensitive agriculture and food systems are needed, with special attention to the food security and nutrition of children under five, school-age children, adolescent girls, and women in order to halt the intergenerational cycle of malnutrition.²² There are policies in a

variety of directions, both in the general population and in sensitive population groups (pregnant, lactating, 5-59 months old, school-age children).

Food assistance programs and policies (FAPs) have been rapidly evolving over the years. FAPs include any publicly financed aid in forms of direct food, cash, or voucher transfers, or food subsidies. There is always a broader objective than the quality and quantity of food consumed, and that is to improve recipients' health and nutritional status. The food assistance programs are a nodal part of the poverty reduction strategy. Food assistance policies and programs can fill in the gaps left by the private food system and informal social safety nets so as to ensure the food security of vulnerable individuals, households and communities.³⁰

The evaluation process of a program is crucial for its effectiveness, coherence, efficiency, and relevance. The input of a program leads through its procedure to outputs and impacts. Monitoring is, of course, an integral part of the/an evaluation. Two types of evaluation exist in the process evaluation and the impact assessment. The process evaluation examines whether the program was carried out as planned and shapes a list of indicators that need to be measured. The impact assessment controls whether the program has brought about a change, in other words, is a measurement of the outcomes to examine if the program was successful. The impact is defined as the results at the recipient level that can be directly attributed to the program activities, rather than external factors. For example, for a food aid program, the evaluation examines the extent to which the program causes changes in food security conditions, as the improvement in nutritional status.³¹ The impact of food aid programs can be classified into two broad categories: qualitative (descriptive) and quantitative (statistical) approaches. Both qualitative and quantitative methods are necessary for the evaluation of the impact of food aid programs.³²

As it is known today, Public law 480 shaped food aid. Food aid can take many forms, such as program, project or emergency. A food aid program has effects on a country's overall economic development and its evaluation requires analysis of changes in the economy over time. There is no attempt to reach specific groups of beneficiaries directly. On the contrary, the food aid project targets vulnerable groups and poor regions of a country. A food aid emergency projects or program occurs after or during a crisis and mostly refers to situations that exist in developing countries. Hence, depending on the type of need, the food aid programs or projects are also shaped accordingly. For short-term crisis, emergency food aid projects are carried out. Food assistance programs pair to a long-term crisis.

There is an established link between poor human nutrition and poverty.³³ The most vulnerable social groups (women, children under 5) are the first to be affected by situations of poverty. Food aid increases the total domestic supply of food and thus leads to reduced food prices which could then have a positive impact by reducing poverty and malnutrition in low-income households.

1.5. Trends in food security and progress towards nutrition improving - Prevalence of undernourishment worldwide

Global hunger has been rising for 3 sequential years.²² The absolute number of undernourished people, that are facing chronic food deprivations, has increased by 17 million between 2016 and 2017. An estimated 821 million people – approximately one out of every nine people in the world – are undernourished.²² Simultaneously, in 2016 more than 1.9 billion adults, 18 years and older, were overweight and of these over 650 million were obese.³⁴ These are levels from almost a decade ago, as shown in Figure 4. The prevalence of undernourishment (PoU) is an indicator that FAO uses since 1974 to measure hunger and food insecurity, and while it measures inadequate consumption, it lags behind in other areas. More specifically, the food accessibility, the nutritional value or quality of people’s diets, are not taken into account in this indicator.³⁵

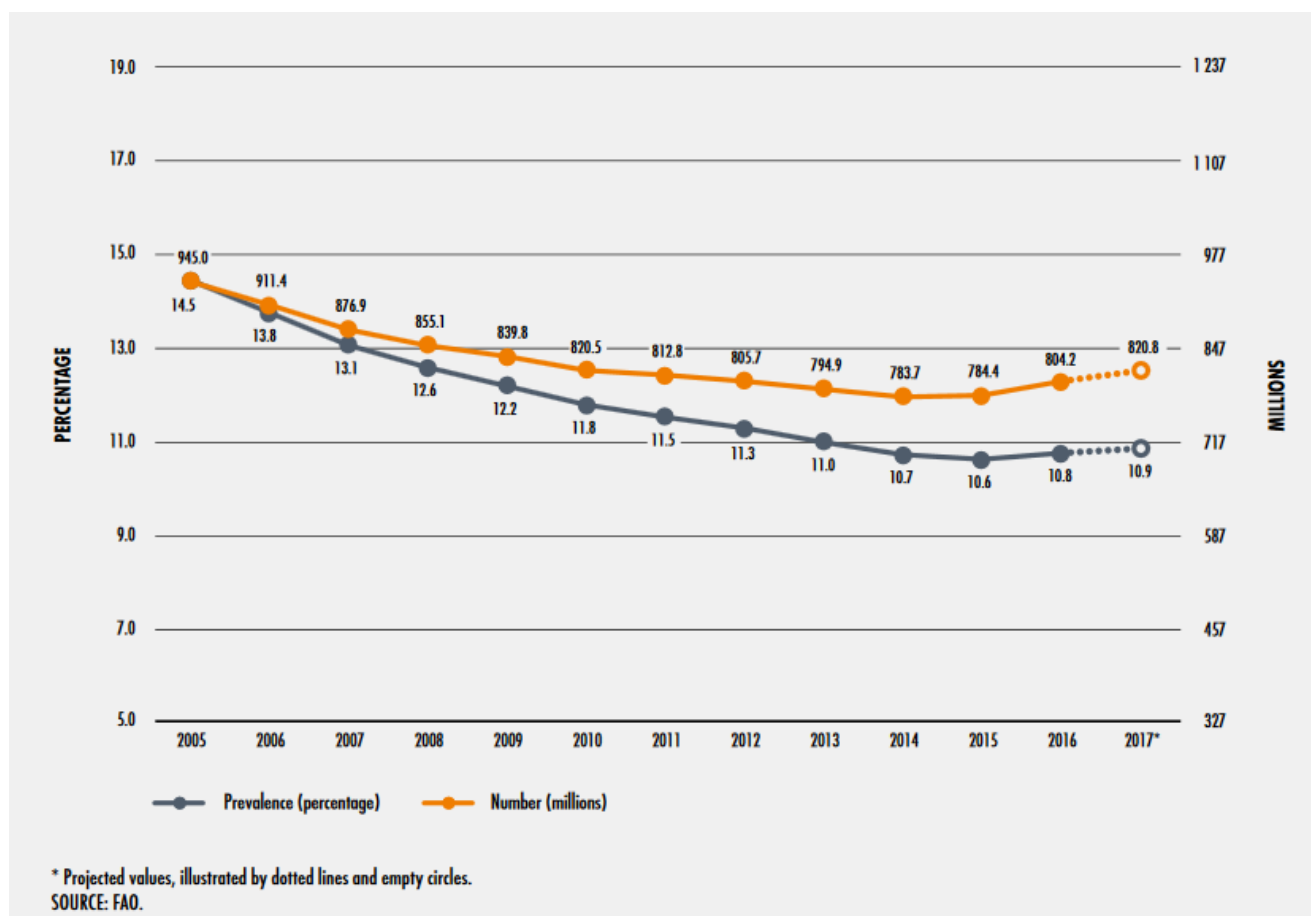


Figure 4: The number of undernourished people in the world has been on rise since 2014, reaching an estimated 821 million in 2017

Source: 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.

As shown in Figure 5, the world's food insecurity rates have risen by 1.3 points between 2016 and 2017. Undernourishment and severe food insecurity appear to be rising in almost all parts of Africa. In Asia, there appears to be a more stable situation, yet without a downward trend in rates. In Latin America, there is an increase, but less than that of Africa. Finally, in North America and Europe, after a decline in 2016 (1.2%), an upward trend (1.4%) is observed. Recognizing the importance of food and nutrition security (FNS) for improving public health, labor productivity, and economic growth, the world has committed to ending all forms of hunger by ensuring access to sufficient and nutritious food for all people (Goal 2 of the Sustainable Development Goals).³⁶

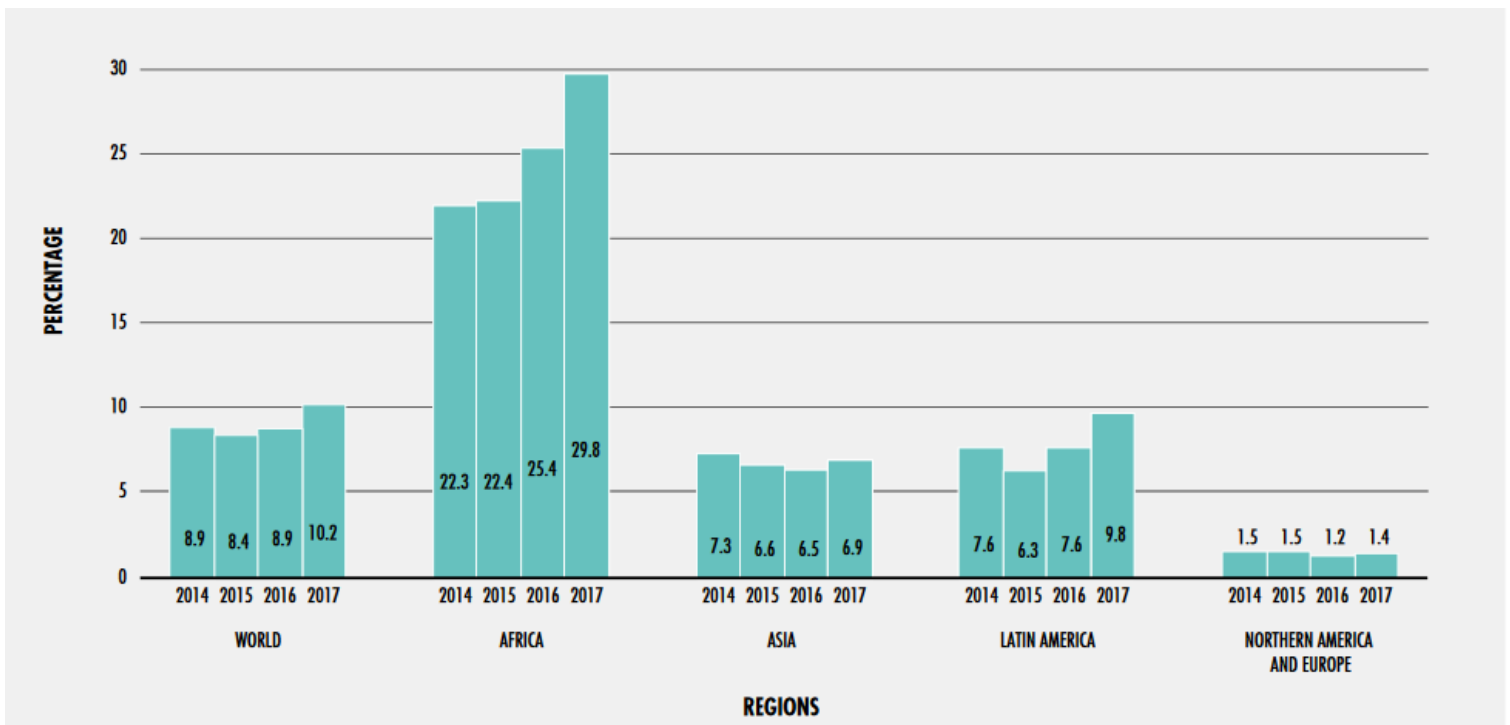


Figure 5: Percentages of Food Insecurity in every region

Source: FAO

1.5.1. Food insecurity in Africa

Africa is a continent with high food insecurity rates, mainly due to numerous armed conflicts that have been taken place on several areas. It should be noted that for many countries in Africa, war conflicts remain the main cause of severe food crises and insecurity. Conflicts result in mortalities, injuries, disabilities, and mental health issues. The human suffering is immeasurable. Particularly, food insecurity increases both in these regions and in neighboring countries due to the mass movement of refugees. Additionally, climatic conditions - mainly drought- seem to significantly fuel the food crisis, resulting in millions of people being placed under acute malnutrition. They also cause considerable economic

damage, both in the short and long term. Conflicts undermine or destroy livelihoods and prevent the accumulation of human capital. They negatively affect the mother and child nutrition, with long-lasting negative effects on human capital and labor productivity. They can also disrupt local markets by destroying infrastructure and raising transaction costs.³⁷ The public investment in agricultural research, training, and infrastructure has been insufficient. The result is the reduction of food production.

Nearly all countries in sub-Saharan Africa experience a multiple burden of malnutrition as a result of inadequate, unbalanced or excessive consumption of the macronutrients that provide dietary energy (carbohydrates, protein, and fats) and the micronutrients (vitamins and minerals) that are essential for physical and cognitive growth and development.³⁸ The prevalence of severe food insecurity in middle Africa and eastern Africa corresponds to an estimated 26 million and 62 million individuals respectively, aged 15 years or more.³⁸ The reason why hunger and nutrition status in these two regions of Africa is not improved is because of the political instability, the civil unrest and the climatic hardships. The lowest prevalence in sub-Saharan Africa is estimated for southern Africa (20 percent), and western Africa (23 percent), counter to the estimates for middle Africa (31 percent) and eastern Africa (28 percent) are relatively higher than the regional average (Figure 6).³⁹

In Southern Africa the rates of stunting continue to decline, despite the rising in the prevalence of undernourishment. Simultaneously, overweight and obesity rates grow, indicating that the double burden of malnutrition is existent in these populations. Progress towards the World Health Assembly global nutrition targets has been poor and a majority of countries need to step up their efforts, especially with concern to reduce anemia rates/cases in women of reproductive age as well as stunting and wasting in children.³⁸

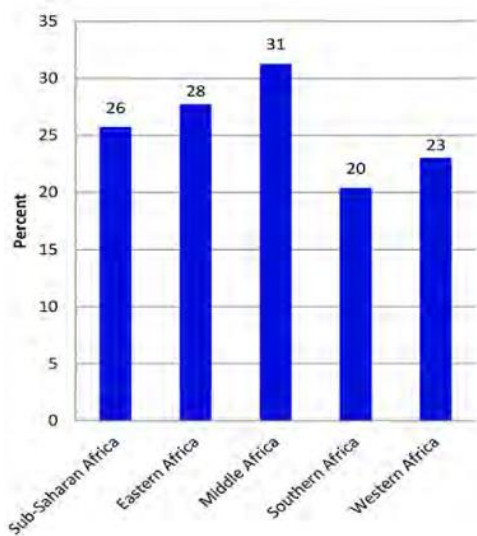


Figure 6: Prevalence of severe food insecurity across subregions in SSA

Source: FAO, *Voices of the Hungry Project*, 2016.

Despite some progress in malnutrition reduction, evidence shows that the region suffers from the triple burden of malnutrition, undernutrition, and overweight/obesity coupled with rising levels of non-communicable diseases and micronutrient (vitamins and minerals) deficiencies. The aim is to develop sustainable nutrition solutions and outcomes. These results can be achieved via multi-sectoral and multidisciplinary approaches that harmonize agriculture, nutrition, social protection, and related measures. Hence, the future policy frameworks should be based on these pylons. The support offered is aimed at, among other things, the elimination of hunger (Zero Hunger, No2 Sustainable Goal) and acute malnutrition in the entire population. The UN aims to eliminate hunger and malnutrition by 2030 constituting one of the top goals of the Sustainable Development Program.

Populations are predisposed to consume mainly what they produce locally. For example, compared to Ghanaians and Senegalese, Ethiopians are more predisposed to eat enjera than fish, dictated by food preference and geography.⁴⁰ Subsequently, the unexpected drop in harvest can highly affect rural households that mainly depend on locally produced food that sets a limit in dietary diversity.

Regarding the types of aid for food distribution or distribution products, distributions were mainly from cash-based transfers that corresponded to either food or vouchers. Pilot tests have illustrated that vouchers have improved nutritional diversity, local markets and well-being of recipients. As far as school meals are concerned, the objectives of school meal programs were mainly to reduce acute malnutrition and food insecurity in school-age children, but it also had secondary goals. Often, it was an indirect measure to increase quality education (Sustainable goal No4) as well as to encourage girls to attend Gender Equality (Sustainable Goal No5). A special case of food aid to Africa is aviation aid. They provide it when access to affected areas is impossible, or when areas are in a state of war. Air cargo programs carry light cargo transport, such as medical supplies and high energy foods, with safe, effective and sufficient access to the beneficiaries. Different types of help, therefore, also are applied to different types of beneficiaries.

The main interested member in the African region is the WFP, together with the Government of the respective country. There are various types of food programs: Emergency Operation Programs (EMOPs), Prolonged Relief and Recovery (PRRO) and Development programs (DEV). In any case, WFP supports almost all of Africa's regions with food programs tailored to the needs of each country or region. There are several Stakeholders who support this process. What seems to be new is the existence of a tendency for different programs to go through WFP and the various organizations into State implementations. The WFP is trying to transfer the technical and practical knowledge of support programs, but especially of development programs to local communities, wherever possible.

1.5.2. Food insecurity in Asia

The Southeast Asian region includes some of the richest countries of Asia and some of the poorest of the world. Achieving food security is of utter importance in any nation.⁴¹ However, food insecurity still exists in many developing countries, with Asia representing almost 65% of the world's undernourished. This calls for urgent action. At national level, the status of food security or insecurity varies dramatically. For example, the proportion of undernourished in the Democratic People's Republic of Korea amounted to a high 41.6% over 2014–2016, but it was less than 5% in the Republic of Korea. This proportion is 16.4% for Bangladesh and 22% for Pakistan in the same time period, above the Asian average of 12.1%.⁴⁵ In the People's Republic of China's (PRC) the proportion is low, but the total number of undernourished remains sizeable at 133.8 million.⁴² Some other Asian countries, such as Japan and Singapore, have managed to improve their food security, with the proportion of undernourished being less than 5%.⁴³

The Regional Overview of food security and nutrition report of WHO for 2017, also noted a slowdown in progress against hunger in recent years. In addition, it noted the need to pay more attention to the growth of the agriculture sector, the support for diverse food systems, and the public investment in quality health care, nutrition education and sanitation. Importantly, Two-thirds of the world's one billion hungry, reside in Asia and the Pacific.⁴⁴ Consequently, rising food prices are bringing the specter of food shortages and undernutrition to millions more of the region's poor.⁴⁵

A closer look at the subregions of Asia reveals that Western and South-eastern Asia are among those which contribute to this slowdown in a decreasing trend, reflecting that countries in South-eastern Asia have been affected by adverse climate conditions with impacts on food availability and prices, while countries in Western Asia have been affected by prolonged armed conflicts.

