

Work Package (WP) 1 Menu Mediterranean Index and Characterisation



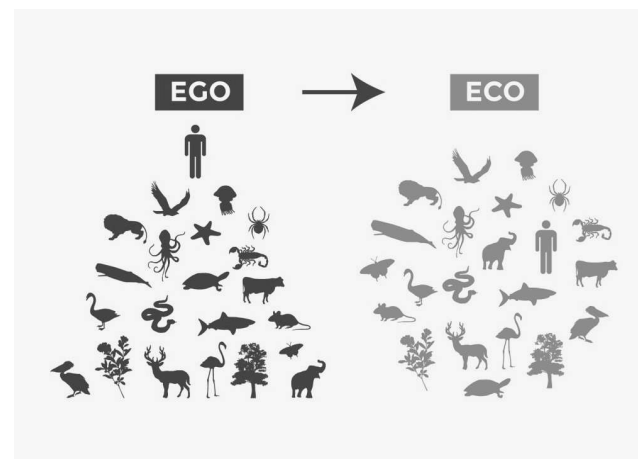
Task 1.1 – Development of Mediterranean Diet Menu Index

Task 1.2. - Characterise the compliance food offered in public high education institutes' (HEIs) canteens with Mediterranean diet principles

Calculation of water and carbon footprint for the menus



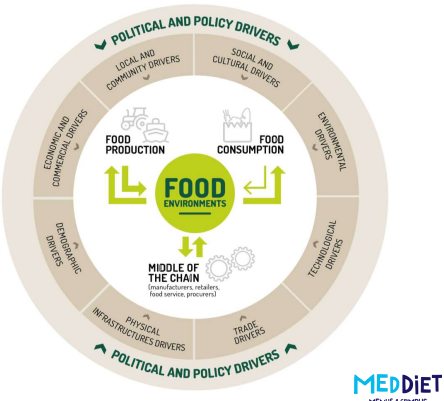
“One-third of the anthropogenic causes affecting climate change are individual dietary patterns and food production”



Not merely an individual issue

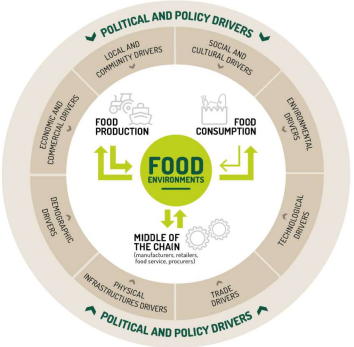


<https://www.who.int/news-room/events/detail/2023/05/31/default-calendar/epi-win-webinar-emerging-zoonotic-diseases-and-the-one-health-approach>
<https://repha.org/policy-briefing-i-discovering-the-role-of-food-environments-for-sustainable-food-systems/>

