Proceedings of the Nutrition Society (2024), **83 (OCE1)**, E163 doi:10.1017/S0029665124001812

47th Annual Scientific Meeting of the Nutrition Society of Australia and Nutrition Society of New Zealand, 28 November – 1 December 2023, Nutrition & Wellbeing in Oceania

A nutritional modelling framework for inclusion in a Norwegian food system model

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The aim of this study was to apply a comprehensive mathematical model designed to assess the current and future availability of food, as well as the resulting nutrient availability and intake, in the context of the Norwegian population. The model explores various scenarios, including self-sufficiency levels for food supply and impacts on nutrition recommendations. A food mass balance charting production, import, export, feed, seed, and consumer allocation in the Norwegian food system provided insights into the nutrients available to the population. The analysis included a comparison with two versions of the Nordic Nutrient Recommendations (NNR)[1], with the latest version recommending substantial changes in food consumption compared to current dietary patterns in Norway. The nutrient analysis compared the food mass to Matvaretabellen[2] and was supplemented with data from the United Nations World Population Prospects[3] and the Food and Agriculture Organisation/World Health Organisation/United Nations[4] report to ensure comprehensive nutrient analysis. Micronutrient gaps were observed in Iodine (94% of the target intake) and Vitamin D (46% of the target intake), while saturated-fatty acids slightly exceeded the recommended requirements (107% of the upper limit) based on the current baseline scenario. The updated NNR[4] recommends changes to specific food categories, namely fruits, vegetables, nuts, and seeds. A secondary scenario testing compared against the updated NNR found that increasing the availability of the supply of these groups does not result in any new nutrient gaps, demonstrating the feasibility of addressing the issue on a national supply basis. These approach offers a mathematical-modelling based tool that can be used to provide information for a national food system. Leveraging the model's capacity to simulate various scenarios, informed decisions to optimise self-sufficiency levels and align food supply with recommended nutritional guidelines can be made. To improve the model, higher data resolution and clearer categorisation of food groups are required which can then be linked into a more complete national food system. The mathematical model presented in this study provides a framework for understanding of food and nutrient availability in Norway. By identifying critical nutrient gaps and potential solutions, this research contributes knowledge for a healthier and sustainable food future for the nation.

Keywords: population nutrition; food supply; mathematical modelling; nutrient supply

Ethics Declaration

Yes

Financial Support

This work was supported by Animilia AS (Project number 1005-206963).

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