High rates of overweight and obesity are also observed in countries and regions in Asia. More specifically, two out of every five adults (or 1 billion people overall) are considered overweight or obese. Particularly, 46.3% of Malaysia's population is considered overweight or obese, Afghanistan (45.89%) and Maldives (40.3%) have high rates also with other countries not far behind, such as Bhutan at 35.3% and Pakistan at 33.1%. Prevalence of overweight and obesity in the Pacific is almost double compared to other Asian countries with the highest rates in Samoa and Tonga (84.0 % and 86.1%, respectively), followed closely by Kiribati (79.1%), the Marshall Islands (76.9%), and the Federated States of Micronesia (74.9%).⁴⁶

1.5.3. Food insecurity in America

Hunger remains a silent plague on the lives of many individuals in the United States. Sometimes the issue of hunger is considered in relation to the economically disadvantaged nations, the developing and undeveloped countries, something that occurs outside of our own borders. Although this theoretical link, reality disproves that as in a recent report by the United States Department of Agriculture (USDA)⁴⁷, statistics on 2016 household food insecurity in the United States revealed that a significant percentage of the population suffers from varying levels of food insecurity. In 2017, 88.2 percent of U.S. households were food secure, the remaining 11.8 percent (15.0 million households) were food insecure, as shown in Figure 9. Food-insecure households (with low and very low food security) had difficulty at some time during the year providing enough food for all their members due to a lack of resources. Moreover, in 2017, 4.5 percent of U.S. households (5.8 million households) had very low food security, down significantly from 4.9 percent in 2016.⁴⁸ In this more severe range of food insecurity, the food intake of some household members was reduced⁴⁹ and normal eating patterns were disrupted at times during the year due to limited resources.

Within the US population, there is a great deal of heterogeneity in the probability of food insecurity.⁵⁰ The intersection of race and other vulnerability factors is highly prevalent in the United States. Some households have higher rates of food insecurity than the national average. For example, households with incomes near or below the Federal poverty line, all households with children, households with children headed by single women or single men, women and men living alone, black- and Hispanic-headed households, and households in principal cities and nonmetropolitan. In addition, the prevalence of food insecurity varied considerably from State to State, ranging from 7.4% in Hawaii to 17.9%t in New Mexico in 2015-17. White households have a comparatively low prevalence of food insecurity, with only 9.3% experiencing difficulties obtaining sufficient nutritious food during the year.⁵¹

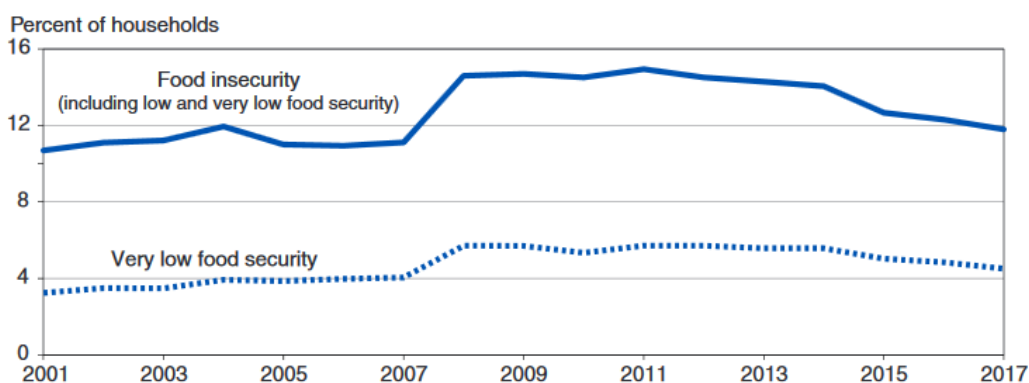


Figure 7: Prevalence of food insecurity and very low food security in the US. Both food security and very low food security indicate a slight drop in 2017 compared to 2016 prevalence rates.

Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, Current Population Survey Food Supplement.

The United States government provides a number of services targeting food insecure individuals.⁵² The most popular and largely funded among those services include the Supplemental Nutrition Assistance Program (SNAP), the Supplemental Program for Women, Infants and Children (WIC)⁴⁷, and a handful of child-targeted meal programs such as the National School Lunch Program (NSLP), the School Breakfast Program (SBP), and the Summer Food Service Program (SFSP).⁵³ Altogether these programs, along with several smaller initiatives, make up the bulk of federal food aid.

The primary tool used across the lifespan to reduce food insecurity is the Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamp Program).⁵⁴ The purpose of SNAP is to help food insecure population to stretch their food budgets and buy healthy food. SNAP is a nutrition program and its benefits are given on a plastic card (electronic benefits transfer), every month. In 2016, SNAP assisted approximately 44 million recipients.

Reviewing the outcomes of the US program, Supplemental Nutrition Assistance Program (SNAP), on health it shows that SNAP recipients consistently spend more on food than do non-participants with equivalent post-transfer incomes. However, whether SNAP participation impacts on nutrient intake remains inconclusive, whereas participation in SNAP is positively associated with obesity for women, although not for men and evidence is mixed for children.³⁰ According to the most recent Behavioral Risk Factor Surveillance System data, adult obesity rates now exceed 35% in seven states, 30% in 29 states and 25% in 48 states, West Virginia has the highest adult obesity rate at 38.1% and Colorado has the lowest at 22.6%⁵⁵.

1.5.4. Food insecurity in Europe

The Great Recessions across Europe have been accompanied by growing concern about food insecurity.³ What is driving food insecurity is a crucial question. Situations like unemployment, debt, and housing arrears lead to food insecurity. The results of this recent recession affect the households in several levels, one of which is the food domain. However, all EU-28 countries do not face the same problems with the same intensity, as we will see below. Across Europe, the number of people being reported to be unable to afford a meal with a protein source every other day, the only surveillance measure of food insecurity in Europe, was declined over 2005 to 2009, falling from 12% of the EU-27 population to 8.7%.³ But in 2010, this trend reversed, with food insecurity rising to 10.9% in 2012 and remaining

elevated in 2013. After 2010, , an estimated total of approximately 13.5 million additional people were food insecure over 2011 to 2013 over and above the historical trend. In 2016, 118.0 million people (23.5 % of the population) in the EU lived in households at risk of poverty or social exclusion.⁵⁶

The EU region suffers the greatest NCD burden. One of the major risk factors is the unhealthy diet according to WHO⁵⁷. The prevalence of overweight and obesity has been steadily increasing in the WHO European Region, as it turns out to form the 2018 European Health Report. In 2010, 55.9% of the population was overweight compared to 2016 where the rate rises to 58.7%.⁵⁸ An increase that also occurred in obesity rates, where from 20.8% in 2010 it reaches 23.3% in 2016. The aforementioned data is clearly depicted in Figures 8 and 9. Overall, national-level data for 2016 showed that in most countries in the European Region, overweight was more prevalent among men, while obesity was more prevalent among women.⁵⁸ Alcohol consumption, tobacco use, and overweight and obesity remain major public health problems in the European Region, with rates of alcohol consumption and tobacco use being the highest globally.⁵⁸ In total, food insecurity in EU can affect people’s health, well-being, and productivity.

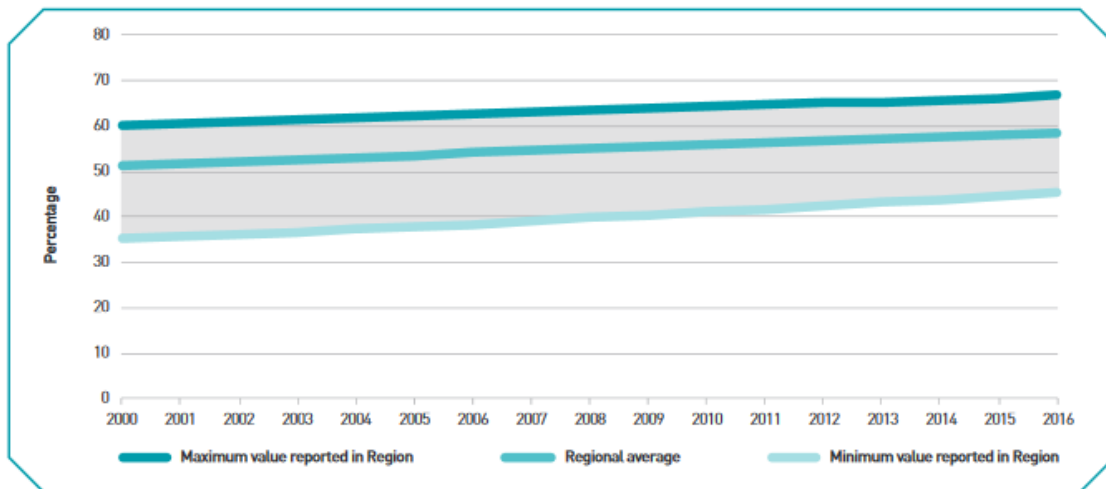


Figure 8: Age-standardized prevalence of overweight (defined as BMI ≥ 25Kg/m²) in people aged 18 years and over, WHO estimates (%)

Source: *Health for All (database of the WHO European Health Information)*

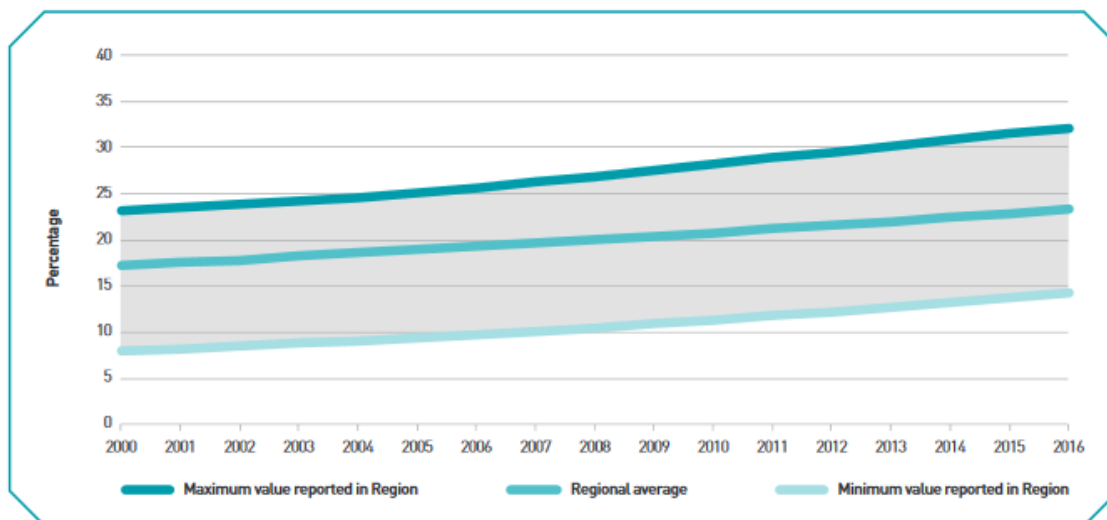


Figure 9: Age-standardized prevalence of obesity (defined as BMI \geq 30Kg/m²) in people aged 18 years and over, WHO estimates (%)

Source: *Health for All (database of the WHO European Health Information)*

While there is significant progress in fighting hunger across the EU, there are some subregions that still face a relatively large PoU(%). As evidenced by EU Health Report (2018), Albania reaches 4.9%, Bosnia and Herzegovina 2.5%, the Former Yugoslav Republic of Macedonia 3.9% and Serbia 5.6%, the years 2014-2016.

Poverty reduction is one of the headline goals of the Europe 2020 strategy.⁵⁹ The Fund for European Aid to the Most Deprived (FEAD) has been set up to contribute to achieve this target. Its specific objective is to alleviate the worst forms of poverty in the EU and to promote the social inclusion of the most deprived persons.⁴ It provides material support and social inclusion measures to each time targeted population group. The Fund supports two types of operational program that complement national poverty eradication and social inclusion policies which remain the prerogative of Member States:

- OP I: 'food and/or basic material assistance operational program' means an operational program supporting the distribution of food and/or basic material assistance to the most deprived persons, combined where applicable with accompanying measures, aimed at alleviating the social exclusion of most deprived individuals;
- OP II: 'social inclusion of the most deprived persons' operational program' means an operational program supporting the activities outside active labor market measures, consisting in non-financial, non-material assistance, aimed at the social inclusion of the most deprived people/individuals.

Overall, the available budget for FEAD interventions over the 2014-2020 periods equals 4.49 billion Euros (including €674 million national co-financing and excluding €154 million technical assistance). Of these, 97.56% is allocated to the OP I and the remaining 2.44% to OP II. There are examples of projects from countries in the European Union that use either OP I, either OP II.

Except for food distribution, counseling services with trained social workers are delivered in some countries. For example, the LEAP project in Malta that provides personalized support to families. After meeting arrangement, a SWOT analysis of the family is constructed to find the channels of effectively help the family out of poverty and the suitable area of support (employment, healthcare, and housing) is targeted. Another area of focus is the skills development of vulnerable groups. Deterrent factors of social inclusion include lack of skills, necessary documentation and lack of language proficiency. In Poland, Culinary project found that recipients lacked nutritional awareness and the independent skills to prepare food. These could lead to unhealthy eating, unbalanced meals, and food waste. Hence, they help culinary workshops throughout the country.

Four countries opting to implement FEAD under OP II: Netherlands, Sweden, Denmark, and Germany. The Netherlands supports socially excluded individuals and focuses on the social inclusion of older people with a disposable income. The project is called Elderly in Community and offers activities in libraries across the country. It aims to help the elderly to overcome the feeling of loneliness and isolation. Sweden's project is called Dignity Omnia-Better life for all and has a specific target group. It aims to help newly-arrived and mobile EU citizens acquire useful skills. Another Swedish program uses mobile teams to reach out to homeless people (particularly Roma) and offer psychological and legal counseling. Denmark also targets homeless people. The UDENFOR project offers homeless people a locker room for their belongings and advice on finding employment, food access and access to healthcare. Moreover, it offers temporary employment to locker room facilities and counseling sessions. Finally, Germany targets mobile EU citizens, their children, and homeless people. For instance, StreetBer project reaches the group of homeless people and offers counseling. To sum up briefly, FEAD can serve as initial point of support and aims to target initial basic needs of the most vulnerable populations across EU.

1.5.5. The case of Greece

The financial crisis in Greece, which began in 2009, had adverse effects on the socioeconomic status of the population and triggered humanitarian action to help those most in need. According to Eurostat, in 2012 about 3.8 million people in Greece (34.6% of the total population) were at risk of poverty or social exclusion, while unemployment reached 26% at the end of 2012. During the same year, approximately 686.000 children (35.4%) were at risk of poverty or social exclusion.⁶⁰

The FEAD operational program in Greece aims to provide food and basic material assistance to the most deprived households. The seriousness of food deprivation led to a significant allocation of the operational program towards food assistance for the most disadvantaged. Food aid and basic material assistance are given to all extremely poor people (around 400,000) including those who are homeless. It also tries to improve their chances for social reintegration.⁶⁹ The scope of the FEAD is specialized in Greece through the OP I.

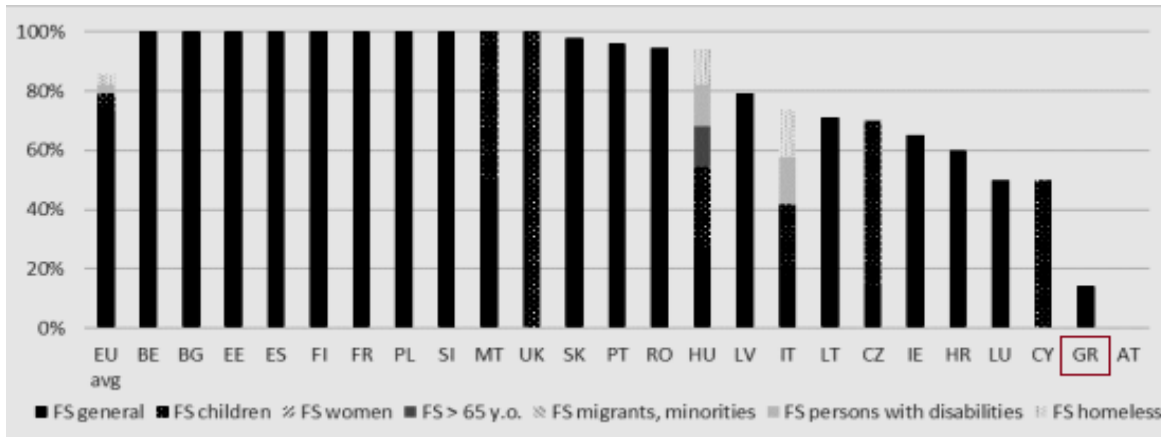


Figure 10: Share of FEAD funding for food support (FS) by OP I MS and target group

Source: FEAD Interim Report 2018

Figure 10 illustrates the share of FEAD funding for support aimed at alleviating food deprivation. Greece's rates seem lower than other countries (~18%), because Greece also devoted funds to material support. The system for distributing food was developed based on the geography of the country (many islands, many remote and mountainous areas where people are scattered). The recipients were identified regarding the number of people who participated in the previous national program of the humanitarian crisis and the intention to continue helping them. The selection of the recipients was decided by income and assets criteria set by the Ministry of Labor, Social Security, and Social Solidarity. Every potential recipient could submit an online application and after a cross check with the economic data, a finalized number of beneficiaries was formed.

Products were distributed either as centralized or decentralized supplies. For centralized supplies, the public procurement procedure is carried out nationally by the FEAD Managing Authority, which also organizes the distribution by the supplier to responsible municipalities and regions (then distributing to local partner organizations). In the case of decentralized supplies, municipalities and/or regional authorities are directly responsible for the procurement of the products and their distribution to the local organizations that are in direct contact with those in need.

The Greek Managing Authority of FEAD opted to distribute not only dry food but also fresh food. Although dry foods have their advantages as they are easier to store, transport and distribute, fresh food was included in the food parcels. The reasons for that decision were their high nutrition value and the development of healthy nutritional habits among recipients, in line with EU priority to provide assistance in households experiencing extreme poverty.

1.6. Research aim and objectives

Overall, in this research we study the nutritional behavior of the food insecure population (FEAD recipients) in comparison to the general population. We aim to assess the nutritional intake and dietary habits of the FEAD-targeted population. Specifically, we examine their demographic data, rates of overweight and obesity and their specific characteristic in macronutrient intake. Food groups consumption for both the food insecure and the general population was calculated and compared to GFBDG and WHO East Mediterranean recommendations. We also analyzed their dietary habits as well as the meal and breakfast frequency consumption. This research gives a picture of the population receiving food aid from the only nationally coordinated food assistance program in Greece, while conducting an indirect evaluation of FEAD effectiveness. As a preliminary indicator, an estimation of the nutritional status of the general population in Greece is performed.