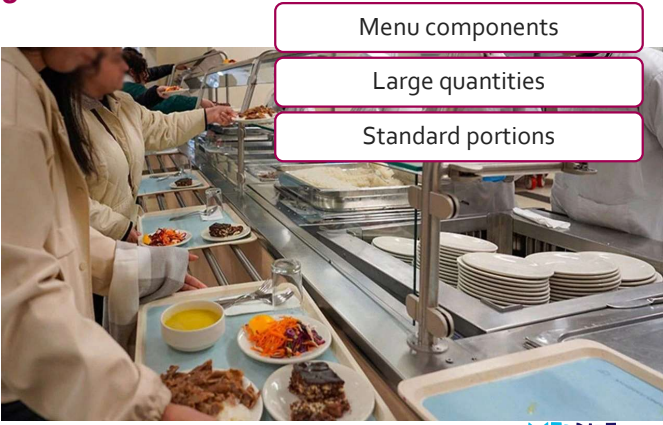


Not merely an individual issue

Role of the food service



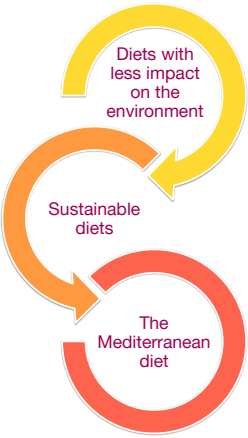
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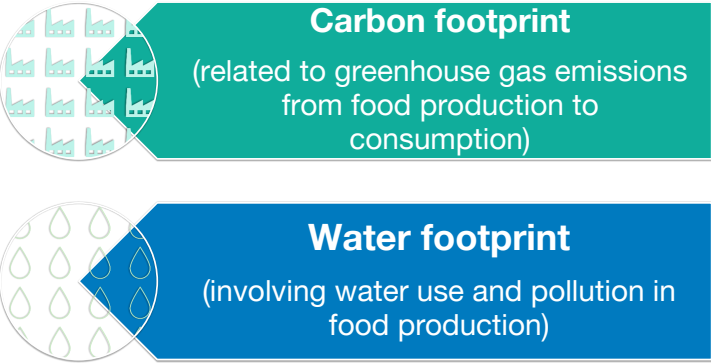
Not merely an individual issue

Role of the food service

The Mediterranean Diet (MedD) is widely recognized as a health-promoting and sustainable dietary pattern.



Role of HEI menus in environmental health



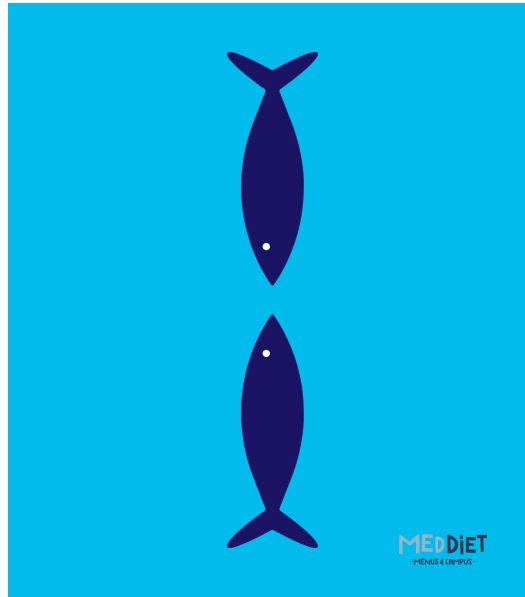
FAO. Biodiversity and Sustainable Diets: United Against Hunger (Rome). Rome 2010.
Vaz-Velho ML, Pinheiro R, Rodrigues AS. The Atlantic diet-Origin and features. International Journal of Food Studies. 2016;5(1).

Tabiello, F. N., et al. (2021). The contribution of agriculture, forestry, and other land use activities to global warming, 1990-2019. Global Change Biology, 27(11), 2333-2363.

Exploring the role of HEI menus

Carbon and water footprint of the HEI menus

Methodology&Results



Sample

Crotia	Portugal	Türkiye
10 canteens		
2-week (10 working days) menus		
1-4 course menus		
298 meals in total		

Data collection

Gün	Plan	Besin maddesi	g
Monday	lettuce soup	Potato	69,6
	lettuce soup	Carrot	65,6
	lettuce soup	Onion	26,7
	lettuce soup	Zucchini	66,5
	lettuce soup	Turnip	20,4
	lettuce soup	Lettuce	37,6
	lettuce soup	Olive oil	2
	TOPLAM		
	Salada with tuna, boiled egg, potato and	Canned tuna	140
	Salada with tuna, boiled egg, potato and	Potato	130,5
	Salada with tuna, boiled egg, potato and	Onion	4,45
	Salada with tuna, boiled egg, potato and	Carrot	49,2
	Salada with tuna, boiled egg, potato and	Peas	80
	Salada with tuna, boiled egg, potato and	Green beans	80
	Salada with tuna, boiled egg, potato and	Egg	27,72
	Salada with tuna, boiled egg, potato and	Parsley	1,3
	Salada with tuna, boiled egg, potato and	Olive oil	3
	TOPLAM		
	piece of fruit	apple	136
	TOPLAM		
	TOPLAM		

Calculation

Carbon and water footprint of the HEI menus

Carbon footprint



Life Cycle Assessment (LCA) approach (ISO 14040) - from raw material to disposal

Greenhouse gas emission in kilograms of CO² equivalent

Carbon Footprint

- Kilograms to grams
- (x) Spices and some flavourings
- **N/A** Vermicelli, parsley, tomato paste, noodles, wheat flour, sugar, semolina, tarhana, bread, margarine, pomegranate, coconut, cauliflower, lamb liver, dill, leek, white cheese, and starch included

Table 4
Summary of GWP values (kg CO₂-eq/kg produce or home free meat) across broad food categories.

