

# The place of dairy in bridging nutrition and cost: perspectives from developed and developing countries

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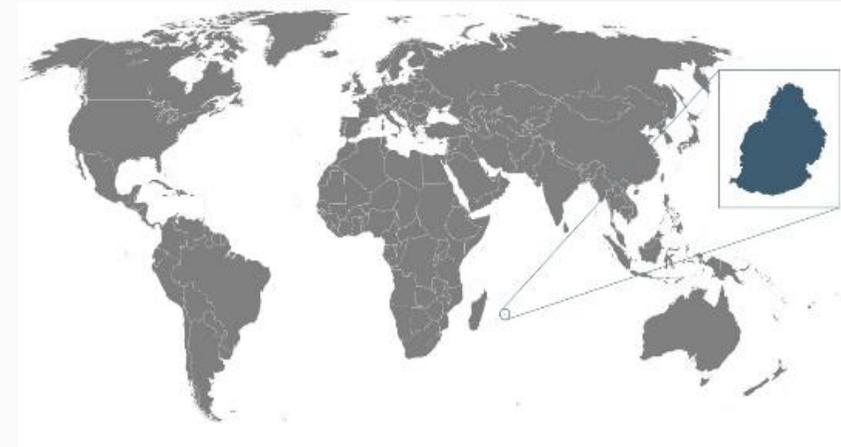
# INTRODUCTION

## BSc (Biomedicine)

Bachelors of Science in Biomedicine  
University of East Anglia, Norwich, United Kingdom



Mauritius



Sylvia “Chung” “Chun Lam”



## PhD (Nutritional Sciences)

Doctor of Philosophy in Nutritional Sciences  
Riddet Institute, Massey University, New Zealand  
“Dairy whey protein and satiety in humans”



# RESEARCH OFFICER - RIDDET INSTITUTE

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# INTRODUCTION

Sylvia “Chung Chun Lam”

## BSc (Biomedicine)

Bachelors of Science in Biomedicine  
University of East Anglia, Norwich,  
United Kingdom

## Least-cost nutritious diet Study

**USA - Chungchunlam, S.M.S.**, Moughan, P.J., Garrick, D.P., Drewnowski, A. (2020). Animal-sourced foods are required for minimum-cost nutritionally adequate food patterns for the United States. *Nature Food* 1: 376-381.

**NZ - Chungchunlam, S.M.S.**, Garrick, D.P., Moughan, P.J. (2021). Using Linear Programming to determine the role of plant- and animal-sourced foods in least-cost, nutritionally adequate diets for adults. *Current Developments in Nutrition* 5: nzab132.