2. Methodology

2.1. Research Design and study sample

A case control study was carried out during December 2017 – December 2018, after obtaining the approval of the Ethics Committee. A total of 499 recipients of the FEAD program across Greece were enrolled in the study (cases-food insecure individuals) alongside an age-matched control (n=545). Cases questionnaires were collected at procurement points. No exclusion criteria applied and their participation in other food aid programs was not recorded. The collection was conducted in both urban and rural areas. Control consists of individuals invited to take part in parks, squares, outside schools and recreational spaces, in both urban and rural areas. The areas of collection were mapped against socio-demographic characteristics. The age-matching criteria in a population level were selected as it would have an impact on other confounding factors such as marital status, size of family and occupational status. We also made sure that controls were not recipients of the FEAD program. All participants were informed in detail about the aims and procedures of the study and provided their written informed consent.

2.2. Socio-demographic statistics and anthropometry

Socio-demographic variables that were recorded were: gender, age, educational level measured by years of school, number of children, number of people that live in the household, occupational status (in the following categories: employed, unemployed, retired, housewife) and marital status categorized as single, married, divorced or widowed.

The Ethics Committee of the Agricultural University of Athens approved the design, the procedures and the aim of the study. A consent form was given to the participants with a view to informing them about the content of the survey, the anonymity of the questionnaires and the safeguarding of personal data based on the GDPR standards.

2.3. Dietary assessment

Dietary habits of the past month were assessed through a validated semi-quantitative⁵ FFQ (Appendix D). Current recommendations suggest the combined use of repeated 24-h recall diaries and food frequency questionnaire (FFQ) to assess individuals' dietary habits. However, in the majority of studies and in this research, the FFQ is the only tool that has been used because it is convenient, cost-effective and gives information on the long-term intake. Related to that, our method approach can address the objectives of our research. Body weight (in kilograms) and height (in meters) were recorded as self-reported values. Body mass index was then calculated as weight (in kilograms) divided by standing height (in meters squared). Overweight and obesity were defined as body mass index 24.9-29.9kg/m² and >29.9kg/m², respectively. The FFQ also includes information of all main food groups that are consumed (i.e., 38 questions regarding consumption of dairy products, cereals, fruits, vegetables, meat, fish, legumes, added fats, alcoholic beverages, stimulants, sweets), as well as dietary behaviors (i.e., eating in restaurants, or canteens, consumption of

breakfast, number of meals consumed on a daily basis and daily water consumption). A 6-grade scale, providing the options for the frequency consumption, was used ranging from “never/rarely”, “1-3 times/month”, “1-2 times/week”, “3-6 times/week”, “1 times/day” to “2 times/day”. Daily consumption in kcal, gr or mg was calculated from the FFQ by multiplying the standard serving size of each one defined in the questionnaire by the value corresponding to each consumption frequency: never=0; 1-3 times/month=0.07; 1-2 times/week=0.21; 3-6 times/week=0.64; 1 times/day=1; 2 times/day=2. The frequency of consumption of various food items was quantified daily.

To calculate the nutritional density of each food variable of the FFQ, we created our own Food Composition Border (Appendix E). Our Food Composition Table was based at the USDA’s Composition Borders³² and the Nutritional Synthesis Tables⁶¹ of Hellenic Health Foundation. From USDA’s Border, we used the SR (standard reference) database. For Greek traditional dishes that do not correspond to the USDA borders, we used the tables of the Hellenic Health Foundation.

As energy cut off we used a minimum daily intake <1.950 Kcal, recommended by FAO Statistics Division (Minimum dietary energy requirement – Greece). Energy deficit was calculated as the distance between the current energy intake of each individual and the FAO cut off. Protein malnutrition was defined as daily intake $\leq 0,75\text{gr/kg}$ body-weight⁶. Total protein consumption was divided by source into Protein from plant sources and Protein from animal sources. Protein from plant sources includes vegetables main, vegetables salad, fruits, nuts, legumes and potatoes variables. Protein from animal sources includes milk yogurt, milk yogurt light, cheese, egg, bread, cereal, rice, pasta, bakery, pies, beef, pork, poultry, lamp, cold cuts, fishes, and seafood and oil fat variables. The source of protein consumption for food insecure and general population was controlled. Daily consumption of macronutrients was compared between groups in total and by gender. An analysis of macronutrients as percent of energy was conducted. Then, total fat distinguished into polysaturated, monosaturated and saturated fat, as percent of energy. The fiber consumption was compared between the two groups using as a reference value the Adequate Intake recommended by EFSA⁶² (25gr per day). The consumption of calcium, again using EFSA’s Population Reference Intakes (950mg per day) was calculated. The reference value used for sodium was the recommendations of GFBDC⁶³ (2.300mg per day), which refers to both sodium exists in food and sodium from table added salt or while cooking.

Table 2: Recommendations and Serving Size of Greek Food-Based Dietary Guidelines and WHO East Mediterranean Region

Greek Food-Based Dietary Guidelines			WHO East Mediterranean Region	
Food group	Recommendations	Serving Size	Recommendations	Serving Size
Vegetables	4 servings per day	150-200r	5 servings per day	½ cup of cut-up raw or cooked vegetables, 1 cup raw leafy vegetable
Potatoes	Up to 3 servings per week	120-150gr	Included in vegetables group	3 cups per week (for starchy vegetables in total)
Legumes	3 servings per week	150-200gr	Included in Vegetable group	3 cups per week
Fruits	3 servings per day	120-200gr	4 servings per day	½ cup of fresh fruit, 1 medium fruit, ½ cup of fresh fruit juice
Cereal	5-8 servings per day	Cereal, Bread 30gr Pasta/rice 70-90gr	180g per day	30g (1 slice of bread, 1 cup of dry cereal, ½ cup cooked rice, pasta)
Dairy	2 servings per day	Milk 250ml Yogurt 200gr	3 cups per day	1 cup of low-fat milk or yogurt, 45g low-fat cheese
Salt	Less than a sweet spoon per day	5gr (2,300mg sodium)	Consume less than 2300mg of sodium per day	1 tea spoon or 5g salt per day
Processed meat	20-30 grams per week	20-30gr	Meat and equivalents 160g per day	Avoid consumption
Red meat	Up to 1 serving per week	120-150gr		30g
White meat	1-2 serving per week	120-150gr		30g
Eggs	Up to 4 servings per week	1 medium egg		1 egg
Fish and seafood	2-3 servings per week	150gr		30g
Oils, olives & nuts	4-5 servings per day	15ml, 1 handful	Oils: 6 tablespoons per day. Nuts are included in Meat and equivalents	1 tablespoon 15g nuts

Classification into food groups of the food items evaluated in FFQ for comparison with the Greek Food-Based Dietary Guidelines (GFBDG) was conducted. Sixteen food groups were formed, each one included one or more variables from the FFQ: Vegetables (vegetables main, vegetables salad), Fruits without juices (fruits), Cereal (bread, cereals, pasta and rice, bakery, pies), Dairy (milk yogurt, milk yogurt light, cheese), Nuts and oils (nuts, olive oil, oil fat), Legumes (legumes), Red meat without cold cuts (beef, pork, lamp), Cold cuts (cold cuts), White meat(poultry), eggs(eggs), Fish (fish, seafood), Potatoes (potatoes), Confectionary and ice cream (chocolate, sweets, ice cream), Refreshments (refreshments), Fruit juices (fruit juice), and Alcohol (alcohol). Intakes of the food groups were assessed against the GFBCB and its serving's recommendations for consumption of each food group. An additional comparison was conducted with the WHO East Mediterranean Region's recommendations of servings for a healthy diet. (Table 2)

2.4. FEAD satisfaction survey

An extra questionnaire was utilized in FEAD recipients (Appendix C). The questions asked include the level of satisfaction, their estimation of the financial contribution of the program, the degree to which the program helps them to meet other needs, the improvement of sense of security and the reduction of anxiety. Their satisfaction is measured on a 3-grade scale ranging from "not at all", "a little bit" and "very much".

2.5. Statistical Analysis

Normally distributed continuous variables will be presented as mean values \pm standard deviation (mean \pm SD), while categorical variables as absolute and relative frequencies separately for cases and controls. P-P plots and histograms were used to assess normality. Independent sample t-test and Mann-Whitney U-test were used to determine differences between variables. Differences between groups were calculated with chi squared test. All reported p-values are compared to a significance level of 5%. The IBM SPSS Statistics 23.0 statistical software package was used for analyses.

3. Results

The basic anthropometric, socio-demographic and lifestyle characteristics of the food insecure and the general population are presented to give a picture of the selected sample (Table 3). The two populations are age matched (47.53 ± 13.1 vs. 47.82 ± 13.6). The majority of all the participants were married, and 76% of the foods insecure were unemployed compared to 16% of the general population ($p < 0.001$). Moreover, the food insecure had less years of education (10.98 ± 8.5 vs. 12.66 ± 3.6 , $p < 0.001$) and were more likely to have 2 or more children ($p < 0.001$). Being food insecure was associated with higher prevalence of overweight and obesity (overweight 44.0% vs. 37.5 and obese 25.4% vs. 18.0%) with close to a quarter of the food insecure having a normal range BMI (28.1%). When the rates of obesity were compared between genders, the rates of obesity were higher in females of general population (48.1% vs. 27.8%) and lower in females of food insecure population (39.0% vs. 51.15%).

Table 3: Demographic and anthropometric data^a of participants, that includes Food insecure (FEAD recipients) and General population

	Food insecure N=499	General population N=545	p ^b
Female, n (%)	301 (60.7)	264 (48.7)	
Years of age (mean±SD)	47.53±13.1	47.82±13.6	0.727
Years of education (mean±SD)	10.98±8.5	12.66±3.6	<0.001
Number of children, n (%)			<0.001
0	68 (15.3)	161 (30.9)	
1	107 (24.0)	83 (15.9)	
2	150 (33.7)	209 (40.1)	
3	76 (17.1)	54 (10.4)	
Size of household (# of people) (mean±SD)	2.04±0.7	2.84±1.3	0.513
Occupational status, n (%)			<0.001
Employed	62 (12.6)	321 (59.3)	
Unemployed	375 (76.4)	84 (15.5)	
Retired	25 (5.1)	94 (17.4)	
Housewife	28 (5.7)	42 (7.8)	
Marital status, n (%)			<0.001
Single	123 (24.8)	137 (25.6)	
Married	245 (49.5)	328 (61.2)	
Divorced	105 (21.2)	42 (7.8)	
Widowed	22 (4.4)	29 (5.4)	
Weight (kg) (mean±SD)	76.96±16.5	75.87±17.1	0.306
Height (m) (mean±SD)	1.68±0.1	1.80±1.3	0.53
Body mass index (kg/m ²) (mean±SD)	27.25±5.3	25.93±5.1	<0.001
BMI categories (%)			<0.001
Underweight (<18 kg/m ²)	1.7%	2.4%	
Normal (18 -24,9 kg/m ²)	28.8%	42.1%	
Overweight (24,9 – 29,9 kg/m ²)	44.0%	37.5%	
Obese (>29,9 kg/m ²)	25.4%	18.0%	

^a Results are presented as mean±SD, as indicated for normal variables.

^b p Values derived through the Independent sample t-test for the normally distributed variable and through the Man-Whitney U-test for the skewed ones.

Statistically significant difference ($p < 0.001$) was recorded in total energy and macronutrient intake between food insecure and general population. Food insecure consumed less total energy, more carbohydrates, more protein, and less fat (Table 4). Applying the 1950 kcal per day cut off, only 58% of the food insecure receive adequate intake compared to 77% of general population. Figure 12.B. illustrates the range of individuals consuming less than 1950Kcal/day for each group. Between genders analysis for energy malnutrition revealed no statistically significant difference.

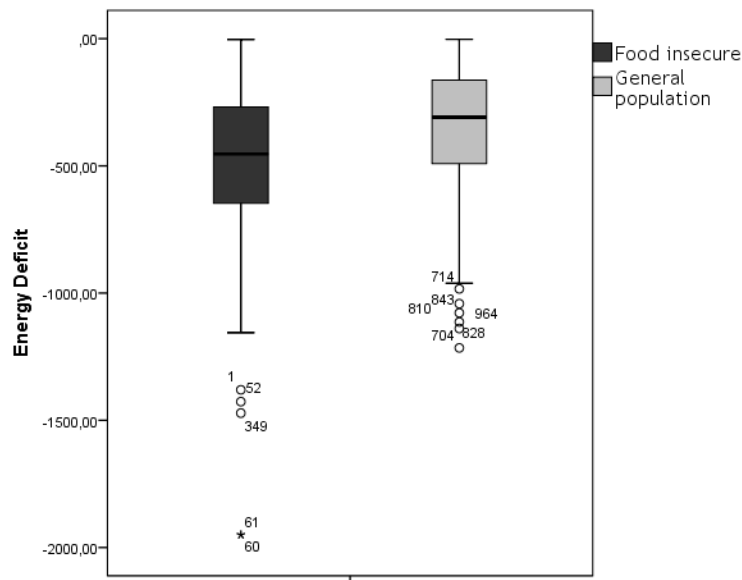
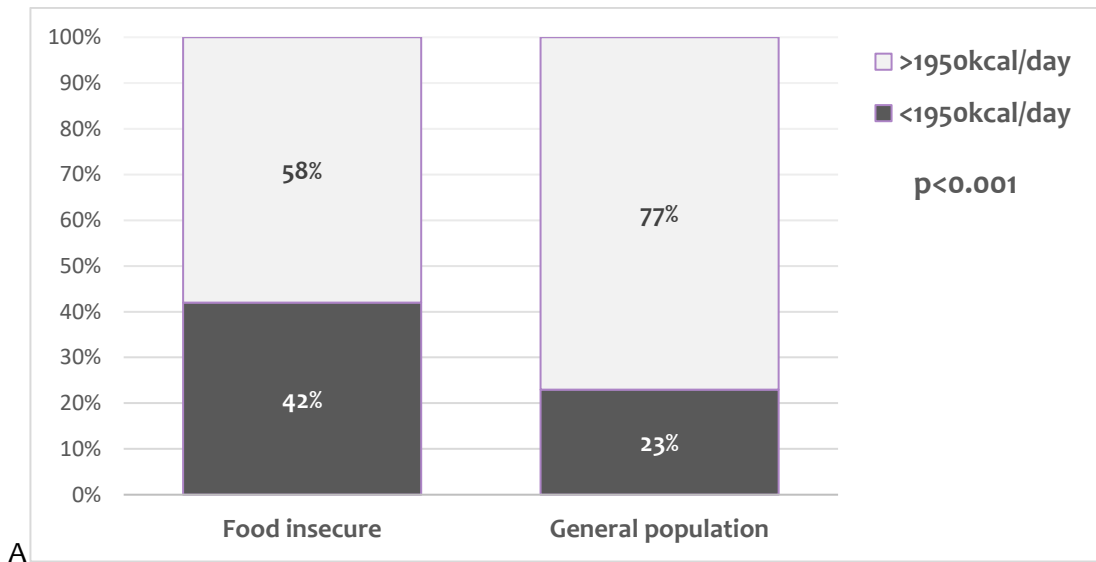


Figure 12.A: Energy intake percentages between Food insecure (FEAD recipients) and the General population, using as cut off 1950kcal per day. **12.B:** The box plot illustrates the range of individuals consuming less than the cut off.

FEAD recipients continued to experience protein malnutrition (18.6%), whereas the general population's rate was 5.0%. Food insecure males displayed higher rates of protein malnutrition, whereas males of general population lower, compared to females ($p < 0.001$). When the protein sources were separated into plant and animal sources, the consumption of protein from plant sources was $3.35 \pm 1.5 \text{ gr/day}$ in the food insecure and $2.80 \pm 1.3 \text{ gr/day}$ in the general population ($p < 0.001$). The consumption of animal protein was detected at lower levels in the food insecure compared to the general population and a statistically significant difference was found ($p < 0.001$). A second analysis between gender for each group was made (data not shown) and statistically significant difference was detected in protein per kg ($p < 0.001$) in both groups. Food insecure males consumed less protein per kg in gr than females [$1.2(0.82, 1.84)$ vs. $1.5(1.01, 2.33)$] and general's population males consumed more than females [$1.68(1.23, 2.12)$ vs. $1.38(0.97, 2.09)$].