Name	Median	Mean	Stdev	Deviation from mean	Min	Max	Q3	No. of LCA studies	No. of GWP values
Vegetables (all field grown vegetable)	0.37	0.47	0.39	83%	0.04	2.54	0.19	0.60	33
Fruits (all field grown fruit)	0.42	0.50	0.32	64%	0.08	1.78	0.28	0.53	77
Cereals	0.50	0.53	0.22	42%	0.11	1.38	0.38	0.63	31
Legumes and pulses	0.51	0.66	0.49	97%	0.15	2.46	0.36	0.53	16
Passive greenhouse fruit and vegetable	1.10	1.02	0.49	48%	0.32	1.94	0.54	1.35	5
Tree nuts combined	1.21	0.93	0.60	65%	0.43	3.77	0.61	2.13	7
Milk world average	1.29	1.39	0.58	41%	0.54	2.50	1.14	1.50	77
Heated greenhouse fruit and vegetable	2.13	2.81	1.81	57%	0.84	7.4	1.74	3.7	18
Rice	2.55	2.66	1.29	48%	0.66	5.69	1.64	3.08	12
Eggs	3.46	3.39	1.21	36%	1.30	6.00	2.45	4.05	19
Fish all species combined	3.49	4.41	3.82	82%	0.78	20.86	1.99	5.16	47
Chicken	3.65	4.12	1.72	42%	1.06	9.98	2.77	5.31	29
Corn	5.64	5.32	1.62	31%	2.10	7.92	3.82	7.14	3
Pork world average	5.77	5.85	1.63	28%	3.20	11.86	4.50	6.59	38
Prawns/shrimp	7.80	14.85	12.37	83%	5.25	38.00	8.76	20.20	7
Cheese	8.55	8.86	2.97	23%	3.71	16.35	7.79	9.58	22
Butter	9.25	11.52	7.37	64%	3.70	25.00	7.28	12.41	4
Lamb world average	25.58	27.01	11.93	43%	10.05	56.70	17.61	33.85	22
Beef world average	26.61	28.73	12.47	45%	10.74	109.5	22.26	31.57	49

Source: generated by the authors from the analysis of data collected through the meta-analysis. See Appendix A for the compilation of raw values and references

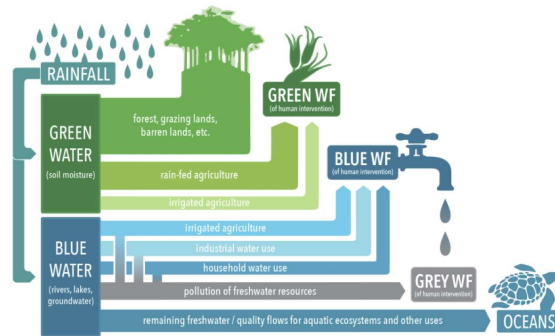
S. Clune et al. / Journal of Cleaner Production 140 (2017) 766e783

Carbon and water footprint of the HEI menus

Water footprint

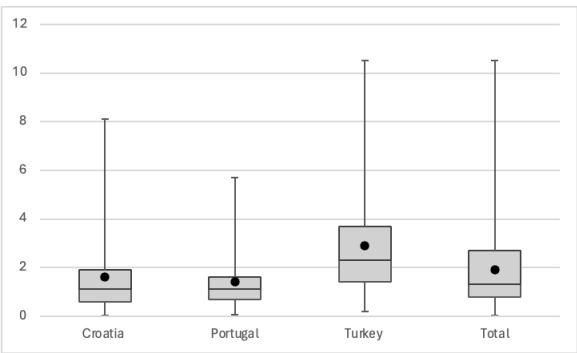
A product's water footprint
(virtual water content)

Sum of the water footprints of each of the
production stages per product unit
(usually m³/ton)