**Developing LMIC -** Indonesia, the Philippines, Kenya, Tanzania



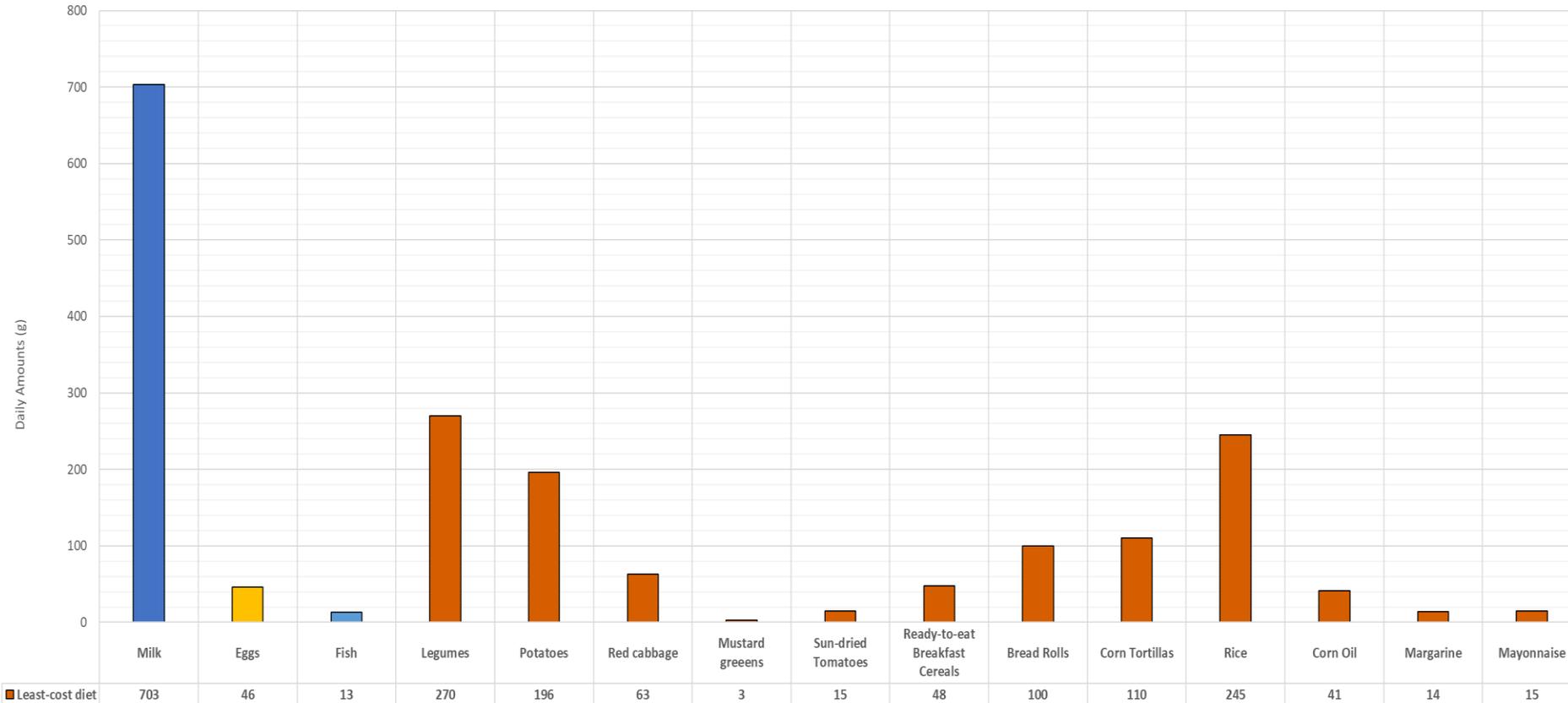
Research based around dietary assessment and nutrient requirements to model food patterns to investigate the role of animal- and plant-based foods in least-cost nutritionally adequate diets using a Linear Programming approach.