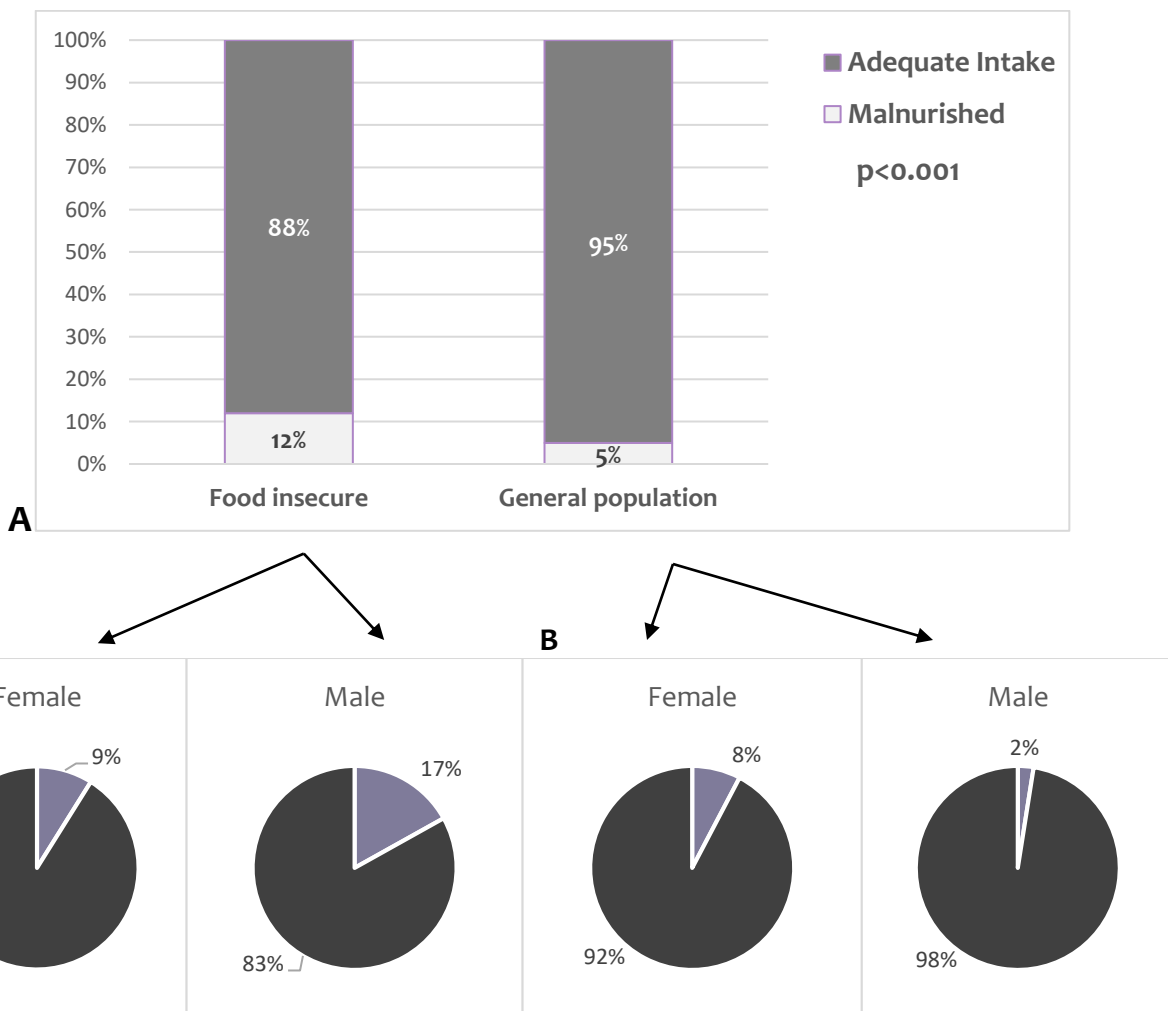


Figure 13.A: Protein malnutrition percentages (defined as $\leq 0,75 \text{ gr/kg}$ body-weight) between food insecure (FEAD recipients) and general Population and between genders (**13.B**)

The analysis of total fat as percent of energy showed that the consumption was higher in the general population. When distinguished into polysaturated, monosaturated and saturated fat, a statistically significant difference was revealed in consumption of PUFA and MUFA. As percent of energy the consumption of saturated fat was common in both groups and far exceeded the recommended max 10% of total energy per day. The fiber consumption was compared between the two groups and 59.9% of food insecure reached the recommendations, compared to 51.4% of general population. No statistically significant difference was found in consumption of calcium and only 2% of food insecure and 4% of general population reached the recommendations in sodium intake.

Table 4: Intake ^a of macronutrients and indicators of adequate intake between food insecure (FEAD recipients) and general population

	Food insecure	General population	p ^b
Energy (kcal/day)	2225.3±832.5	2498.2±728.0	<0.001
Carbohydrates (%E)	30.92± 6.2	27.12± 6.0	<0.001
Protein (%E)	21.32± 7.5	18.07 (15.34, 23.2)	<0.001
Protein per kg (gr)	1.37 (0.91, 2.09)	1.52 (1.09, 2.10)	0.004
Protein from plant sources (%E)	3.35± 1.5	2.80± 1.3	<0.001
Protein from animal sources (%E)	10.09± 2.9	10.88± 2.9	<0.001
Total fat (%E)	55.60± 8.1	57.52± 7.8	<0.001
PUFA (%E)	8.00±2.3	7.59±1.9	0.001
MUFA (%E)	29.62±6.6	31.48±6.0	<0.001
SFA (%E)	14.36 (12.18,18.70)	14.85 (12.85,20.38)	0.126
Fiber (g/day)	27.37 (21.77,45.21)	25.27 (20.04,31.65)	<0.001
Calcium (mg/day)	33.10±15.8	28.03±12.5	0.031
Sodium (mg/day)	1037.9±509.3	1245.29±531.81	<0.001

^a Results are presented as mean±SD, as indicated for normally distributed variables, and median(Q₁,Q₃), as indicated for skewed variables. Categorical values were presented as frequency (n and relative percent).

^b p-Values derived through the independent t-test for the normally distributed variable and through the Man-Whitney U-test for the skewed ones.

Table 5: Daily Intakes^a of Food Groups compared with the GFBDG and WHO portions per day between food insecure (FEAD recipients) and general population

Food Groups	Food insecure			General population			p ^b gr/day
	gr/day	GFBDG portions/day ^c	WHO portions/day ^d	gr/day	GFBDG portions/day ^c	WHO portions/day ^d	
Vegetables	231.5 (163.4,244.4)	1.54 (1.09,1.63)	2.57 (1.82,2.72)	231.48 (144.0,244.4)	1.54 (0.96,1.63)	2.57 (1.60,2.72)	0.459
Fruits	98.29±63.7	1.03 (0.66,1.03)	1.38 (0.88,1.38)	103.9±78.6	1.03 (0.22,1.03)	1.37(0.29,1.38)	0.8
Fruit juices	50.4 (0.0,153.6)	0.40 (0.00,1.23)	0.40 (0.00,1.23)	16.8 (0.00,102.0)	0.13 (0.00,0.82)	0.13 (0.00,0.82)	0.004
Cereals	158.58±70.85		5.29±2.4	149.7±77.2		4.99±2.6	0.052
Pasta, rice		1.88 (1.33,2.31)			1.33 (0.90,2.31)		
Bread		1.00 (1.00,2.00)			1.00 (0.64,2.00)		
Dairy	244.0 (70.44,274.0)	1.22 (0.35,1.37)		214.98 (70.44,319.9)	1.07 (0.35,1.60)		0.074
Cheese			0.38(0.13,0.60)			0.60 (0.60,0.60)	
Milk			1.00(0.21,1.01)			0.64 (0.21,1.21)	
Oils & nuts	75.8±37.2			91.96±38.4			<0.001
Oils		4.68 (3.33,6.82)	4.68 (3.33,6.82)		6.67 (3.49,6.82)	4.68 (3.33,6.82)	
Nuts		0.22 (0.00,0.67)	0.23 (0.00,.070)		0.67 (0.00,2.04)	0.70 (0.00,2.13)	
Legumes	104.96±74.5	0.42 (0.42,1.28)	2.10 (2.10,6.40)	73.6±53	0.42 (0.42,0.42)	2.10(2.10,2.10)	<0.001
Red meat	38.85 (19.95,59.85)	0.32 (0.17,0.50)	1.30 (0.67,2.00)	59.85 (38.85,105.98)	0.50 (0.32,0.88)	2.00 (1.30,3.53)	<0.001
Cold cuts	2.10 (0.00,6.30)	0.11 (1.09,1.63)	a.c. ^e	6.30 (0.00,19.20)	0.32 (0.00,0.96)	a.c. ^e	<0.001
White meat	37.7±29.6	0.26 (0.26,0.26)	1.05 (1.05,1.05)	51.2±43.1	0.26(0.26,0.80)	1.05 (1.05,3.20)	<0.001
Eggs	22.09±19.6	0.24 (0.24,0.73)	0.24 (0.24,0.73)	20.03±21.5	0.24 (0.24,0.73)	0.24 (0.24,0.74)	0.107
Fish & seafood	10.5 (10.5,31.5)	0.07 (0.07,0.21)	0.35 (0.35,1.05)	31.5 (10.5,42.0)	0.21 (0.07,0.28)	1.05 (0.35,1.40)	<0.001
Potatoes	38.16±25.7	0.43 (0.14,0.43)	1.31 (0.43,1.31)	29.1±23.7	0.14 (0.14,0.43)	0.43 (0.43,1.31)	<0.001

^a Results are presented as mean±SD, as indicated for normally distributed variables, and median(Q₁,Q₃), as indicated for skewed variables. ^b p-Values derived through the Independent sample t-test for the normally distributed variable and through the Man-Whitney U-test for the skewed ones. ^c Portions per day as defined by Greek Food-Based Dietary Guidelines. ^d Portions per day as defined by WHO Eastern Mediterranean Region Office. ^ea.c.=avoid consumption

In Table 5, the daily intakes of Food groups in grams per day are presented. In most food groups the grams per day consumption between food insecure and general population showing statistically significant difference. The consumption of fruit juices, oils and nuts, meat, fish and seafood, confectionary and ice cream and alcohol were higher in the general population in compared to the food insecure. The food insecure population consumes more legumes and potatoes per day however. An additional analysis indicated the portions per day that correspond to the consumption of each food group based on the GFBDG (Table 2). An additional comparison is made with WHO East Mediterranean Region’s recommendations of servings for a healthy diet.

A statistically significant difference was found when meals per day and breakfast frequency was compared between the two groups ($p < 0.001$). The food insecure population seems to skip breakfast more often than the general population (58.8% vs. 38.8%) and almost never consume more than six meals per day (including snacks).



Figure 14.A: Meals per day and breakfast consumption (14.B) comparison between food insecure (FEAD recipients) and general population

4. Discussion

This study is one of the first attempts to assess the eating habits of vulnerable social groups and the so-called victims of the crisis (people in food insecurity) in Greece. From this analysis, it becomes evident that being enrolled in the FEAD food assistance program does not successfully address the increased rates of protein and energy malnutrition among Greece's most deprived. It also highlights important findings on their nutritional habits with higher likelihood of meal skipping, especially breakfast, and lower consumptions of red meat, white meat, fish & seafood, oils & nuts, most likely linked to their higher cost compared to legumes and fish & seafood.

This study was designed as an age-matched case control study, in an attempt to account for the higher educational level and later age of marriage and child-birth among the younger Greek generations. Nonetheless, statistical differences are still observed in these parameters. This is linked to the inclusion criteria of FEAD per se, which is based on a calculation of the household monthly income. The algorithm for FEAD selection, includes income, number of dependents, marital status and unemployment, which is reflected in our findings. The difference in years of education could also be a caveat of the FEAD algorithm.

The phenotype of the average food insecure individual is characteristic of the double burden of malnutrition with barely 2% of this group having a BMI in the underweight range and the astonishing 69.4% classified as overweight/obese. These findings are consistent with another study that associate the prevalence of obesity with low income households and lower levels of education.¹⁸ Other analyzes of the SNAP program in the USA have observed similar findings²⁰ with a higher obesity rates among women,^{21,22} such a gender dependence was not observed in our analysis. According to HNNHS⁶⁴, a nationwide recent study aimed to assess among others the nutritional intake in the Greek population, the percentages of overweight and obesity in adult population are 32% and 15.5% accordingly. Compared to these findings, the general population is at approximately the same rate, while food insecure population exceeds more than 10% these rates in both overweight and obese classification.

When a 1950kcal per day cut off was applied in total energy intake, 42% of the food insecure and 23% of the general population was classified as experiencing inadequate energy intake. The coexistence of high overweight/obesity rates and high inadequate energy intake rates for the food insecure may seem contradictory. So, energy deficit was measured and the range of individuals consuming less than the cut off was illustrated (Figure 12.B.). The energy deficit is higher for the food insecure (~500kcal/day) in comparison to the general population (~400 kcal/day). Focusing further on those food insecure individuals with an inadequate energy intake showed a higher prevalence of overweight (higher than the general population) and those food insecure but with adequate energy intake which might seem contradictory (Appendix B). A potential explanation of this phenomenon and the general

higher prevalence and of overweight/obesity among the food insecure could be that weight and BMI status are markers of long-term energy balance, and hence of their background diet, while the energy intake as measured in this study is a short-term indicator of energy/food availability at the time of the study. In fact, the lack of longitudinal data on weight status or a measure of the time they might have been experiencing food insecurity does not allow us to completely understand the relationship between BMI and food insecurity. What is more important though, is the fact that the energy deficit among the food insecure with inadequate energy intake was approximately the same across the BMI categories. A similar trend was also seen in the general population, with a slightly higher energy deficit among the underweight individuals. Although people of an overweight/obese status might need higher amounts of energy to maintain their weight, they are also more resilient in short-term energy intake fluctuations. On the contrary those classified as underweight are already at risk of malnutrition and those having normal weight can become populations at risk. The fact the energy deficit is similar across all these groups, highlights the need for a policy/intervention that can identify those at greater risk even among the vulnerable groups and address their needs more urgently. In shaping public health policies, we should not focus at the average malnourished individual, but at the at-risk individuals, we should investigate the vulnerable groups within vulnerable population.

Considering the above, there is significant and alarming proportion of food insecure population, enrolled in a food assistance program, experiencing the double burden of malnutrition, which is an important public health issue. Overweight and obesity are associated with increased total mortality and increased risk of disease or death from cardiovascular diseases, diabetes, and several types of cancer.²⁴ Food insecure population experiences the uncertainty of access to food. Low-income populations tend to consume more ultra-processed food than the general population.²⁵ Anxiety, stress and depression lead to disordered patterns of eating and to high quantity but low-quality food consumption for unknown time. Inexpensive, high-calorie, low-nutrition foods drive these groups to overweight and obesity.³ There are studies^{26,27} indicating that the economic downturn is related with the decline of the Mediterranean Diet within the general population, leading to inequities in food access. The coexistence of undernutrition with overweight and obesity is defined by FAO as “nutritional transition” that is existent in the Mediterranean Region. Further research needs to be made in order to examine in deeper depth the nutritional status of food insecure populations in Greece.

Food insecure population consumed less total energy, more carbohydrates, more protein, and less fat, with statistically significant difference, compared to general population. In comparison with the macronutrient intake recommendations of EFSA, both groups consumed less carbohydrate and more total fat than recommended. In the present study the consumption of fat may be overestimated due to the FFQ. The FFQ that is used notice low validity in food consumption of olive oil intake. These differences could be mainly attributed

to difficulties on estimating specific quantities consumed throughout the day or used during food preparation.⁵ Total fat is the main source of macronutrient intake with rates that reach 55.60 ± 8.1 gr/day for food insecure and 57.52 ± 7.8 gr/day for general population. As percent of energy the consumption of saturated fat was similar in both groups and far exceeded the 10% of total energy per day. The fiber consumption was higher among food insecure population.

Regarding the sodium intake only 2% of food insecure and 4% of general population exceeded the recommendations. These rates are building without considering added salt at the table or while cooking. Food sodium intake was considerably low in both food insecure and general population (1037.9 ± 509.3 vs. 1245.29 ± 531.81 mg/day) compared to another study⁶⁵ of Greek population which found higher intake ($1,983.2 \pm 814.1$ mg/day). Taking into account a recent EFET study⁶⁶ on the amount of salt existing in bread in Greece, we see that we probably underestimate the intake. Based on that study, the average amount of salt in bread is 1.32% (2.2% maximum). Thus, we have a rate of underestimation in our calculation with Food Composition Table of 12.88%. In this point we cannot assess whether this is a systematic or random bias. This reflects the need for an updated Food Composition Table in Greece. A further underestimate of intake occurs because we only measure the salt in the food. From other studies^{66,67}, about an extra 10-15% comes from the salt added while cooking and table salt. Our estimation is that there is augmented intake of sodium in the Greek population.

Food group classification made clear the differences in dietary habits between the two populations (Appendix A). As expected food insecure consume less oils and nuts, more legumes, less red meat, less fish and seafood and more potatoes, with statistically significant difference. This might be an outcome of the cost of each food group. Red meat, fish and seafood, oils and nuts are expensive meal choices. Legumes, eggs and cold cuts are cheaper choices. So, a nutritional pattern of alternate the protein source is created, in which legumes are a cheaper substitute for protein. Simultaneously, the consumption of fish and seafood is almost at zero for the food insecure population. It is expected that food insecure population's choices depend from on cost of each food item. Processed food, refreshments, junk food in general is cheaper than other healthier choices. These findings are consistent with studies in the UK where individuals report buying cheaper or discounted food out of financial necessity more often than not, the most inexpensive and discounted foods are also less healthy. All these indicate that the state of food insecurity within a household can influence the dietary patterns in varied ways. Some of them lead to healthier diets (increased consumption of legumes compared to general population), but other build the pathway to overweight and obesity. Consistent with the pathway of overweight and obesity is the finding that food insecure consume high quantity of confectionary and ice cream ($22.40(4.55, 57.35)$ gr per day). These are sources of saturated and Trans fatty acids.

When the intake (in grams per day) was studied comparatively with the GFBGD daily portions of each food group were calculated. A comparison was then made between them

and the daily portions based on WHO East Mediterranean guide for a healthy diet. As illustrated in Table 5 the portions of GFBDG are larger than WHO's in most food groups. For example, the portion size for vegetables in WHO recommendations is 90gr, whereas the minimum portion size in GFBDG is 120gr. Similarly, red meat portion in GFBDG is larger than in WHO recommendations (120gr vs. 30g). This may lead to the conclusion that the GFBDG of Greece overestimates the portion size for each food group.

When the meal frequency was counted, most food insecure people consumed only 1-3 meals per day (including snacks). General population had equally distributed rates between 1-3 and 4-5 meals per day. Both groups had low rates of >6 meals per day, with the rates of food insecure being almost zero. When asked about breakfast consumption the clear majority (71.4%) reported skipping daily breakfast. This matches with the Food Foundation and the End Hunger UK Coalition which shows that 16% of adults and 23% of parents in the UK are skipping meals out of financial necessity.⁶⁸ These indicate that the food assistance programs in Greece should start considering the true nutritional needs of this vulnerable population, and maybe what is lacking is not food aid in general but a specific target in meals and food groups.

FEAD recipients still face a food gap with respect to nutritional needs. In the FEAD satisfaction survey however another aspect of the program was analyzed. The sense of food security also includes a psychological part. When the food insecure population was asked if the food distribution reduced their stress and anxiety, 40.8% declared "very much". Similarly, when asked if they feel safer after their participation in the program 51.4% declared "very much". So, this food aid program must be supported and improved in crucial points, such as the nutritional composition of food provision items and the provision of nutritional education and guidance towards the ways that the population could comply with the principles of a healthy diet.

With reference to an analysis that used a simulation approach in order to calculate the food provision entitlement of each participant, and eventually its contribution to their dietary needs, the total contribution of FEAD is found to be less than 16% (data not published). Based on that, the contribution of FEAD in the nutritional intake of FEAD recipients, as formed above, is rather low. FEAD in Greece began as an emergency measure and the nutritional status of the food insecure population in Greece at that time was unidentified. This research shapes the nutritional gap of food insecure population targeted by FEAD, their nutritional intake and dietary habits. Alongside, a revision of the food guide based on which the choice of food items distributed should be made, in order to improve the impact of the program on the population.

Therefore, based on the evidence provided by the present study, some suggestions to improve the way the FEAD program is implemented in Greece can be made. The insufficient amount of intake of specific food groups points towards the parts that need to be improved.