MEDDIET
-MENUS 4 CIP-PLUS-

Carbon Footprint



Total 1.9 ± 1.8 kg
CO₂-eq

Türkiye 2.91 ± 2.13 kg
CO₂-eq

Portugal 1.42 ± 1.26
kg CO₂-eq

MEDDIET
-MENUS 4 CIP-PLUS-

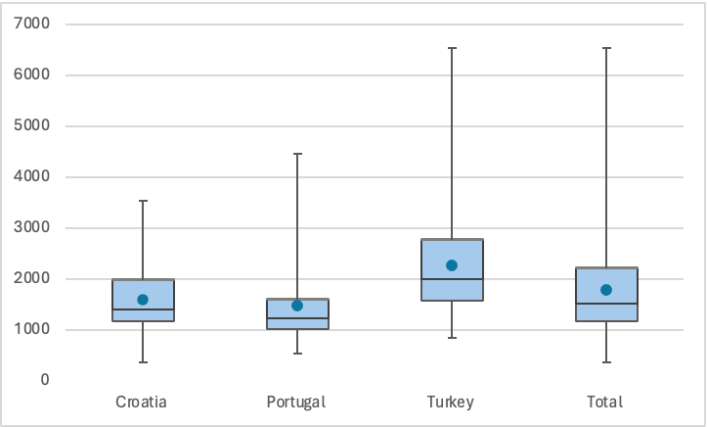
Water Footprint

Table 3. The Water Footprint of Some Selected Food Products from Vegetable and Animal Origin

Food item	Water footprint per ton (m ³ /ton)				Nutritional content			Water footprint per unit of nutritional value		
	Green	Blue	Grey	Total	Calorie (kcal/kg)	Protein (g/kg)	Fat (g/kg)	Calorie (liter/kcal)	Protein (liter/g protein)	Fat (liter/g fat)
Sugar crops	130	52	15	197	285	0.0	0.0	0.69	0.0	0.0
Vegetables	194	43	85	322	240	12	2.1	1.34	26	154
Starchy roots	327	16	43	387	827	13	1.7	0.47	31	226
Fruits	726	147	89	962	460	5.3	2.8	2.09	180	348
Cereals	1,232	228	184	1,644	3,208	80	15	0.51	21	112
Oil crops	2,023	220	121	2,364	2,908	146	209	0.81	16	11
Pulses	3,180	141	734	4,055	3,412	215	23	1.19	19	180
Nuts	7,016	1367	680	9,063	2,500	65	193	3.63	139	47
Milk	863	86	72	1,020	560	33	31	1.82	31	33
Eggs	2,592	244	429	3,265	1,425	111	100	2.29	29	33
Chicken meat	3,545	313	467	4,325	1,440	127	100	3.00	34	43
Butter	4,695	465	393	5,553	7,692	0.0	872	0.72	0.0	6.4
Pig meat	4,907	459	622	5,988	2,786	105	259	2.15	57	23
Sheep/goat meat	8,253	457	53	8,763	2,059	139	163	4.25	63	54
Beef	14,414	550	451	15,415	1,513	138	101	10.19	112	153