# LEAST-COST DIETS OF US AVERAGE ADULT



Least-cost Diet for average US adult: US \$ 1.98 per day

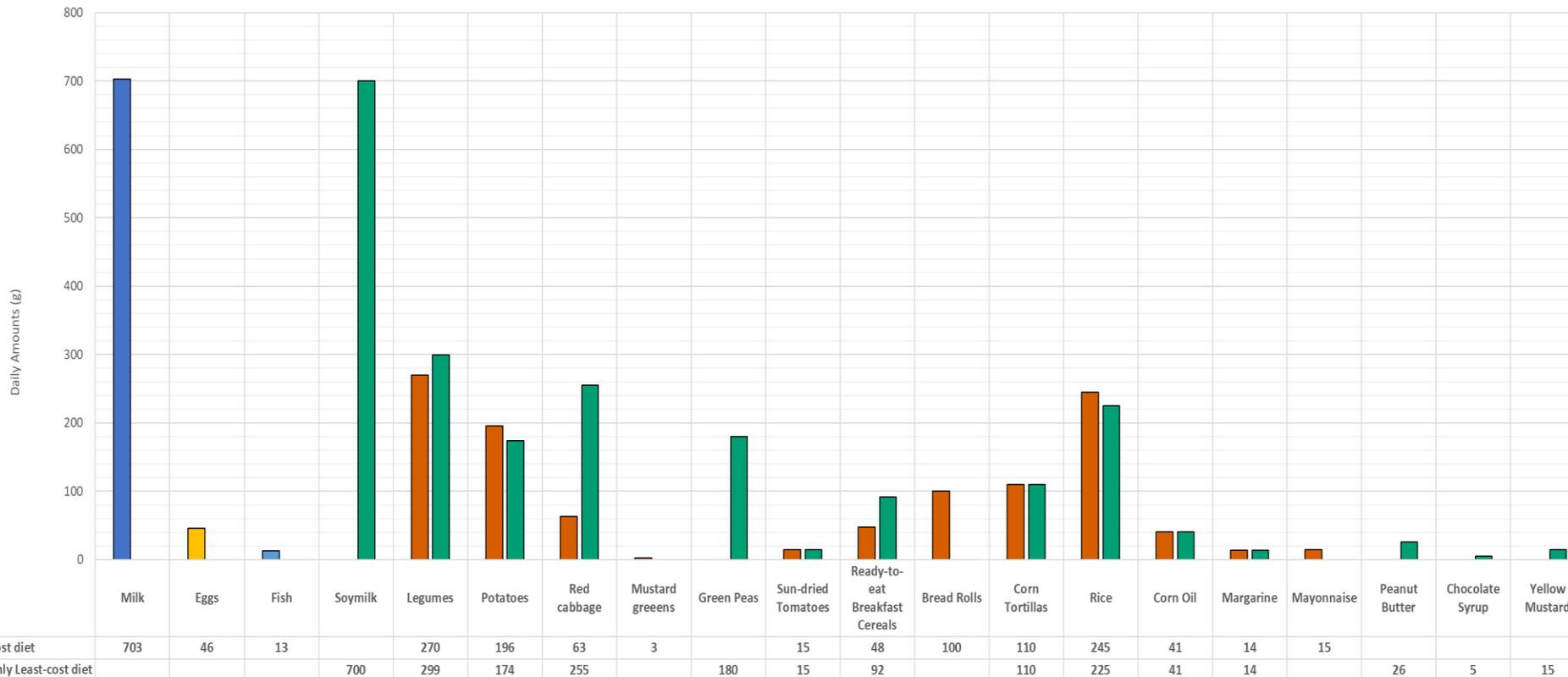


- 3 servings of Dairy Milk
- 26 % of protein
  - 88 % calcium
  - 95 % of phosphorus
  - 42 % of selenium
  - 56 % of first-limiting vitamin D
  - 51 % of vitamin A
  - 138 % of vitamin B12
  - 108 % of riboflavin (B2)
  - 51 % of pantothenic acid

**Chungchunlam SMS, Moughan PJ, Garrick DP, Drewnowski A.** Animal-sourced foods are required for minimum-cost nutritionally adequate food patterns for the United States. *Nature Food* 1, 376-81. doi: 10.1038/s43016-020-0096-8