Primary, the increase of high-quality protein source and energy density is crucial. Additionally, the promotion of a healthy diet is necessary by increasing the distribution of fruits and vegetables and fish and seafood. When whole wheat consumption was calculated, only 18.2% of food insecure consume at least one portion of whole wheat daily compared with 28.1% of general population and 51.1% do not consume at all. At the same time fiber consumption does not reach the recommendations. Therefore, all grains distributed should be whole wheat grains. Overall, based on our findings we observed that people who become food insecure are more likely to keep their diet habits. The parameter that mainly affects their food choices is the cost of food item. Maybe what we are missing here is the opportunity to reeducate these populations, enrolled in food assistance programs, on the values of a healthy diet through the implementation of the program. The objective of public health policies focused on food insecurity is to guarantee access to safe and nutritious food. In this pathway, the healthiest choice should be the easiest one, in order to shape healthy food patterns, especially at a time of economic crisis.⁶⁹

5. Limitations and Future Research

The findings are subject to several limitations. Firstly, the height and weight of all participants was self-reported and that may lead to bias in classifying weight status. Social desirability bias and recall error are well-known reasons for measurement error.^{70,71} Specifically, approximately one in six to seven obese individuals are misclassified as non-obese due to underestimation of BMI.⁷²

Moreover, although FEAD program could not eliminate the food gap that food insecure population is experiencing, we have to mention that we are unaware about their previous situation and their potential participation in other corresponding programs. This could affect the nutritional situation as mapped in this research and in Greece there are plenty of supportive structures for populations experiencing food insecurity. As it seems from unpublished data the current emergency food system includes various types of food aid programs (direct production, food reclamation, direct aid and consumer choice), including the EU FEAD program (the only nationwide). So, in future research it should be examined whether the recipients of FEAD are also recipients from another food program or project, such as Boroume, Food Band of Athens and Thessaloniki, School snack program (Diatrofi), Hot School Meal pilot program, Solidarity Piraeus etc. This way the nutritional condition of each person can be examined and assessed more clearly.

The FFQ utilization in this study made impossible to identify the source of each food item food insecure population consumed. Hence, we are not able to analyze the contribution

of different forms of food aid that food insecure receives and better record the dietary habits. A combination of FFQ and 24h recalls, ideally from multiple days could end up in more detailed results. As a form of qualitative research, focus groups can be used, in order to understand the thinking behind the food choices. Interviews with small groups of FEAD recipients may help to examine their perceptions, their degree of satisfaction and better understand their nutritional condition. Further, a comparative analysis could be conducted, which will compare those that receive 1st time FEAD and those that are recipients of the program for a long time. Another study⁷³ that compared the food insecure households that had just entered the SNAP program with those that had participated for about 6 months captured the households' circumstances and experiences prior to receiving benefits and measured the true reduction of food insecurity. However, in this research we examine food insecure families in total. We cannot investigate whether food insecurity affects mostly the adults or the children of the family. We cannot separately analyze the specific needs of each member of the family according to the age group by separating the adults, the children and the elderly.

Additionally, an extra economic analysis could be conducted, to calculate an indicative cost per gram in euro for each Food group food insecure and general population consumed. Accordingly, a new comparison can then be made, based on the cost of food, between the food choices of food insecure population and general population.

6. Conclusion

About ten years after the outburst of the economic crisis in Greece, disparities in food accessibility continue to exist. The double burden of malnutrition is becoming evident in vulnerable populations, despite being enrolled in a food assistance program. Inadequate energy intake and protein malnutrition remains an issue for those living under food insecurity. While the idea that food insecurity increases the risk of obesity may be counterintuitive, more and more studies point that way. Food transition was primarily connected with underweight, but indications may lead to the changing face of food insecurity that is connected with overweight and obesity. The findings of this research address the importance of increasing access to affordable healthy foods for all adults, suggesting the need for improvements in national policies in Greece and/or their implementation.

7. References

1. FAO. TRADE REFORMS AND FOOD SECURITY. ROME; 2003.
2. Health Ha. Causes and Consequences of Food Insecurity. . <https://hungerandhealth.feedingamerica.org/understand-food-insecurity/hunger-health-101/>. (accessed February 4 2019).
3. Loopstra R, Reeves A, McKee M, Stuckler D. Food insecurity and social protection in Europe: Quasi-natural experiment of Europe's great recessions 2004-2012. *Prev Med* 2016; **89**: 44-50.
4. Metis. FEAD Mid-Term Evaluation Interim Report, 2018.
5. Bountziouka V BE, Giotopoulou A, et al. . Development, repeatability and validity regarding energy and macronutrient intake of a semi-quantitative food frequency questionnaire: Methodological considerations. *Nutrition, Metabolism and Cardiovascular Diseases*. 2012; **22**(8): 659-67.
6. Consultation RoaJFWUE. Energy and Protein Requirements: World Health Organization; 1991.
7. Berry EM, Dernini S, Burlingame B, Meybeck A, Conforti P. Food security and sustainability: can one exist without the other? *Public Health Nutr* 2015; **18**(13): 2293-302.
8. Resolution SN. 1974. http://ernaehrungsdenkwerkstatt.de/fileadmin/user_upload/EDWText/Abbildungen/Vorlesung_OLT/Surveillance_Nutrition_Resolution_1974_ICN_Infos.pdf. (accessed February 4 2019).
9. Maxwell S. Food security: a post-modern perspective. *Food Policy* 1996; **21**(2): 155-70.
10. Jones AD, Ngure FM, Pelto G, Young SL. What are we assessing when we measure food security? A compendium and review of current metrics. *Adv Nutr* 2013; **4**(5): 481-505.
11. Worldwide. UNWFP-FH. What is food security? <https://www.wfp.org/node/359289>.
12. Jock PFEBA. Encyclopedia of Food Security and Sustainability Elsevier
13. Global C. The Food Security Project C. <http://www.conservationglobal.org/food-security/> (accessed February 4 2019).
14. Food Insecurity: A Public Health Issue. *Public Health Rep* 2016; **131**(5): 655-7.
15. WHO. The determinants of health. <https://www.who.int/hia/evidence/doh/en/> (accessed February 4 2019).
16. Cafiero CV, Sara & Nord, Mark. (2017). 116. . Food security measurement in a global context: The Food Insecurity Experience Scale. . *Measurement* 2017; (116): 146-52.
17. FAO. The Food Insecurity Experience Scale: Measuring food insecurity through people's experiences. . www.fao.org/in-action/voices-of-the-hungry. (accessed February 4 2019).
18. America F. Importance of Nutrition on Health in America. <https://www.feedingamerica.org/hunger-in-america/impact-of-hunger/hunger-and-nutrition> (accessed December 14 2019).
19. Center FFRaA. The Impact of Poverty, Food Insecurity, and Poor Nutrition on Health and Well-Being. 2017.
20. WHO. What is malnutrition? <http://www.who.int/features/qa/malnutrition/en/> (accessed December 13 2018).
21. Institute IFPR. International Food Policy Research Institute. Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030. Washington, DC, 2016.

22. FAO I, UNICEF, WFP and WHO. 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. 2018.
23. FAO. Strategic Work of FAO Helping Eliminate Hunger and Malnutrition. . 2017 (accessed February 4 2019).
24. Freiberg. Obesity and Diabetes - Side effects of Globalization: Global problem with local solutions. [http://www.academia.edu/35189032/Obesity and Diabetes -Side-effects of Globalization Global problem with local solutions](http://www.academia.edu/35189032/Obesity_and_Diabetes_-_Side-effects_of_Globalization_Global_problem_with_local_solutions). (accessed February 4 2019).
25. International WCRF. The link between food, nutrition, diet and non-communicable diseases. . 2014. [https://www.wcrf.org/sites/default/files/PPA NCD Alliance Nutrition.pdf](https://www.wcrf.org/sites/default/files/PPA_NCD_Alliance_Nutrition.pdf). (accessed February 4 2019).
26. Helble M SE. The costs of being overweight and obese in Asia and the Pacific. Asia Pathways. . 2018.
27. Alliance. N. Unhealthy Diets and Obesity.
28. 2018 TSDGR. UN, 2018.
29. Garnett T, Appleby MC, Balmford A, et al. Agriculture. Sustainable intensification in agriculture: premises and policies. *Science* 2013; **341**(6141): 33-4.
30. Lentz EaB, Christopher B. The Economics and Nutritional Impacts of Food Assistance Policies and Programs. 2013.
31. Frank Riely NM, Bruce Cogill, Laura Bailey, and Eric Kenefick. Food Security Indicators and Framework for Use in the Monitoring and Evaluation of Food Aid Programs. 1999.
32. USDA. Food Composition Database Show Foods List.
33. Awokuse TO. Assessing the Impact of Food Aid on Recipient Countries: A Survey 2006.
34. WHO. Obesity and overweight. .
35. Ballard TJ, Kepple, A.W. & Cafiero. The food insecurity experience scale: development of a global standard for monitoring hunger worldwide. Technical Paper. . Rome: FAO, 2013.
36. . U. Sustainable Developments Goals. Goal 2. <https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/Goal-2.pdf>. (accessed February 4 2019).
37. FAO. Africa Regional Overview of Food Insecurity and Nutrition. <http://www.fao.org/3/a-i7967e.pdf>. (accessed February 4 2019).
38. FAO. Regional Overview of Food Security and Nutrition in Africa 2017. The food security and nutrition–conflict nexus: building resilience for food security, nutrition and peace. . 2017.
39. FAO. Regional Overview of Food Security and Nutrition in Africa 2016. The challenges of building resilience to shocks and stresses. 2017.
40. E. S. Foresight Africa viewpoint – Nutrition security: The last mile of Africa’s food security agenda. 2018. <https://www.brookings.edu/blog/africa-in-focus/2018/01/26/foresight-africa-viewpoint-nutrition-security-the-last-mile-of-africas-food-security-agenda/>.
41. Zhang-Yue Zhou GW. Food Insecurity in Asia Why Institutions Matter: ASIAN DEVELOPMENT BANK INSTITUTE; 2017.
42. WFP. 10 Facts About Nutrition in China. <https://www.wfp.org/stories/10-facts-about-nutrition-china> (accessed December 18 2018).
43. Zhou Z WG. Asian Development Bank Institute, eds. Food Insecurity in Asia: Why Institutions Matter. 2017.
44. Bank AD. Data and Statistics about Food Security in Asia and the Pacific. . 2017. <https://www.adb.org/news/features/data-and-statistics-about-food-security-asia-and-pacific>. (accessed February 4 2019).

45. Bank AD. Agriculture and Food Security Issues in Asia and the Pacific. . 2014. <https://www.adb.org/sectors/agriculture/issues>. (accessed 2019).
46. Helble M SE. The costs of being overweight and obese in Asia and the Pacific. . 2018. <https://www.asiapathways-adbi.org/2018/09/the-costs-of-being-overweight-and-obese-in-asia-and-the-pacific/>. (accessed December 11 2018).
47. David E. Food Insecurity in America: Putting Dignity and Respect at the Forefront of Food Aid. 2017. <http://www.socialconnectedness.org/wp-content/uploads/2018/02/Food-Insecurity-in-America-Putting-Dignity-and-Respect-at-the-Forefront-of-Food-Aid.pdf> (accessed February 4 2019).
48. America. F. The State of Senior Hunger. 2018. <https://www.feedingamerica.org/research/senior-hunger-research/senior>. (accessed February 4 2019).
49. Alisha Coleman-Jensen MPR, Christian A. Gregory, Anita Singh. Household Food Security in the United States in 2015, 2016.
50. Coleman-Jensen A, Mark Nord, Margaret Andrews, and Steven Carlson. Household Food Security in the United States in 2011., 2012.
51. Seligman HK, Schillinger D. Hunger and socioeconomic disparities in chronic disease. *N Engl J Med* 2010; **363**(1): 6-9.
52. Health Ha. What is Food Insecurity?
53. USDA. Nutrition.gov. 2019).
54. Gundersen C. Food Insecurity Is an Ongoing National Concern. *Advances in Nutrition* 2013; **4**(1): 36-41.
55. Obesity TSo. Adult Obesity in the united States. 2018. <https://www.stateofobesity.org/adult-obesity/>.
56. Explained ES. People at risk of poverty or social exclusion. https://ec.europa.eu/eurostat/statistics-explained/index.php/People_at_risk_of_poverty_or_social_exclusion#Material_deprivation. .
57. WHO. Global status report on non communicable diseases. 2010.
58. WHO. European health report 2018. (accessed.
59. European Comission. Employment SAI. Ταμείο Ευρωπαϊκής Βοήθειας προς τους Απόρους (FEAD). 2018. <https://ec.europa.eu/social/main.jsp?catId=1089&langId=el&furtherPubs=yes.%20Accessed%20December%2013,%202018>. (accessed December 13 2018).
60. UNICEF. THE STATE OF THE CHILDREN IN GREECE REPORT. 2014. <https://www.unicef.gr/uploads/filemanager/PDF/2014/children-in-greece-2014-sum-eng.pdf> (accessed February 4 2019).
61. Foundation HH. Food Composition Tables. NUTRITIONAL COMPOSITION OF GREEK FOODS AND TRADITIONAL DISHES BY LABORATORY ANALYSES. <http://www.hhf-greece.gr/tables/FoodItemsIntro.aspx?l=el> (accessed December 16 2018).
62. EFSA. Dietary Reference Values for nutrients Summary report.; 2017.
63. Prolepsis. Ethnikos diatrophicos odigos gia enilikes – scientific documentation. 2014.
64. Magriplis E, Dimakopoulos I, Karageorgou D, et al. Aims, design and preliminary findings of the Hellenic National Nutrition and Health Survey (HNNHS). *BMC Med Res Methodol* 2019; **19**(1): 37.

65. Athanasatou A, Kandyliari A, Malisova O, Pepa A, Kapsokefalou M. Sodium and Potassium Intake from Food Diaries and 24-h Urine Collections from 7 Days in a Sample of Healthy Greek Adults. *Front Nutr* 2018; **5**: 13.
66. EFET. Salt content of bread in Greece - EFET.; 2016.
67. James WP, Ralph A, Sanchez-Castillo CP. The dominance of salt in manufactured food in the sodium intake of affluent societies. *Lancet* 1987; **1**(8530): 426-9.
68. Sustain. 1 in 4 UK parents skipping meals due to lack of money. Sustain: the alliance for better food and farming.
https://www.sustainweb.org/news/jan18_calls_grow_for_government_food_insecurity_measurement/ (accessed February 4 2019.).
69. Rao M, Afshin A, Singh G, Mozaffarian D. Do healthier foods and diet patterns cost more than less healthy options? A systematic review and meta-analysis. *BMJ Open* 2013; **3**(12): e004277.
70. Stommel M SC. Accuracy and usefulness of BMI measures based on self-reported weight and height: findings from the NHANES & NHIS 2001-2006. . *BMC Public Health* 2009; **9**: 421.
71. Gorber SC TM, Moher D, et al. . A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev* 2007; **8**: 307-26.
72. Hattori A, Sturm R. The obesity epidemic and changes in self-report biases in BMI. *Obesity (Silver Spring)* 2013; **21**(4): 856-60.
73. Pan L, Sherry B, Njai R, Blanck HM. Food insecurity is associated with obesity among US adults in 12 states. *J Acad Nutr Diet* 2012; **112**(9): 1403-9.

8. Appendices

8.1. Appendix A: Consumption (gr/day) of Food Groups

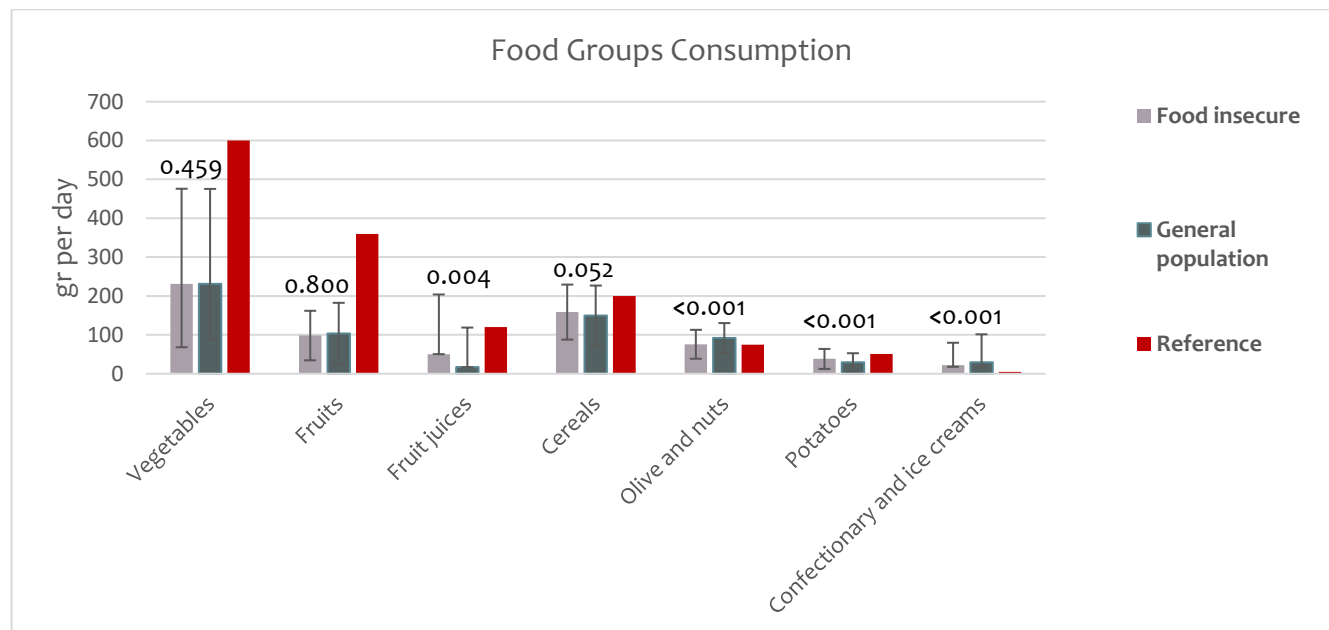
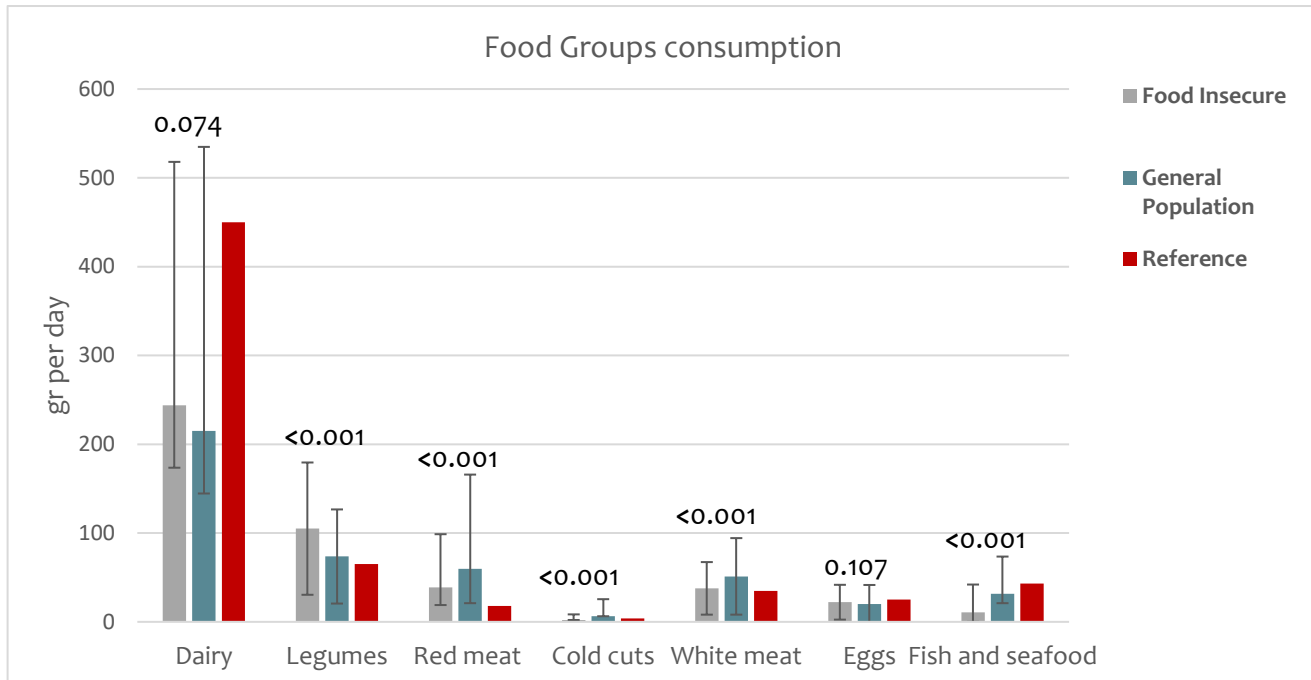


