

# Frontiers in Pulses Fortification: Knowns and Unknowns

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# Critical Case for Food Fortification

- Food insecurity has been rising since 2014
- >1.5b people can't afford diet that meets required levels of essential nutrients
- Alarming levels of hunger in 11 countries and serious levels in another 40
- COVID-19 expected to worsen the trend
- Nutrition must be ensured for all, including the most vulnerable
- Food fortification presents an opportunity

# Food Fortification: Unfinished Agenda

- Endorsed as a sustainable and cost-effective intervention
- Potential to reach populations at large with essential micronutrients
- With proven public health, human capital and economic impacts
- Fortification regulations/guidance in majority of the countries globally
- Still far from meeting its potential for impact at a global scale
- Need for innovations to maximize the impact
- Exploring the potential for pulses fortification

# Potential of Pulses as a Vehicle for Fortification

## Strengths:

- Powerhouse of nutrients:
  - Important sources of protein and energy - plant-based foods
  - High in dietary fiber
  - Low Glycemic Index - helpful in addressing overweight/obesity, NCDs
- Global availability increasing since 2000, largest increases in LMICs
- Low-cost (comparatively), important part of healthy diet
- Benefits from longer shelf life
- Often grown by local farmers - help to keep food systems secure and empower women in the process – and mainly milled commercially
- Climate-smart source of protein / an ally against climate change

## Challenges:

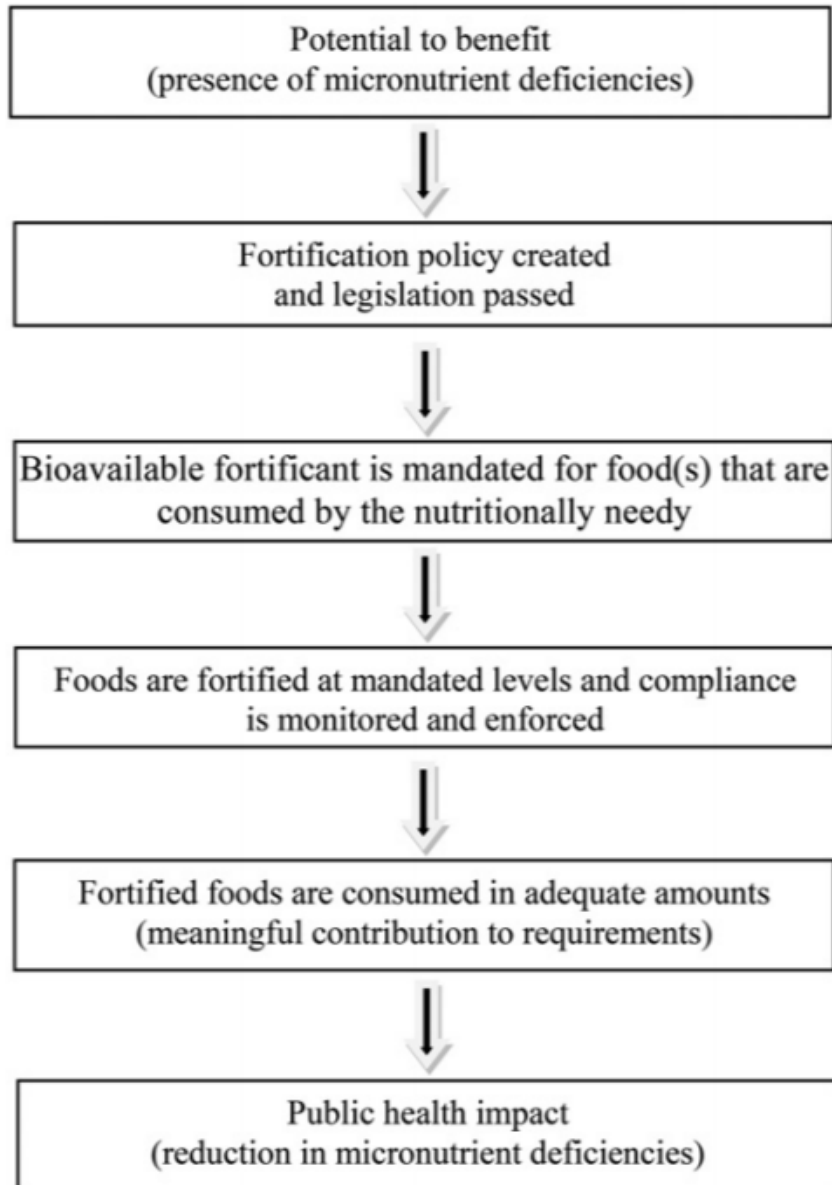
- Pulses are rich in anti nutrients
- Methods of preparation, processing and heat applications increase the glycemic index of pulses

# What makes Pulses different from Cereal Grains?

- Pulses are especially rich in select essential amino acids, often low in cereal grains
- Pulse provide two to three times more dietary fiber (per 100g edible portion) than whole grain cereal products
- Pulses are slowly digested - lower on glycemic index (GI) scale
- Average (global) per capita consumption of pulses\* is low



# Understanding Pulses Fortification Program Design



Important to design program framework while:

- Answering critical questions (5Ws and 1H)

**Why**

**When**

**What**

**Where**

**Who**

**How**

- Assessing the components along the program impact pathway

**Source:** Reynaldo Martorell et al. Am J Clin Nutr 2015; 101:210–217

# Pulses Fortification Scope: 5Ws and 1H Questions

**Why**

Why (need) micronutrient intervention in general and food fortification in specific?