# Plant-only diet double the cost than animal-plant diet (US \$ 3.61 vs US \$ 1.98 per day) for average US adult

Dairy milk to Soymilk beverage



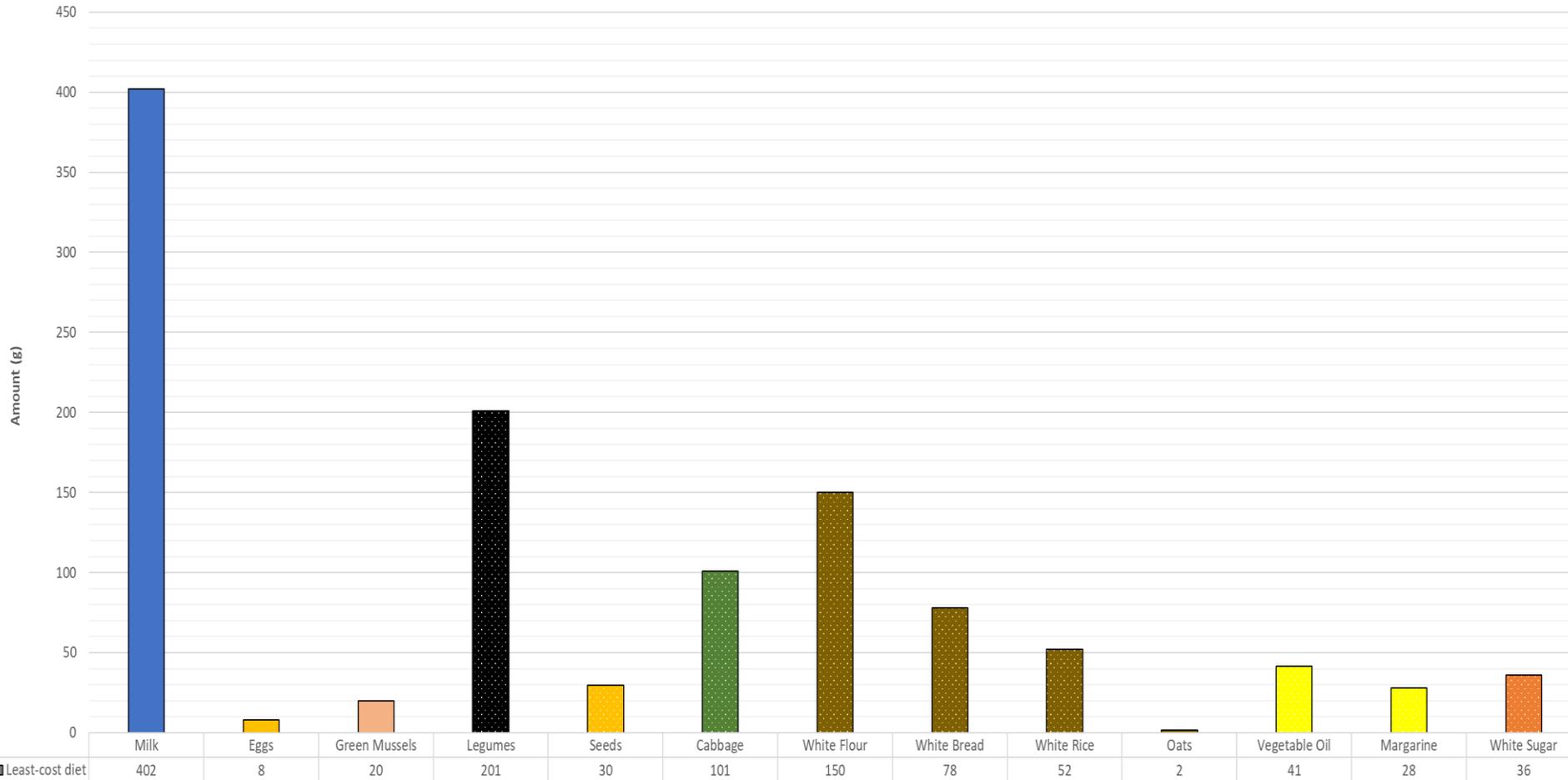
- Price of animal foods increased greatly (10 x) before they no longer appeared in the least-cost diet
- 8 x Milk prices
  - 3 x Cheese prices
  - 2.5 x Yogurt prices
  - 2 x Ice cream prices
  - 2.0-11.5 x other animal food prices

**Chungchunlam SMS**, Moughan PJ, Garrick DP, Drewnowski A. Animal-sourced foods are required for minimum-cost nutritionally adequate food patterns for the United States. *Nature Food* **1**, 376-81. doi: 10.1038/s43016-020-0096-8