Figure 15A,B: Consumption of Food Groups in gr per day for Food insecure (FEAD recipients) and General Population

8.2. Appendix B: Energy deficit of individuals with Inadequate Energy Intake

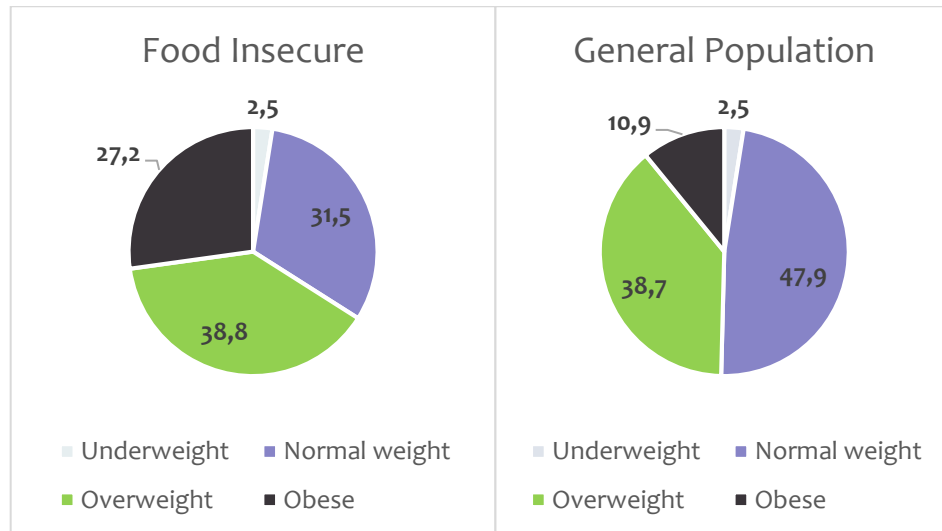
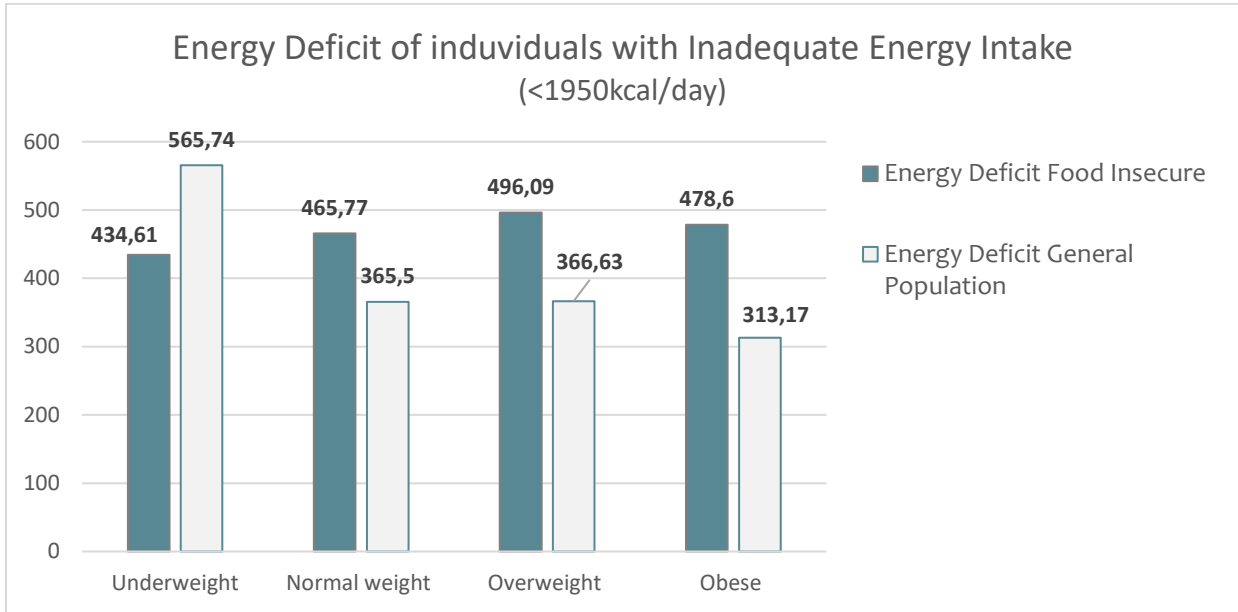


Figure 16.A,B: Energy deficit of individuals with Inadequate Energy Intake (<1950kcal/day) and BMI categories pie charts for Food insecure (FEAD recipients) and General Population

8.3. Appendix C: Semi-quantitative questionnaire (cases)



ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΤΡΟΦΙΜΩΝ ΚΑΙ ΔΙΑΤΡΟΦΗΣ ΤΟΥ ΑΝΘΡΩΠΟΥ
ΜΟΝΑΔΑ ΔΙΑΤΡΟΦΗΣ ΤΟΥ ΑΝΘΡΩΠΟΥ
 Ιερά Οδός 75, 11855 Αθήνα, Τηλ: 210529496
 E-mail: kapsok@aua.gr

ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ ΔΙΑΤΡΟΦΙΚΗΣ ΑΞΙΟΛΟΓΗΣΗΣ ΤΕΒΑ

Α. Κοινωνικο/δημογραφικά στοιχεία

ΚΩΔΙΚΟΣ:	Δήμος / Περιφέρεια:	Ημερομηνία:
Φύλο: Άνδρας <input type="checkbox"/> Γυναίκα <input type="checkbox"/>	Πόσο καιρό είστε στο πρόγραμμα:	Έτος γέννησης:
Πόσες διανομές τροφίμων έχετε λάβει ως τώρα:		
Πόσες διανομές ειδών προσωπικής υγιεινής έχετε λάβει ως τώρα:		
Βάρος (κιλά):	Ύψος (εκ.):	Συνολικά έτη σπουδών:
Αριθμός Παιδιών:	Πόσα άτομα μένετε σπίτι (μαζί με εσάς):	
Αριθμός ωφελούμενων (στην οικογένεια):		
Επάγγελμα: 1. Εργαζόμενος <input type="checkbox"/> 2. Άνεργος <input type="checkbox"/> 3. Συνταξιούχος <input type="checkbox"/> 4. Οικιακά <input type="checkbox"/>		
Οικογενειακή κατάσταση: 1. Άγαμος/η <input type="checkbox"/> 2. Έγγαμος/η <input type="checkbox"/> 3. Διαζευγμένος/η <input type="checkbox"/> 4. Χήρος/α <input type="checkbox"/>		

Β. Αξιολόγηση ποιότητας παρεχόμενων τροφίμων από το πρόγραμμα του ΤΕΒΑ

Παρακαλώ βαθμολογήστε τις παρακάτω προτάσεις:	Καθόλου	Λίγο	Πολύ
1. Σας αρέσει η γεύση των προϊόντων που σας δίνονται σε σχέση με αυτά που αγοράζατε μόνοι σας;			
2. Σας αρέσει η όψη των προϊόντων (δυσχρωμίες, κακοσχηματισμένα προϊόντα ή ελλατωματικές συσκευασίες) που σας δίνονται σε σχέση με αυτά που αγοράζατε μόνοι σας;			
3. Σας καλύπτει ο χρόνος ζωής των προϊόντων που σας δίνονται σε σχέση με αυτά που αγοράζατε μόνοι σας;			

Γ. Αξιολόγηση ικανοποίησης του ωφελούμενου από το πρόγραμμα και επίδρασης στην ζωή του

Παρακαλώ βαθμολογήστε τις παρακάτω προτάσεις:	Καθόλου	Λίγο	Πολύ
4. Το πρόγραμμα του ΤΕΒΑ βοηθάει στον οικογενειακό προϋπολογισμό;			
5. Η ποικιλία των τροφίμων είναι ικανοποιητική			
6. Η ποιότητα των τροφίμων που σας δίνονται είναι ικανοποιητική			
7. Από τότε που συμμετέχω στο πρόγραμμα νιώθω πιο ασφαλής			
8. Από τότε που συμμετέχω στο πρόγραμμα αγχώνομαι λιγότερο			
9. Από τότε που συμμετέχω στο πρόγραμμα μπορώ να δώσω στα παιδιά μου πιο ποιοτικό φαγητό			
10. Χρησιμοποιείτε εσείς και η οικογένειά σας τα παρακάτω προϊόντα που σας δίνονται από το πρόγραμμα			

	Καθόλου	Λίγο	Πολύ
Όσπρια (φακές, φασόλια, ρεβίθια)			
Γάλα			
Τυρί			
Κρέας (κοτόπουλο, χοιρινό μοσχάρι)			
Φρούτα/λαχανικά			
Ρύζι, αλεύρι			
Μακαρόνια			
Ελαιόλαδο			
Βρεφικές τροφές			

11. Τι χρήματα θα δίνετε για να αγοράσετε τα τρόφιμα που σας παρέχονται από τα ΤΕΒΑ;

_____ ευρώ.

12. Τι χρήματα θα δίνετε για να αγοράσετε τα είδη προσωπικής υγιεινής που σας παρέχονται από τα ΤΕΒΑ;

_____ ευρώ.

13. Με τα χρήματα που εξοικονομείτε μέσω του προγράμματος του ΤΕΒΑ, ποιες άλλες ανάγκες καλύπτετε;

α) Ενοίκιο β) ΔΕΚΟ (ΔΕΗ, νερό, τηλέφωνο) γ) άλλα τρόφιμα

δ) μετακινήσεις ε) εκπαίδευση στ) άλλο

14. Αν δεν χρησιμοποιείτε όλα τα τρόφιμα που σας δίνονται από το πρόγραμμα για ποιο λόγο συμβαίνει;

α) Δεν μου/μας αρέσουν γενικά λόγω προτίμησης τα συγκεκριμένα τρόφιμα

β) Έχω αγοράσει προηγουμένως τα ίδια τρόφιμα οπότε μου περισσεύουν

γ) Δεν είναι ποιοτικά (στην γεύση, το άρωμα κλπ.)

δ) Δεν έχουν μεγάλο χρόνο ζωής και αναγκάζομαι να τα πετάξω

ε) Άλλο

15. Θα επιθυμούσατε να συνεχιστεί το πρόγραμμα;

α) Ναι β) Όχι γ) Ναι, με άλλες συνθήκες

Ε. Ερωτηματολόγιο συχνότητας κατανάλωσης τροφίμων

Σημειώστε ΠΟΣΟ ΣΥΧΝΑ καταναλώσατε τα παρακάτω τρόφιμα τον τελευταίο μήνα: Προσοχή, θα πρέπει να απαντήσετε έχοντας ως μερίδα αναφοράς την ποσότητα που αναγράφεται στις παρενθέσεις. (Συντμήσεις: φ = φορές, γρ. = γραμμάρια, τμχ. = τεμάχιο, φλ. = φλιτζάνι τσαγιού = 240 ml)						
	Ποτέ/ Σπάνια	1-3 φ/ μήνα	1-2 φ/ εβδομ	3-6 φ/ εβδομ	1 φ/ ημέρα	≥ 2 φ/ ημέρα
1. Γάλα/ γιαούρτι (1 ποτήρι/ 1 κεσεδάκι)	α	β	γ	δ	ε	στ
2. Γάλα/ γιαούρτι χαμηλό σε λιπαρά (1 ποτήρι/1 κεσεδάκι)	α	β	γ	δ	ε	στ
3. Τυρί (30 γρ)	α	β	γ	δ	ε	στ
4. Αυγό (βραστό, τηγανιτό, ομελέτα) (1 τμχ)	α	β	γ	δ	ε	στ
5. Ψωμί (1 φέτα 30γρ ή φέτα τοστ), φρυγανιά (2 τμχ), παξιμάδια (1 μέτριο)	α	β	γ	δ	ε	στ
6. Δημητριακά πρωινού (½ φλ)	α	β	γ	δ	ε	στ
7. Ρύζι, μακαρόνια, κριθαράκι, χυλοπίτες, άλλα ζυμαρικά (1 φλ)	α	β	γ	δ	ε	στ
8. Αρτοπαρασκευάσματα (κριτσίνια, κουλούρια) (2 μέτρια)	α	β	γ	δ	ε	στ
9. Πίτες (σπιτικές ή αγοραστές) (1 τμχ)	α	β	γ	δ	ε	στ
10. Πατάτες βραστές, φούρνου, πουρές (1 μέτρια/ ½ φλ), τηγανητές (½ μερ)	α	β	γ	δ	ε	στ
11. Μοσχάρι (μπριζόλα, κομμάτι: 150 γρ), κιμάς (1 κουτάλα), μπιφτέκι (2 μέτρια)	α	β	γ	δ	ε	στ
12. Κοτόπουλο/ γαλοπούλα (όλα τα είδη) (150 γρ)	α	β	γ	δ	ε	στ
13. Χοιρινό (μπριζόλα, κομμάτι, σουβλάκι) (150 γρ)	α	β	γ	δ	ε	στ
14. Αρνί, κατσίκι, παϊδάκια (150 γρ)	α	β	γ	δ	ε	στ
15. Αλλαντικά (1 φέτα), κρεατοσκευάσματα	α	β	γ	δ	ε	στ
16. Ψάρια (150 γρ)	α	β	γ	δ	ε	στ
17. Θαλασσινά (χταπόδι, καλαμάρι, γαρίδες) (150 γρ)	α	β	γ	δ	ε	στ
18. Όσπρια (π.χ. φακές, φασόλια, ρεβίθια) (1 πιάτο)	α	β	γ	δ	ε	στ
19. Λαχανικά ως σαλάτα (1 φλ. ωμά, ½ φλ. βραστά)	α	β	γ	δ	ε	στ
20. Λαχανικά ως κυρίως γεύμα (1 πιάτο)	α	β	γ	δ	ε	στ
21. Φρέσκα φρούτα (1 τμχ. ή ½ φλ), αποξηραμένα φρούτα (¼ φλ.)	α	β	γ	δ	ε	στ
22. Ξηροί καρποί, σπόροι (1 φλ. καφέ)	α	β	γ	δ	ε	στ

23. Σοκολατοειδή γλυκίσματα (1 τμχ), μπισκότα (3-4)	α	β	γ	δ	ε	στ
	Ποτέ/ Σπάνια	1-3 φ/ μήνα	1-2 φ/ εβδομ	3-6 φ/ εβδομ	1 φ/ ημέρα	≥ 2 φ/ ημέρα
24. Γλυκά ταψιού (1 τμχ), γλυκά κουταλιού (1 κουτ. γλυκού)	α	β	γ	δ	ε	στ
25. Παγωτό, κρέμα, ρυζόγαλο (1 τμχ)	α	β	γ	δ	ε	στ
26. Αλκοόλ (1 ποτήρι από κάθε ποτό)	α	β	γ	δ	ε	στ
27. Αναψυκτικά (1 κουτί ~ 330 ml)	α	β	γ	δ	ε	στ
28. Χυμός φρούτων (1 ποτήρι)	α	β	γ	δ	ε	στ
29. Καφές (1 φλ. ή ποτήρι)	α	β	γ	δ	ε	στ
30. Τσάι, άλλα αφεψήματα (1 φλ)	α	β	γ	δ	ε	στ
31. Πόσες φορές χρησιμοποιείς ελαιόλαδο (οπουδήποτε);	α	β	γ	δ	ε	στ
32. Πόσες φορές χρησιμοποιείς άλλου είδους λίπος ή έλαιο (οπουδήποτε);	α	β	γ	δ	ε	στ
33. Πόσο συχνά καταναλώνεις προϊόντα ολικής αλέσεως (οτιδήποτε)	α	β	γ	δ	ε	στ
34. Πόσο συχνά παραγγέλνεις από έξω ή τρως εκτός σπιτιού;	α	β	γ	δ	ε	στ
35. Πόσο συχνά καταναλώνεις πρωινό	α	β	γ	δ	ε	
36. Πόσα γεύματα έχεις συνολικά την ημέρα μαζί με τα σνακ;		1-3		4-5		> 6
37. Πόσα ποτήρια νερό καταναλώνετε την ημέρα: 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> αν περισσότερα πόσα.....						
38. Πόσα μικρά μπουκαλάκια νερού των 500ml πίνετε την ημέρα : ½ <input type="checkbox"/> 1 <input type="checkbox"/> 1 ½ <input type="checkbox"/> 2 <input type="checkbox"/> 2 ½ <input type="checkbox"/> 3 <input type="checkbox"/> 3 ½ <input type="checkbox"/> 4 <input type="checkbox"/> 4 ½ <input type="checkbox"/> 5 <input type="checkbox"/> αν περισσότερα πόσα..... (υπολογίστε ότι το μεσαίο μπουκάλι νερού είναι 750ml και το μεγάλο μπουκάλι νερού είναι 1500ml)						