**What**

What could be the potential of pulses fortification?

**Who**

Who do we intend to reach with fortified pulses?

**When**

When do we consider ourselves ready?

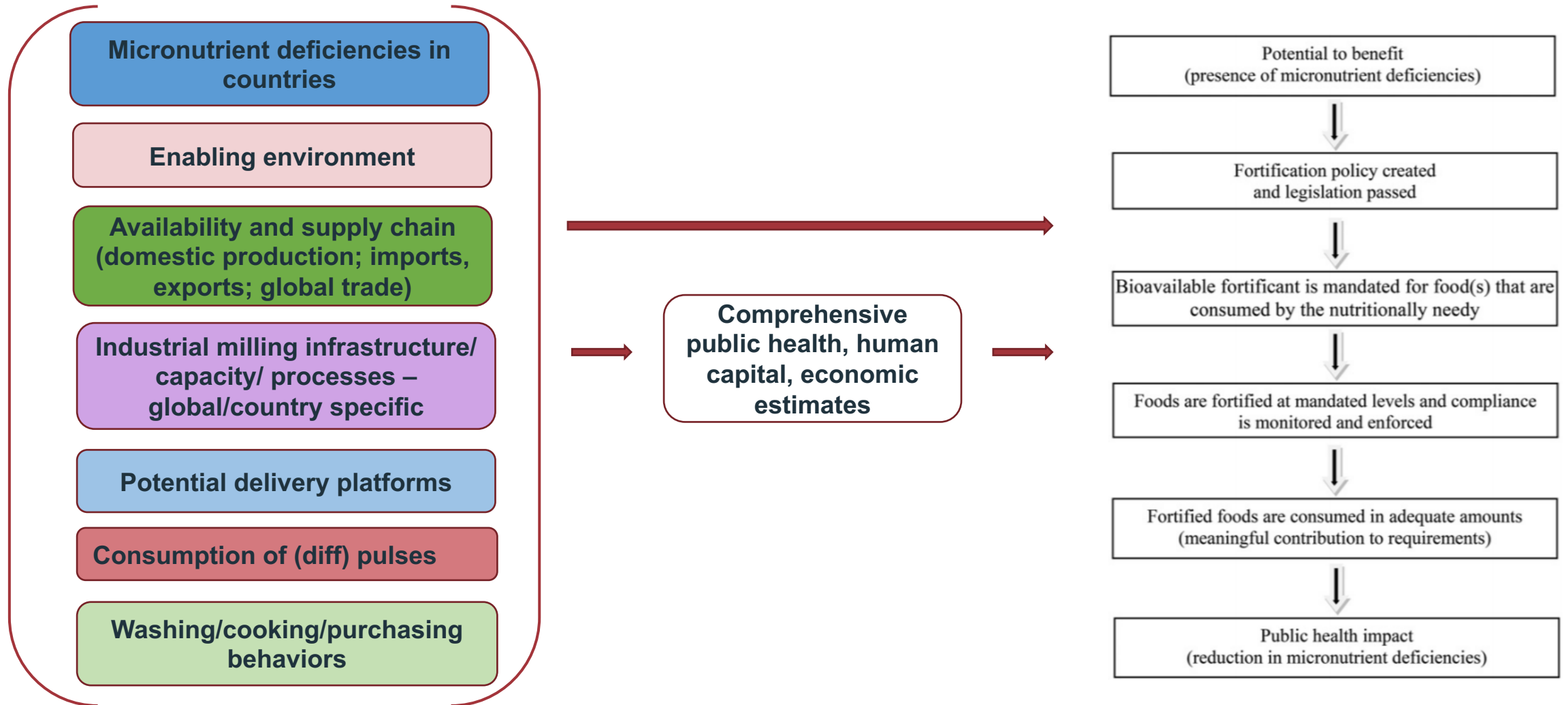
**Where**

Where does the intervention make sense?

**How**

How best to reach the intended groups?

# Exploring Pulses Fortification Program Design (not exhaustive)





# Pulses Fortification Global Scoping

## Factors

Prevalence of micronutrient deficiencies

Availability and supply chain  
(domestic production; imports, exports; global trade)

Industrial milling infrastructure/  
capacity/ processes –  
global/country specific

## Global – (more) Quantitative Assessment

## Critical Decision Points

Shortlisted Country-  
Pulse combination

Optimal Operational  
(business) Models

Enabling environment for  
fortification

Potential delivery platforms

Consumption of (diff) pulses

Consumer behaviors,  
perceptions

## Country Specific - (more) Qualitative Assessment

Platforms

Optimal Technology

Relevant  
Studies/Trials

Partnerships

# *Thanks a lot!*

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