# LEAST-COST DIETS OF NZ ADULT



Least-cost Diet for average NZ adult: US \$ 2.14 (NZ \$ 3.23) per day

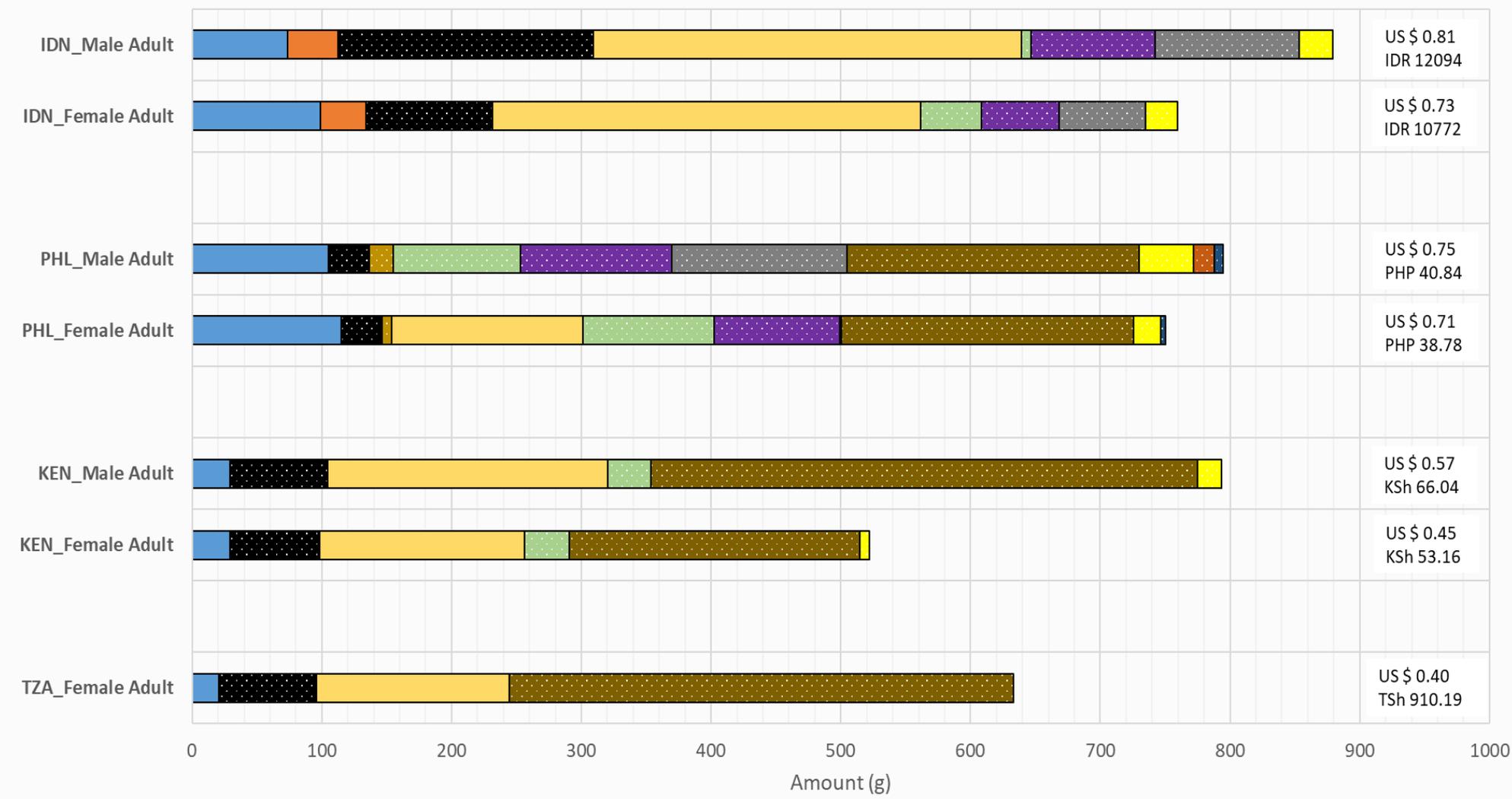


## 1.6 servings of Dairy Milk

- 28 % of protein
- 52 % first-limiting calcium
- 22 % of first-limiting molybdenum
- 39 % of phosphorus
- 21 % of first-limiting vitamin A
- 45 % of vitamin D
- 72 % of vitamin B12
- 22 % of niacin (B3)
- 94 % of riboflavin (B2)

**Chungchunlam SMS, Moughan PJ, Garrick DP, Drewnowski A.** Animal-sourced foods are required for minimum-cost nutritionally adequate food patterns for the United States. *Nature Food* **1**, 376-81. doi: 10.1038/s43016-020-0096-8

