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Abstract

The DELTA Model: Applying a Global Perspective to 'Sustainable' Individual Dietary Choices to Explore Their Practicality †

Charlotte J. van der Lee [1,2,*], Nick W. Smith [2,3], Jeremy P. Hill [1,2,3], Andrew J. Fletcher [1,2,3] and Warren C. McNabb [2,3]

1 Fonterra Research and Development Centre, Private Bag 11029, Palmerston North 4472, New Zealand; jeremy.hill@fonterra.com (J.P.H.); andrew.fletcher@fonterra.com (A.J.F.)
2 Riddet Institute, Massey University, Private Bag 11222, Palmerston North 4472, New Zealand; n.w.smith@massey.ac.nz (N.W.S.); w.mcnabb@massey.ac.nz (W.C.M.)
3 Sustainable Nutrition Initiative™, Riddet Institute, Massey University, Private Bag 11222, Palmerston North 4472, New Zealand
* Correspondence: charlotte.vanderlee@fonterra.com
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Abstract: As pressure rises in the fight to reduce global warming, increasing scrutiny is falling on food systems. A growing number of individuals are looking to optimise their own diets for the benefit of the environment. To gain a holistic understanding on the impact of these choices on the world, and to ensure true sustainability for future populations, it is essential to consider these diets from the perspective of the global food production system and its nutrient supply. The DELTA Model is a tool to simulate global food production scenarios and the nutrients they supply. The model was used to simulate future scenarios of food production that aligned with common diets often adopted for improved environmental sustainability (vegan, vegetarian, and the EAT-Lancet reference diet). This was performed by altering production quantities of specific food groups. The resulting nutrient supply of the scenario was then analysed. All the modified scenarios saw reduced availability of many nutrients in future years (2030 and 2050) compared to 2018 data. Nutrient availability was compared to nutrient reference values scaled to the global population. All modified scenarios had a global nutrient undersupply, including calcium (>31% below requirement), iron (>27%), zinc (>26%), Vitamin B12 (>67%), and Vitamin E (>10%). It was also found that the increased cropland area required to produce food in these modified scenarios would put strain on the world's limited resources. A transition to these scenarios irrespective of filling nutrient undersupply was estimated to increase the land area required to produce food by >22% compared to 2018, and >33% if nutrient requirements were fulfilled. The results of the DELTA Model emphasise the essential need to consider the practicalities and capacity of global food production systems, as well as the nutrition of populations, when advocating for worldwide diet adaptation.

Keywords: sustainable nutrition; food production; nutrient supply; modelling

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