



HAL
open science

Evaluating affordability of healthier diets in four African countries

Joaquin Ameller Pavez, Sophie Drogué, Kaleab Baye, Marie-Josephe Amiot, Noora Kanerva, Agnes Le Port, Marinel Hoffman, Abdelrahman Lubowa, Gaston Ampe Tumuhimbise, Mikael Fogelholm, et al.

► To cite this version:

Joaquin Ameller Pavez, Sophie Drogué, Kaleab Baye, Marie-Josephe Amiot, Noora Kanerva, et al.. Evaluating affordability of healthier diets in four African countries. 14th European Nutrition Conference (FENS 2023), Belgrade, Serbia, 14-17 novembre 2023, Proceedings, 91 (1), MDPI, pp.128, 2023, 10.3390/proceedings2023091128 . hal-04426416

HAL Id: hal-04426416

<https://hal.inrae.fr/hal-04426416>

Submitted on 30 Jan 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.






L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution| 4.0 International License

Abstract

Evaluating Affordability of Healthier Diets in Four African Countries [†]

Joaquin Ameller Pavez ^{1,*}, Sophie Drogue ¹, Kaleab Baye ², Marie-Josephe Amiot ¹, Noora Kanerva ³, Agnes Le Port ⁴, Marinel Hoffman ⁵, Abdelrahman Lubowa ⁶, Gaston Ampe Tumuhimbise ⁷, Mikael Fogelholm ³, and Natalia Rosa-Sibakov ⁸

- ¹ Montpellier Interdisciplinary Centre on Sustainable Agri-Food Systems (UMR Moisa), French National Research Institute for Agriculture, Food and Environment (INRAE), 34000 Montpellier, France; marie-josephe.amiot-carlin@inrae.fr (M.-J.A.)
- ² Center for Food Science & Nutrition, College of Natural and Computational Sciences, Addis Ababa University, Addis Ababa P.O. Box 3434, Ethiopia
- ³ Department of Food and Nutrition, University of Helsinki, 00014 Helsinki, Finland; noora.kanerva@helsinki.fi (N.K.); mikael.fogelholm@helsinki.fi (M.F.)
- ⁴ Montpellier Interdisciplinary Centre on Sustainable Agri-Food Systems (UMR Moisa), French National Research Institute for Sustainable Development (IRD), 34000 Montpellier, France; agnes.leport@ird.fr
- ⁵ Department of Consumer and Food Sciences, University of Pretoria, Pretoria 0002, South Africa; marinel.hoffman@up.ac.za
- ⁶ Independent Consultant, Kampala P.O. Box 7106, Uganda; a.lubowa@yahoo.com
- ⁷ Department of Food Technology and Nutrition, School of Food Technology, Nutrition and Bio-Engineering, College of Agricultural and Environmental Sciences, Makerere University, Kampala P.O. Box 7062, Uganda; ampston23@gmail.com
- ⁸ VTT Technical Research Centre of Finland, 02044 Espoo, Finland; natalia.rosa-sibakov@vtt.fi
- * Correspondence: joaquin.ameller-pavez@inrae.fr
- [†] Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Between 702 and 828 million people around the world were affected by hunger in 2021. The prevalence of undernourishment relentlessly continues to affect the world, and particularly Sub-Saharan Africa (23.2% in 2021). Exacerbated inequalities across and within countries are undermining the nutritional adequacy and affordability of diets and threatening vulnerable groups including children under five years of age and women of reproductive age. This research presents a diet optimization approach where the objective is to evaluate the nutritional adequacy and affordability of diets across 4 African countries, namely Ethiopia, Kenya, South Africa and Uganda. The targeted population includes dyads of women of reproductive age and their children between 6 and 24 months. The mathematical programming approach allows for the theoretically contrasting of optimal outcomes of the model with data from food consumption surveys in primary and secondary cities of each country. Based on the observed food intake patterns and the nutrient deficiencies, these outcomes propose new diets modifying food intake (organized in food groups) in order to achieve nutritional adequacy while minimizing food intake changes, or, if applicable, the outcomes indicate which nutrient recommendations are unattainable under the current model setup. On average, our results show that nutritional adequacy can be attained by increasing the intake of legumes, vegetables and fruits, while reducing the intake of cereals. We include a discussion on the assessment of diet affordability and show the practical implications of evaluating healthier diets' viability. Conclusions include paths for future research on diet optimization modelling and its implications as a means of support for designing future dietary guidelines.

Keywords: diet optimization; mathematical programming; health and welfare; diet affordability



Citation: Ameller Pavez, J.; Drogue, S.; Baye, K.; Amiot, M.-J.; Kanerva, N.; Le Port, A.; Hoffman, M.; Lubowa, A.; Tumuhimbise, G.A.; Fogelholm, M.; et al. Evaluating Affordability of Healthier Diets in Four African Countries. *Proceedings* **2024**, *91*, 128. <https://doi.org/10.3390/proceedings2023091128>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 25 January 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Author Contributions: Conceptualization, all authors; software, J.A.P.; formal analysis, J.A.P. and S.D.; investigation, K.B., N.K., A.L.P., M.H., A.L., G.A.T. and M.F.; data curation, J.A.P., S.D., K.B., N.K. and A.L.; writing—original draft preparation, J.A.P.; writing—review and editing, J.A.P.; supervision, S.D. and M.-J.A.; project administration, N.R.-S.; funding acquisition, N.R.-S. All authors have read and agreed to the published version of the manuscript.”

Funding: This study was conducted as part of the Innofood Africa project, which received funding from the EU Horizon 2020 Grant No 862170.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data sharing not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.