# LEAST-COST DIETS OF SEA AND EA ADULT



- IDN Least-cost Diets: Fish (fresh and canned) and chicken liver.
- PHL Least-cost Diets: Fish (fresh and canned)
- KEN Least-cost Diets: Fish (fresh)
- TZA Least-cost Diets: Fish (dried)

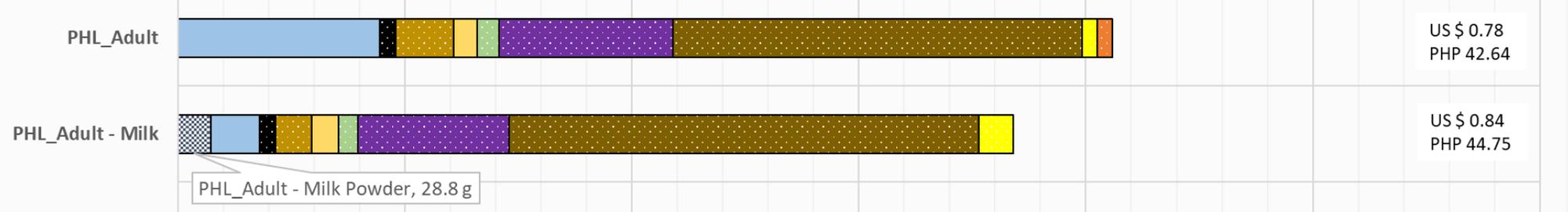


Chungchunlam, S.M.S.  
Unpublished data

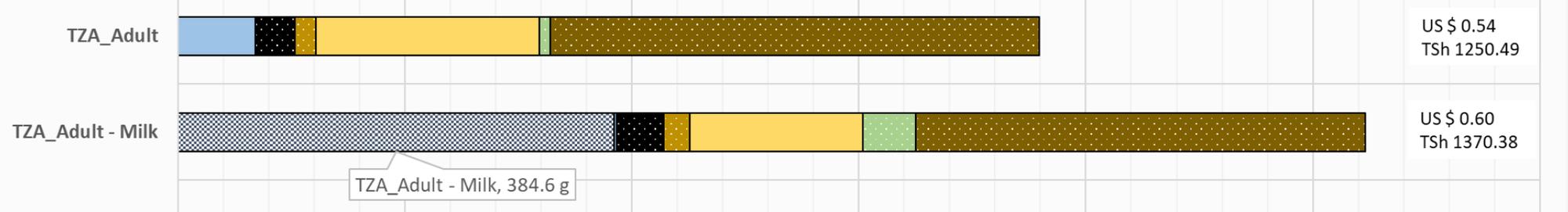
■ Fish (fresh, canned, dried) ■ Chicken liver ■ Legumes and soy ■ Nuts ■ Starchy vegetables ■ Leafy vegetables ■ Fruits ■ Rice and noodles ■ Grains (corn, semolina, wheat flour, sorghum) ■ Vegetable oils ■ Sugars ■ Sauces

# Milk included in least-cost nutritious diets for PHL and TZA adults

## Price of fish 25 % more for PHL Least-cost Diet



## Price of fish 30 % more for TZA Least-cost Diet



- Milk
- Fish (fresh, canned, dried)
- Legumes
- Nuts
- Starchy vegetables
- Leafy vegetables
- Fruits
- Grains (corn, semolina, bread, millet, sorghum, rice)
- Vegetable oils
- Sugars

# CONCLUSION

## Dairy has an important role in least-cost nutritious dietary patterns in developed and developing countries.

- Food Cost and Economic access to food are important considerations for Food Choice, Nutrition and Diet Quality.  
Bridge Cost and Nutrition – cost per nutrient
- A diverse range of nutrient-rich and cost-effective animal-sourced foods (dairy, fish, eggs, chicken liver) and plant-based foods were needed to achieve daily nutrition at the lowest cost in developed and developing countries.
- The inclusion of dairy will assist in providing lowest-cost nutritionally balanced diets for sustainable food security.



# THANK YOU

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