8.4. Appendix D: Semi-quantitative questionnaire (controls)



ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
 ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΤΡΟΦΙΜΩΝ ΚΑΙ ΔΙΑΤΡΟΦΗΣ ΤΟΥ ΑΝΘΡΩΠΟΥ
 ΜΟΝΑΔΑ ΔΙΑΤΡΟΦΗΣ ΤΟΥ ΑΝΘΡΩΠΟΥ
 Ιερά Οδός 75, 11855 Αθήνα, Τηλ: 210529496
 E-mail: kapsok@aua.gr

ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ ΔΙΑΤΡΟΦΙΚΗΣ ΑΞΙΟΛΟΓΗΣΗΣ ΤΕΒΑ

A. Κοινωνικο/δημογραφικά στοιχεία

ΚΩΔΙΚΟΣ:	Δήμος / Περιφέρεια:	Ημερομηνία:
Φύλο: Άνδρας <input type="checkbox"/> Γυναίκα <input type="checkbox"/>	Έτος γέννησης:	
Βάρος (κιλά):	Ύψος (εκ.):	Συνολικά έτη σπουδών:
Αριθμός Παιδιών:	Πόσα άτομα μένετε σπίτι (μαζί με εσάς):	
Επάγγελμα: 1. Εργαζόμενος <input type="checkbox"/> 2. Άνεργος <input type="checkbox"/> 3. Συνταξιούχος <input type="checkbox"/> 4. Οικιακά <input type="checkbox"/>		
Οικογενειακή κατάσταση: 1. Άγαμος/η <input type="checkbox"/> 2. Έγγαμος/η <input type="checkbox"/> 3. Διαζευγμένος/η <input type="checkbox"/> 4. Χήρος/α <input type="checkbox"/>		

B. Ερωτηματολόγιο συχνότητας κατανάλωσης τροφίμων

Σημειώστε ΠΟΣΟ ΣΥΧΝΑ καταναλώσατε τα παρακάτω τρόφιμα τον τελευταίο μήνα:
 Προσοχή, θα πρέπει να απαντήσετε έχοντας ως μερίδα αναφοράς την ποσότητα που αναγράφεται στις παρενθέσεις.
 (Συντμήσεις: φ = φορές, γρ. = γραμμάρια, τμχ. = τεμάχιο, φλ. = φλιτζάνι τσαγιού = 240 ml)

	Ποτέ/ Σπάνια	1-3 φ/ μήνα	1-2 φ/ εβδομ	3-6 φ/ εβδομ	1 φ/ ημέρα	≥ 2 φ/ ημέρα
Γάλα/ γιαούρτι (1 ποτήρι/ 1 κεσεδάκι)	α	β	γ	δ	ε	στ
Γάλα/ γιαούρτι χαμηλό σε λιπαρά (1 ποτήρι/1 κεσεδάκι)	α	β	γ	δ	ε	στ
Τυρί (30 γρ)	α	β	γ	δ	ε	στ
Αυγό (βραστό, τηγανιτό, ομελέτα) (1 τμχ)	α	β	γ	δ	ε	στ
Ψωμί (1 φέτα 30γρ ή φέτα τοστ), φρυγανιά (2 τμχ), παξιμάδια (1 μέτριο)	α	β	γ	δ	ε	στ
Δημητριακά πρωινού (½ φλ)	α	β	γ	δ	ε	στ
Ρύζι, μακαρόνια, κριθαράκι, χυλοπίτες, άλλα ζυμαρικά (1 φλ)	α	β	γ	δ	ε	στ
Αρτοποιασκευάσματα (κριτσίνια, κουλούρια) (2 μέτρια)	α	β	γ	δ	ε	στ
Πίτες (σπιτικές ή αγοραστές) (1 τμχ)	α	β	γ	δ	ε	στ
Πατάτες βραστές, φούρνου, πουρές (1 μέτρια/ ½ φλ), τηγανητές (½ μερ)	α	β	γ	δ	ε	στ

Μοσχάρι (μπριζόλα, κομμάτι: 150 γρ), κιμάς (1 κουτάλα), μπιφτέκι (2 μέτρια)	α	β	γ	δ	ε	στ
Κοτόπουλο/ γαλοπούλα (όλα τα είδη) (150 γρ)	α	β	γ	δ	ε	στ
Χοιρινό (μπριζόλα, κομμάτι, σουβλάκι) (150 γρ)	α	β	γ	δ	ε	στ
Αρνί, κατσίκι, παϊδάκια (150 γρ)	α	β	γ	δ	ε	στ
Αλλαντικά (1 φέτα), κρεατοσκευάσματα	α	β	γ	δ	ε	στ
Ψάρια (150 γρ)	α	β	γ	δ	ε	στ
Θαλασσινά (χταπόδι, καλαμάρι, γαρίδες) (150 γρ)	α	β	γ	δ	ε	στ
	Ποτέ/ Σπάνια	1-3 φ/ μήνα	1-2 φ/ εβδομ	3-6 φ/ εβδομ	1 φ/ ημέρα	≥ 2 φ/ ημέρα
Όσπρια (π.χ. φακές, φασόλια, ρεβίθια) (1 πιάτο)	α	β	γ	δ	ε	στ
Λαχανικά ως σαλάτα (1 φλ. ωμά, ½ φλ. βραστά)	α	β	γ	δ	ε	στ
Λαχανικά ως κυρίως γεύμα (1 πιάτο)	α	β	γ	δ	ε	στ
Φρέσκα φρούτα (1 τμχ. ή ½ φλ), αποξηραμένα φρούτα (¼ φλ.)	α	β	γ	δ	ε	στ
Ξηροί καρποί, σπόροι (1 φλ. καφέ)	α	β	γ	δ	ε	στ
Σοκολατοειδή γλυκίσματα (1 τμχ), μπισκότα (3-4)	α	β	γ	δ	ε	στ
Γλυκά ταψιού (1 τμχ), γλυκά κουταλιού (1 κουτ. γλυκού)	α	β	γ	δ	ε	στ
Παγωτό, κρέμα, ρυζόγαλο (1 τμχ)	α	β	γ	δ	ε	στ
Αλκοόλ (1 ποτήρι από κάθε ποτό)	α	β	γ	δ	ε	στ
Αναψυκτικά (1 κουτί ~ 330 ml)	α	β	γ	δ	ε	στ
Χυμός φρούτων (1 ποτήρι)	α	β	γ	δ	ε	στ
Καφές (1 φλ. ή ποτήρι)	α	β	γ	δ	ε	στ
Τσάι, άλλα αφεψήματα (1 φλ)	α	β	γ	δ	ε	στ
Πόσες φορές χρησιμοποιείς ελαιόλαδο (οπουδήποτε);	α	β	γ	δ	ε	στ
Πόσες φορές χρησιμοποιείς άλλου είδους λίπος ή έλαιο (οπουδήποτε);	α	β	γ	δ	ε	στ
Πόσο συχνά καταναλώνεις προϊόντα ολικής αλέσεως (οτιδήποτε)	α	β	γ	δ	ε	στ
Πόσο συχνά παραγγέλνεις από έξω ή τρως εκτός σπιτιού;	α	β	γ	δ	ε	στ
Πόσο συχνά καταναλώνεις πρωινό	α	β	γ	δ	ε	στ
Πόσα γεύματα έχεις συνολικά την ημέρα μαζί με τα σνακ;	1-3			4-5		> 6
Πόσα ποτήρια νερό καταναλώνετε την ημέρα: 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> αν περισσότερα πόσα.....						
Πόσα μικρά μπουκαλάκια νερού των 500ml πίνετε την ημέρα : ½ <input type="checkbox"/> 1 <input type="checkbox"/> 1½ <input type="checkbox"/> 2 <input type="checkbox"/> 2½ <input type="checkbox"/> 3 <input type="checkbox"/> 3½ <input type="checkbox"/> 4 <input type="checkbox"/> 4½ <input type="checkbox"/> 5 <input type="checkbox"/> αν περισσότερα πόσα..... (υπολογίστε ότι το μεσαίο μπουκάλι νερού είναι 750ml και το μεγάλο μπουκάλι νερού είναι 1500ml)						

Γ. ΕΚΤΙΜΗΣΗ ΤΗΣ ΥΠΟΣΤΗΡΙΞΗΣ ΠΟΥ ΑΙΣΘΑΝΕΣΘΕ ΑΠΟ ΤΟΝ ΚΟΙΝΩΝΙΚΟ ΠΕΡΙΓΥΡΟ

A1	Μερικοί υποστηρίζουν ότι βοηθώντας τους άλλους τελικά βοηθάς τον εαυτό σου. Συμφωνείτε με αυτήν την άποψη;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A2	Έχετε βοήθεια από τους φίλους σας όταν την χρειάζεστε;	<input type="checkbox"/> Όχι	<input type="checkbox"/> Μάλλον όχι	<input type="checkbox"/> Μάλλον ναι	<input type="checkbox"/> Ναι, οπωσδήποτε
A3	Όταν πηγαίνετε για ψώνια στην περιοχή σας συνήθως συναντάτε γνωστούς και φίλους;	<input type="checkbox"/> Όχι πολύ συχνά	<input type="checkbox"/> Μερικές φορές	<input type="checkbox"/> Πολύ συχνά	<input type="checkbox"/> Σχεδόν πάντα
A4	Συμφωνείτε με την άποψη ότι οι περισσότεροι άνθρωποι είναι άξιοι εμπιστοσύνης;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A5	Νοιώθετε ασφαλής να περπατάτε στην γειτονιά σας όταν νυχτώσει;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A6	Αισθάνεστε καταξιωμένος/η στην κοινωνία;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A7	Προσφέρετε εθελοντική εργασία σε κάποιο τοπικό σύλλογο, ομάδα ή οργάνωση;	<input type="checkbox"/> Όχι, ποτέ	<input type="checkbox"/> Σπάνια	<input type="checkbox"/> 1 φορά το μήνα	<input type="checkbox"/> 1 φορά την εβδομάδα
A8	Έχετε μαζέψει ποτέ σκουπιδάκια άλλων σε κάποιο δημόσιο χώρο;	<input type="checkbox"/> ποτέ	<input type="checkbox"/> Μερικές φορές	<input type="checkbox"/> Συχνά	<input type="checkbox"/> Πολύ συχνά
A9	Είστε ευχαριστημένοι με όσα έχετε ζήσει-καταφέρει μέχρι τώρα στη ζωή σας;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A10	Εάν χαλάσει κάποιο αυτοκίνητο έξω από το σπίτι σας, θα προσκαλούσατε τον/την οδηγό μέσα στο σπίτι για να χρησιμοποιήσει το τηλέφωνο;	<input type="checkbox"/> Όχι, δεν υπάρχει περίπτωση	<input type="checkbox"/> Μάλλον όχι	<input type="checkbox"/> Μάλλον ναι	<input type="checkbox"/> Ναι, οπωσδήποτε
A11	Θεωρείται η περιοχή που μένετε ασφαλής;	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A12	Αν προσέχατε κάποιο παιδάκι και χρειαζόταν να βγείτε έξω για λίγο, θα ζητούσατε από κάποιον γείτονα να το κρατήσει;	<input type="checkbox"/> Όχι, δεν υπάρχει περίπτωση	<input type="checkbox"/> Μάλλον όχι	<input type="checkbox"/> Μάλλον ναι	<input type="checkbox"/> Ναι, οπωσδήποτε
A13	Επισκεφτήκατε κάποιον γείτονα την τελευταία εβδομάδα;	<input type="checkbox"/> Όχι, ούτε μια φορά	<input type="checkbox"/> 1-2 φορές	<input type="checkbox"/> 3-4 φορές	<input type="checkbox"/> Αρκετά συχνά
A14	Έχετε συμμετάσχει-παρευρεθεί σε κάποια εκδήλωση στην περιοχή που μένετε τους τελευταίους 6 μήνες;	<input type="checkbox"/> Όχι, ούτε μια φορά	<input type="checkbox"/> 1 φορά	<input type="checkbox"/> 2 φορές	<input type="checkbox"/> 3 φορές ή περισσότερες
A15	Συμμετέχετε ενεργά σε κάποιο τοπικό σύλλογο; (αθλητικό, κοινωνικό, πολιτικό, Πολιτιστικό,)	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Σπάνια	<input type="checkbox"/> Μερικές φορές	<input type="checkbox"/> Πολύ ενεργά
A16	Νοιώθετε ότι εκεί που ζείτε είναι «σαν το σπίτι σας;»(δηλ. νοιώθετε άνετα στην περιοχή που ζείτε)	<input type="checkbox"/> Καθόλου	<input type="checkbox"/> Λίγο	<input type="checkbox"/> Πολύ	<input type="checkbox"/> Πάρα πολύ
A17	Πόσες φορές μιλήσατε με φίλους στο τηλέφωνο την τελευταία εβδομάδα; (όχι συγγενείς)	<input type="checkbox"/> Καμία	<input type="checkbox"/> 1-3 φορές	<input type="checkbox"/> 4-5 φορές	<input type="checkbox"/> Πάνω από 6 φορές
A18	Με πόσα άτομα μιλήσατε εχθές; (φίλους συγγενείς που συναντήσατε)	<input type="checkbox"/> Κανένα	<input type="checkbox"/> 1-5 άτομα	<input type="checkbox"/> 6-10 άτομα	<input type="checkbox"/> Πάνω από 10 άτομα
A19	Συνηθίζετε να τρώτε τα Σαββατοκύριακα με φίλους (ή/και συγγενείς) κάπου εκτός σπιτιού;	<input type="checkbox"/> Όχι πολύ συχνά	<input type="checkbox"/> Μερικές φορές	<input type="checkbox"/> Πολύ συχνά	<input type="checkbox"/> Σχεδόν πάντα
A20	Επισκέπτεστε μέλη της οικογένειάς σας που μένουν σε άλλη περιοχή από αυτή που μένετε εσείς;	<input type="checkbox"/> Όχι πολύ συχνά	<input type="checkbox"/> Μερικές φορές	<input type="checkbox"/> Αρκετά συχνά	<input type="checkbox"/> Πολύ συχνά

A21	Εάν χρειαστεί να πάρετε μια πολύ σημαντική απόφαση για τη ζωή σας, ξέρετε που να βρείτε τις απαραίτητες πληροφορίες;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, δεν ξέρω	Μάλλον όχι	Μάλλον ναι	Ξέρω σίγουρα
A22	Τους τελευταίους έξι μήνες έτυχε να βοηθήσετε κάποιον γείτονά σας που αρρώστησε;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, ούτε μια φορά	1-2 φορές	3-4 φορές	Περισσότερες από 5 φορές
A23	Ανήκετε στο διοικητικό συμβούλιο κάποιου συλλόγου, ομάδας ή οργάνωσης της περιοχής σας;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, σε κανέναν	Σε ένα (1)	Σε δύο (2)	Τρεις ή περισσότερους (3)
A24	Τα τελευταία 3 χρόνια, συνεργαστήκατε με άλλα άτομα για να αντιμετωπίσετε μια έκτακτη ανάγκη στην περιοχή σας;(βαρυχειμωνιά, φωτιά, πλημμύρα)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, ούτε μια φορά	1-2 φορές	3-4 φορές	Τουλάχιστον 5 φορές
A25	Τα τελευταία 3 χρόνια πήρατε μέρος σε κάποια δραστηριότητα που γίνεται στην περιοχή σας; (δενδροφύτευση, καθαρισμός δρόμων, καρναβάλι κλπ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, ούτε μια φορά	Σπάνια	Μερικές φορές	Ναι, συχνά
A26	Έχετε πάρει την πρωτοβουλία να οργανώσετε κάποιο καινούριο σύλλογο στην περιοχή σας; (εθελοντικής αιμοδοσίας, κατηχητικό, σύλλογο για ηλικιωμένους κλπ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, ποτέ	1 φορά	2 φορές	Τουλάχιστον 3 φορές
A27	Σε συζητήσεις με άλλους είστε πρόθυμοι να εκφράσετε διαφορετική άποψη από αυτή της πλειοψηφίας;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, δεν υπάρχει περίπτωση	Μάλλον όχι	Μάλλον ναι	Ναι, οπωσδήποτε
A28	Αν γίνει κάποια παρεξήγηση με τους γείτονές σας, είστε πρόθυμοι να τα βρείτε;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, δεν υπάρχει περίπτωση	Μάλλον όχι	Μάλλον ναι	Ναι, οπωσδήποτε
A29	Πιστεύετε ότι το να ζουν στην περιοχή σας άτομα από διαφορετικά μέρη κάνει την ζωή σας καλύτερη;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Καθόλου	Λίγο	Πολύ	Πάρα πολύ
A30	Σας αρέσει να ζείτε μεταξύ ατόμων με διαφορετικό τρόπο ζωής από τον δικό σας;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Καθόλου	Λίγο	Πολύ	Πάρα πολύ
A31	Εάν κάποια άτομα με διαφορετικές συνήθειες ή διαφορετικό τρόπο ζωής μετακομίσουν στη γειτονιά σας, θα γίνουν αποδεκτοί από τους γείτονες;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, δεν οπωσδήποτε υπάρχει περίπτωση	Μάλλον όχι	Μάλλον ναι	Ναι

ΕΑΝ ΕΡΓΑΖΕΣΤΕ, ΣΑΣ ΠΑΡΑΚΑΛΩ ΑΠΑΝΤΗΣΤΕ ΣΤΙΣ ΕΠΟΜΕΝΕΣ ΕΡΩΤΗΣΕΙΣ.

ΕΑΝ ΔΕΝ ΕΡΓΑΖΕΣΤΕ, ΣΑΣ ΕΥΧΑΡΙΣΤΟΥΜΕ ΠΟΥ ΣΥΜΠΛΗΡΩΣΑΤΕ ΤΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ.