MEDDIET
-MENUS 4 CIP-PLUS-

Water footprint



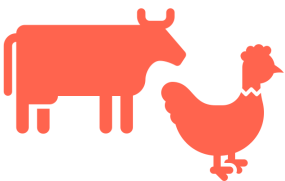
1785.411 ± 909.3 m³/ton

Türkiye 2271.90 ± 1016.11 m³/ton

Portugal 1485.46 ± 767.28 m³/ton



Menu components



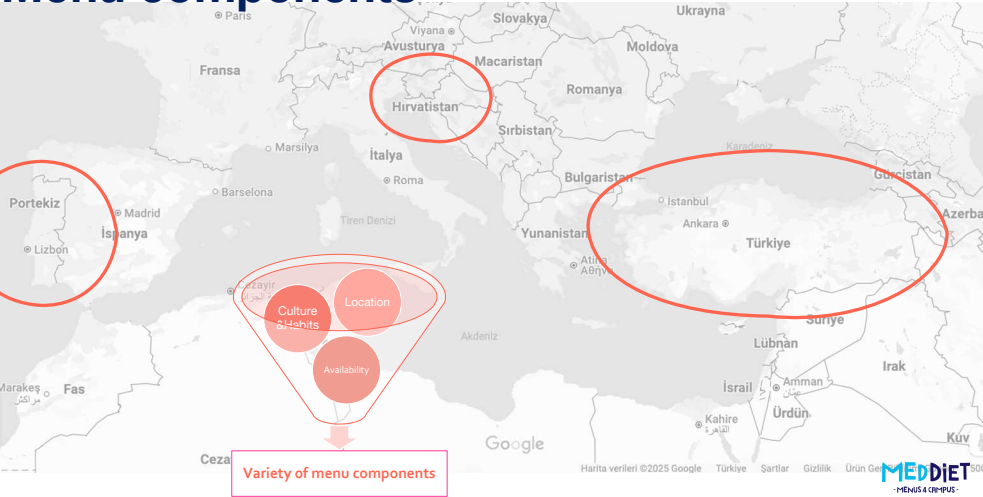
High carbon and water footprint



Low carbon and water footprint



Menu components

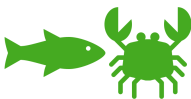


Menu components

Croatia



Portugal



Türkiye



“Implementing sustainable food policies in educational institutions and university restaurants, such as offering more diverse vegetarian menus and reducing food waste”



Future work & ideas

Menu interventions in HEI canteens



Insert: Mediterranean diet
projection of a reduction
2.2–23.4% in the carbon footprint
37.5–58.6% in the water footprint in TR

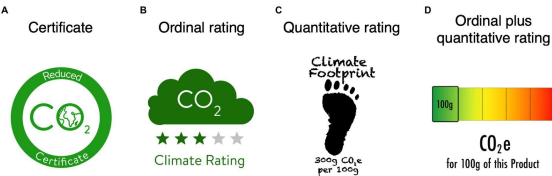


Jyoti-Sathi, G., Begum, A., Sati, S. S., Sathya, A., & Chakraborty, S. (2022). Relationship between nutrient profiles, carbon footprint and water footprint of hospital menus. *Nutrition & Food Science*, 2(2), 319-333.

Future work & ideas

Social marketing interventions in HEI canteen

Energy and nutrient values are already available on many menus.
Water and carbon footprints – out of sight, out of mind

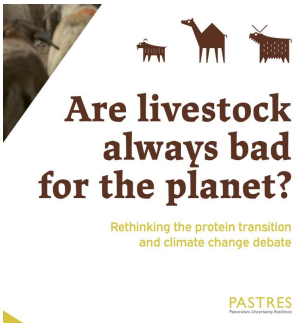


Kühne, S. J., Reijnen, E., Laastner Vogt, L., & Baumgartner, M. (2023). Can carbon labels encourage green food choices? *Frontiers in Psychology*, 13, 902869.

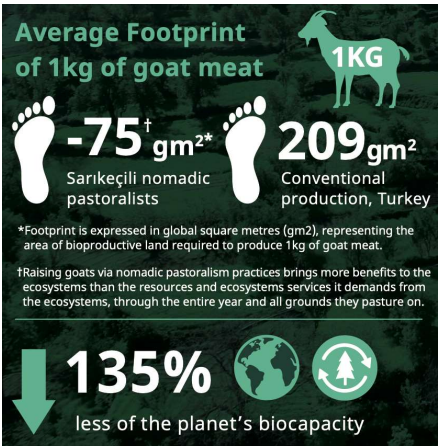


Future work & ideas

Local and sustainable collaborations and solutions



Houzer, E. and Spooner, I. (2021) Are Livestock Always Bad for the Planet? Rethinking the Protein Transition and Climate Change Debate. Brighton: PASTRES.
Wambersie L., Mancini M.S., Galli A., Orton A., Ales, B., and Yilmaz E., 2023. Ecological Footprint of goat meat from nomadic pastoralist families in Turkey. Report on the work commissioned by the Yolda Initiative within the context of the Foodnected project (2021-2022) funded by MAVA.



Future work & ideas

Examining the footprint of HEI canteen food waste

The top two food categories contributing to the total carbon footprint in Chinese universities

Meat waste: 46.28%

Grain waste: 36.52%



Qian, L., Rao, Q., Liu, H., McCarthy, B., Liu, L. X., & Wang, L. (2022). Food waste and associated carbon footprint: evidence from Chinese universities. *Ecosystem Health and Sustainability*, 8(1), 2130094.

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