



Which dietary changes to move towards nutritionally adequate diets without increasing their impact on biodiversity, water and land-use? The case of Tunisia

Marlène Perignon, Jalila El Ati, Carole Sinfort, Sophie Drogue, Nicole Darmon, Marie Josephe Amiot-Carlin, - Medina Study Group

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Background and objectives: As several Mediterranean countries, Tunisia has experienced an epidemiological and nutritional transition resulting in an increase in overweight, obesity and co-morbidities. In the last decades, food consumption departed from traditional diets towards higher consumption of animal-based and sweet products. Tunisia also faces environmental issues such as water scarcity, soil erosion and biodiversity loss. This growing concern for health issues and climate change has emphasized the need to promote sustainable diets, i.e. nutritionally adequate, affordable, culturally acceptable, and with low environmental impact. The objective was to identify dietary changes needed to move towards nutritionally adequate diets without increasing their environmental impact.

Methods: Nutrient intakes were estimated using dietary data from the nationally representative Tunisian study on food consumption (n=7209, 35-70y), and food composition from a Tunisian database and the Food Processor software. Environmental impact of diets was assessed through 6 indicators - water scarcity, biodiversity, and 4 indicators for land-use (erosion resistance, mechanical filtration, groundwater replenishment, biotic production) ? estimated for 161 foods. For each gender, two optimized diets respecting all nutritional recommendations from WHO and with minimized departure from the mean observed diet were designed with linear programming under 2 scenarios to fulfill: i) all nutritional constraints (NUTRI) and ii) all nutritional constraints without exceeding observed levels for the 6 environmental indicators (NUTRIENV).

Results: Calcium, copper, iron (for women), magnesium and potassium intakes were below their recommendations in the mean observed diets, while sodium and fats exceeded them. Under the NUTRI scenario, i.e. reaching nutritional adequacy without controlling for the environmental impacts, the main dietary changes were the increases of vegetables, starchy foods, fish and dairy products, and decreases of fats and sweet products. All the environmental indicators were impaired, except erosion resistance and biotic production. Under the NUTRIENV scenario, i.e. when

environmental indicators were limited to their observed levels, changes in dairy and starchy products quantities were lower than in the NUTRI scenario. In addition, fruits increased and meat decreased.

Conclusions: Environmental impacts should be assessed when identifying food consumption changes to reach nutritional adequacy. Dietary changes identified to move towards more sustainable diets in Tunisia will be translated into action proposals.

Keywords (5 keywords maximum): Sustainable diet; Nutritional adequacy; Environmental impact; Tunisia; Diet modeling

Conflict of Interest Disclosure (mandatory): None