A32	Νοιώθετε ότι είστε μέλος της κοινότητας στην περιοχή που εργάζεστε;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Καθόλου	Λίγο	Πολύ	Πάρα πολύ	
A33	Είναι οι συνάδελφοί σας φίλοι σας;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Καθόλου	Λίγο	Πολύ	Πάρα πολύ	
A34	Νοιώθετε ότι είστε μέλος μιας ομάδας στη δουλειά σας;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Καθόλου	Λίγο	Πολύ	Πάρα πολύ	
A35	Στη δουλειά σας, αναλαμβάνετε την πρωτοβουλία να κάνετε κάτι που χρειάζεται να γίνει ακόμα κι αν δεν σας το έχει ζητήσει κανείς;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Ποτέ	Σχεδόν ποτέ	Αρκετά συχνά	Πολύ συχνά	
A36	Κατά τη διάρκεια της τελευταίας εβδομάδας, βοηθήσατε κάποιο συνάδελφο στη δουλειά του, ενώ δεν ήταν δική σας ευθύνη ή υποχρέωση;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Όχι, ούτε μια φορά	1-2 φορές	3-4 φορές	Τουλάχιστον 5 φορές	

8.5. Appendix E: Food Composition Table

Question No	FFQ name	Code (SR)	Triho-poulou	Energy (Kcal)	Protein (g)	Total lipid (fat) (g)	Carbohydrate (g)	Fiber total dietary (g)	Calcium Ca (mg)	Sodium Na (mg)	Fatty acids total saturated (g)	Fatty acids, total monounsaturated (g)	Fatty acids, total polysaturated (g)
1	Milk	01211		1	0,03	0,03	0,05	0	1	0	0,019	0,008	0,002
1	Yogurt	01293		1	0,09	0,05	0,04	0	1	0	0,024	0,021	0,005
				1	0,06	0,04	0,045	0	1	0	0,0215	0,0145	0,0035
2	Milk light	01078		1	0,03	0,04	0,05	0	1	0	0,023	0,011	0,001
2	Yogurt light	01287		1	0,01	0,02	0,04	0	1	0	0,012	0,005	0,001
				1	0,02	0,03	0,045	0	1	0	0,0175	0,008	0,001
3	Feta cheese	01019		3	0,14	0,21	0,04	0	5	11	0,133	0,046	0,006
3	Gouda cheese	01022		4	0,25	0,27	0,02	0	7	8	0,176	0,077	0,007
3	Edam cheese	01018		4	0,25	0,29	0,01	0	7	10	0,187	0,081	0,007
				3,666666667	0,213333333	0,256666667	0,023333333	0	6,333333333	9,666666667	0,165333333	0,068	0,006666667
4	Egg boiled	01129		2	0,13	0,11	0,01	0	0	1	0,033	0,041	0,014
4	Egg fried	01128		2	0,14	0,15	0,01	0	1	2	0,043	0,062	0,033
4	Ouellette	01130		2	0,11	0,12	0,01	0	0	2	0,033	0,048	0,027
				2	0,126666667	0,126666667	0,01	0	0,333333333	1,666666667	0,036333333	0,050333333	0,024666667
5	Toast bread	18967		2	0,11	0,02	0,44	0,1	7	5	0,006	0,004	0,01
5	Toast	18076		3	0,16	0,04	0,51	0,1	1	6	0,009	0,02	0,007

5	Rusk	18224		4	0,14	0,07	0,72	0	0	3	0,014	0,028	0,023
				3	0,1366 66667	0,0433 33333	0,556 66666 7	0,066666 667	2,6666 66667	4,6666 66667	0,009666667	0,017333333	0,013333333
6	Breakfast cereal	08084		4	0,29	0,11	0,5	0,2	0	0	0,018	0,015	0,066
7	Rice	20451		1	0,02	0	0,29	0	0	0	0,001	0,001	0,001
7	Pasta	20421		2	0,06	0,01	0,31	0	0	0	0,002	0,001	0,003
7	Egg noodles	20410		1	0,05	0,02	0,25	0	0	0	0	0	0
				1,33333 3333	0,0433 33333	0,01	0,2833 33333	0	0	0	0,001	0,000666667	0,001333333
8	Rattles	18080		4	0,12	0,1	0,68	0	0	7	0,014	0,036	0,036
8	Cookies	28319		3	0,09	0	0,55	0	1	4	0	0	0
				3,5	0,105	0,05	0,615	0	0,5	5,5	0,007	0,018	0,018
9	Pies		Χορτόπιτα (Χαλκιδικής)	2,22	0,052	0,145	0,21	0,02	1,48	2,37	0,021	0,1	0,001
9	Pies		Χορτοπιτάκια τηγανιτά (Κρήτης)	3,7	0,05	0,23	0,31	0,03	1,35	1	0,003	0,175	0,014
9	Pies		Χορτοτυρόπιτα (Ηπείρου)	2,91	0,07	0,18	0,27	0,02	1,4	3,07	0,039	0,121	0,015
9	Pies		Τυρόπιτα	2,75	0,08	0,21	0,14	0	1,65	3,87	0,066	0,112	0,001
				2,895	0,063	0,1912 5	0,2325	0,0175	1,47	2,5775	0,03225	0,127	0,00775
10	Boiled potatoes	11367		1	0,02	0	0,2	0	0	0	0	0	0
10	Roasted Potatoes	11363		1	0,02	0	0,22	0	0	0	0	0	0
10	Smashed	31036		1	0,02	0,05	0,13	0	0	3	0,026	0,012	0,007

	d potatoes												
10	Fried potatoes	21138		3	0,03	0,15	0,41	0	0	2	0,023	0,06	0,054
				1,5	0,0225	0,05	0,24	0	0	1,25	0,01225	0,018	0,01525
11	Beef steak	36013		2	0,3	0,08	0	0	0	3	0,031	0,037	0,007
11	Beef burger		Μπιφτέκια	2,45	0,1	0,17	0,06	0	0,27	1,23	0,061	0,087	0,01
11	Minced beef	13047		2	0,19	0,13	0	0	0	1	0,053	0,048	0,005
				2,15	0,196666667	0,126666667	0,02	0	0,09	1,743333333	0,048333333	0,057333333	0,007333333
12	Chicken	05118		2	0,27	0,04	0	0	0	1	0,011	0,015	0,009
12	Chicken		Κοτόπουλο ψητό	1,8	0,15	0,14	0	0	0	0	0,035	0,072	0,024
12	Chicken		Κοτόπουλο πανέ	2,8	0,12	0,16	0,23	0	0,4	0	0,032	0,093	0,023
12	Chicken	5112		2	0,24	0,13	0	0	0	1	0,037	0,054	0,029
12	Chicken	7935		1	0,15	0,08	0,02	0	0	9	0,025	0,028	0,015
12	Turkey	5305		1	0,2	0,08	0	0	0	1	0,02	0,026	0,022
12	Turkey	5166		2	0,29	0,07	0	0	0	1	0,022	0,026	0,021
				1,8	0,202857143	0,1	0,035714286	0	0,057142857	1,857142857	0,026	0,044857143	0,020428571
13	Pork steak	10085		2	0,27	0,13	0	0	0	1	0,05	0,062	0,014
13	Minced pork	10220		3	0,26	0,21	0	0	0	1	0,077	0,092	0,019
13	Pork	10069		2	0,27	0,06	0	0	0	0	0,019	0,025	0,006
13	Pork souvlaki	10136		2	0,23	0,09	0	0	0	15	0,031	0,044	0,014
				2,25	0,2575	0,1225	0	0	0	4,25	0,04425	0,05575	0,01325

14	Lamb		Αρνί κοκκινιστ ό	2	0,11	0,21	0	0	0	0,5	0,085	0,096	0,014
14	Lamb	17014		2	0,28	0,08	0	0	0	1	0,028	0,034	0,005
14	Κατσίκι	17169		1	0,27	0,03	0	0	0	1	0,009	0,014	0,002
14	Ribs	17031		4	0,21	0,3	0	0	0	1	0,128	0,125	0,022
				2,25	0,2175	0,155	0	0	0	0,875	0,0625	0,06725	0,01075
15	Cold cuts	07944		1	0,14	0,03	0,08	0	0	12	0,001	0,006	0,004
15	Cold cuts	10998		1	0,28	0,03	0,02	0	0	10	0,01	0,013	0,005
				1	0,21	0,03	0,05	0	0	11	0,0055	0,0095	0,0045
16	Fish		Γαύρος τηγανιτός	3	0,24	0,23	0,06	0	1	2,6	0,004	0,123	0,005
16	Fish		Γαύρος φούρνου	2,59	0,19	0,2	0	0	1	2	0,035	0,109	0,041
16	Fish		Βακαλάος τηγανιτός	2	0,22	0,13	0,47	0	0,19	0,73	0,018	0,085	0,018
16	Fish		Βακαλάος φρέσκος πλακί	1,4	0,15	0,082	0,017	0	0,15	0,5	0,012	0,053	0,012
16	Fish	15088		2	0,25	0,11	0	0	4	3	0,015	0,039	0,051
16	Fish	15092		1	0,24	0,03	0	0	0	1	0,007	0,005	0,01
				1,99833 3333	0,215	0,1303 33333	0,0911 66667	0	1,05666 6667	1,63833 3333	0,015166667	0,069	0,022833333
17	Seafood (octopus)		Χταπόδι ξιδάτο	1	0,29	0,07	0	0	0,5	0	0,013	0,042	0,015
17	Seafood (octopus)	15230		2	0,3	0,02	0,04	0	1	5	0,005	0,003	0,005
17	Seafood (squid)		Καλαμάρι α κοκκινιστ ά	1,5	0,09	0,1	0,04	0	0,18	0,68	0,015	0,063	0,014

17	Seafood (squid)	15176		2	0,18	0,07	0,08	0	0	3	0,019	0,027	0,021
17	Seafood (shrimps)	15271		1	0,24	0	0	0	1	1	0,001	0	0,001
17	Seafood (cuttlefish)	15229		2	0,32	0,01	0,02	0	2	7	0,002	0,002	0,003
				1,583333333	0,236666667	0,045	0,03	0	0,78	2,78	0,009166667	0,022833333	0,009833333
18	Legumes Lentils		Φακές κοκκινιστές	1	0,04	0,08	0,09	0,02	0,17	0	0,012	0,057	0,011
18	Legumes Lentils		Φακές	1	0,04	0,09	0,1	0,01	0,17	0	0,001	0,006	0,001
18	Legumes Lentils	16070		1	0,09	0	0,2	0,1	0	0	0,001	0,001	0,002
18	Legumes Beans		Φασόλια σούπα	1	0,03	0,08	0,1	0,04	0,36	0,13	0,012	0,059	0,011
18	Legumes Beans	16005		2	0,06	0,05	0,22	1	4	0,019	0,021	0,007	0
18	Legumes Chickpeas		Ρεβίθια σούπα	1	0,069	0,1	0,16	0,04	0,53	0	0,013	0,062	0,018
18	Legumes Chickpeas	16057		2	0,09	0,03	0,27	0,1	0	0	0,003	0,006	0,012
				1,285714286	0,059857143	0,061428571	0,162857143	0,187142857	0,747142857	0,021285714	0,009	0,028285714	0,007857143
19	Vegetables salad raw		Σαλάτα ντομάτα αγγούρι	0,9	0	0,09	0	0	0,1	„07	0,0013	0,064	0,012
19	Vegetables salad raw	11253		0	0,01	0	0,03	0	0	0	0	0	0,001

19	Vegetables salad boiled		Χόρτα βραστά	0,1	0,02	0	0,01	0,02	0,57	0,13	0	0	0
19	Vegetables salad boiled		Ζοχός (άγριο χόρτο)	2,2	0,18	0	0	0,2	1,27	0,7		0	0
19	Vegetables salad boiled		Κολοκυθάκια	0,2	0,02	0	0,03	0	0,2	0,2	0	0	0
				0,68	0,046	0,018	0,014	0,044	0,428	0,2575	0,000325	0,0128	0,0026
20	Vegetables as main dish		Αρακάς κοκκινιστός	1,43	0,04	0,1	0,08	0,03	0,2	0	0,016	0,071	0,016
20	Vegetables as main dish		Γεμιστά (τομάτες, πιπεριές, κολοκυθάκια)	1,32	0,15	0,09	0,11	0,02	0,2	0,08	0,013	0,061	0,012
20	Vegetables as main dish		Μελιτζάνες ιμάμ	0,95	0,01	0,08	0,04	0,02	0,18	0	0,012	0,055	0,011
20	Vegetables as main dish		Μελιτζάνες μουσακάς	2,4	0,08	0,2	0,06	0,01	0,94	1,08	0,057	0,115	0,023
20	Vegetables as main dish		Φασολάκια κοκκινιστά	1,1	0,01	0,09	0,04	0,02	0,29	0	0,014	0,065	0,013
				1,44	0,058	0,112	0,066	0,02	0,362	0,232	0,0224	0,0734	0,015
21	Fresh Fruits	9040		1	0,01	0	0,23	0	0	0	0,001	0	0,001
21	Fresh Fruits	9004		0	0	0	0,13	0	0	0	0	0	0
21	Fresh Fruits	9252		1	0	0	0,15	0	0	0	0	0,001	0,001

21	Fresh Fruits	9326		0	0,01	0	0,08	0	0	0	0	0	0
21	Fresh Fruits	9236		0	0,01	0	0,1	0	0	0	0	0,001	0,001
21	Fruits dried	9094		2	0,03	0,01	0,64	0,1	2	0	0,001	0,002	0,003
21	Fruits dried	9085		3	0,03	0	0,77	0	1	0	0,001	0	0
21	Fruits dried	9291		2	0,02	0	0,64	0,1	0	0	0,001	0,001	0,001
				1,125	0,01375	0,00125	0,3425	0,025	0,375	0	0,0005	0,000625	0,000875
22	Nuts	16087		6	0,26	0,49	0,16	0,1	1	0	0,063	0,244	0,156
22	Nuts	12061		6	0,21	0,5	0,22	0,1	3	0	0,038	0,316	0,123
22	Nuts	12087		6	0,18	0,44	0,3	0	0	0	0,078	0,238	0,078
22	Nuts	12155		7	0,15	0,65	0,14	0,1	1	0	0,061	0,089	0,472
22	Seeds	12036		6	0,21	0,51	0,2	0,1	1	0	0,045	0,185	0,231
				6,2	0,202	0,518	0,204	0,08	1,2	0	0,057	0,2144	0,212
23	Chocolate	19076		4	0,02	0,03	0,88	0	0	0	0,01	0,019	0,003
23	Chocolate	19081		5	0,04	0,34	0,6	0,1	0	0	0,201	0,112	0,01
23	Chocolate	19078		6	0,14	0,52	0,28	0,2	1	0	0,323	0,161	0,016
23	Chocolate cookies	18167		5	0,04	0,26	0,66	0,1	0	0	3	0,074	0,146
23	Chocolate cookies	18157		4	0,07	0,14	0,73	0	0	6	0,042	0,049	0,042
		19182		2	0,04	0,16	0,16	0	1	0	0,092	0,05	0,009
				4,333333333	0,058333333	0,241666667	0,551666667	0,066666667	0,333333333	1	0,611333333	0,0775	0,037666667
24	Stove sweets		Γαλακτομ πούρεκο	2,14	0,04	0	0,33	0	0,7	0,8	0,028	0,027	0,01

24	Stove sweets		Καρυδόπιτα	2,86	0,05	0,1	0,43	0,01	0,29	0,81	0,012	0,023	0,057
24	Stove sweets		Ραβανί	3,31	0,05	0,1	0,53	0,01	0,44	0,26	0,045	0,042	0,013
24	Stove sweets		Χαλβάς	2,99	0,02	0,13	0,43	0,01	0,13	0	0,017	0,087	0,01
24	Stove sweets		Κυδωνόπαστο	3,09	0	0	0,75	0,02	0	0	0	0	0
				2,878	0,032	0,066	0,494	0,01	0,312	0,374	0,0204	0,0358	0,018
25	Ice cream	43506		3	0,04	0,2	0,31	0	3	1	0,127	0,05	0,015
25	Ice cream	1301		3	0,03	0,14	0,29	0	1	1	0,027	0,018	0,007
25	Ice cream		Παγωτό βανίλια	1,8	0,04	0,077	0,232	0	0,99	0,45	0,031	0,029	0,006
25	Ice cream		Παγωτό σοκολάτα	2,34	0,048	0,11	0,29	0	0,89	0,4	0,052	0,039	0,007
25	Ice cream	19095		2	0,04	0,11	0,24	0	1	1	0,068	0,03	0,005
25	Ice cream	19270		2	0,04	0,11	0,28	0	1	1	0,068	0,032	0,004
25	Cream		Κρέμα	1,16	0,03	0,04	0,17	0	1,2	0,75	0,025	0,012	0,001
25	Cream	19168		1	0,05	0,05	0,11	0	1	1	0,022	0,014	0,004
25	Rice cream		Ρυζόγαλο	1,06	0,029	0,03	0,175	0	0,86	0,41	0,018	0,009	0,001
				1,928888889	0,038555556	0,096333333	0,233	0	1,215555556	0,778888889	0,048666667	0,025888889	0,005555556
26	Alcohol	14084		1	0	0	0,03	0	0	0	0	0	0
26	Alcohol	14004		0	0	0	0,03	0	0	0	0	0	0
26	Alcohol	14037		2	0	0	0	0	0	0	0	0	0
				1	0	0	0,02	0	0	0	0	0	0
27	Refreshments	14145		0	0	0	0,1	0	0	0	0	0	0
27	Refreshments	14400		0	0.00	0.00	0.10	0.0	0	0	0	0	0

				0	0	0	0,1	0	0	0	0	0	0
28	Fruits juice	42270		1	0	0	0.13	0	0	0	0	0	0
28	Fruits juice	9206		0	0,01	0	0,1	0	0	0	0	0	0
				0,5	0,005	0	0,1	0	0	0	0	0	0
29	Coffee	14210		0	0	0	0,02	0	0	0	0,001	0	0,001
29	Coffee	14215		0	0	0	0	0	0	0	0	0	0
				0	0	0	0,01	0	0	0	0,0005	0	0,0005
30	Tea	14278		0	0	0	0	0	0	0	0	0	0
30	Tea	14247		0	0	0	0	0	0	0	0	0	0
				0	0	0	0	0	0	0	0	0	0
31	Olive oil		Ελαιόλαδο	8,86	0	0,99	0	0	0	0	0,143	0,754	0,088
31	Olive oil	4053		9	0	1	0	0	0	0	0,138	0,73	0,105
				8,93	0	0,995	0	0	0	0	0,1405	0,742	0,0965
32	Other oils	4060		9	0	1	0	0	0	0	0,101	0,454	0,401
32	Other oils		Αραβοσιτέλαιο	8,79	0	0,99	0	0	0,3	0	0,129	0,257	0,569
32	Other oils		Ηλιέλαιο	8,8	0	0,99	0	0	0,1	0,002	0,11	0,223	0,622
32	Other oils	4630		4	0	0,44	0	0	0	7	0,111	0,104	0,21
32	Other oils	1145		7	0,01	0,81	0	0	0	0	0,505	0,234	0,3
				7,518	0,002	0,846	0	0	0,08	1,4004	0,1912	0,2544	0,4204