



NOMATECH

Bridging Horizons: Interdisciplinary to Agriculture and Food Security Beyond Boundaries

Emeritus Professor Dr. Wickneswari Ratnam FASc

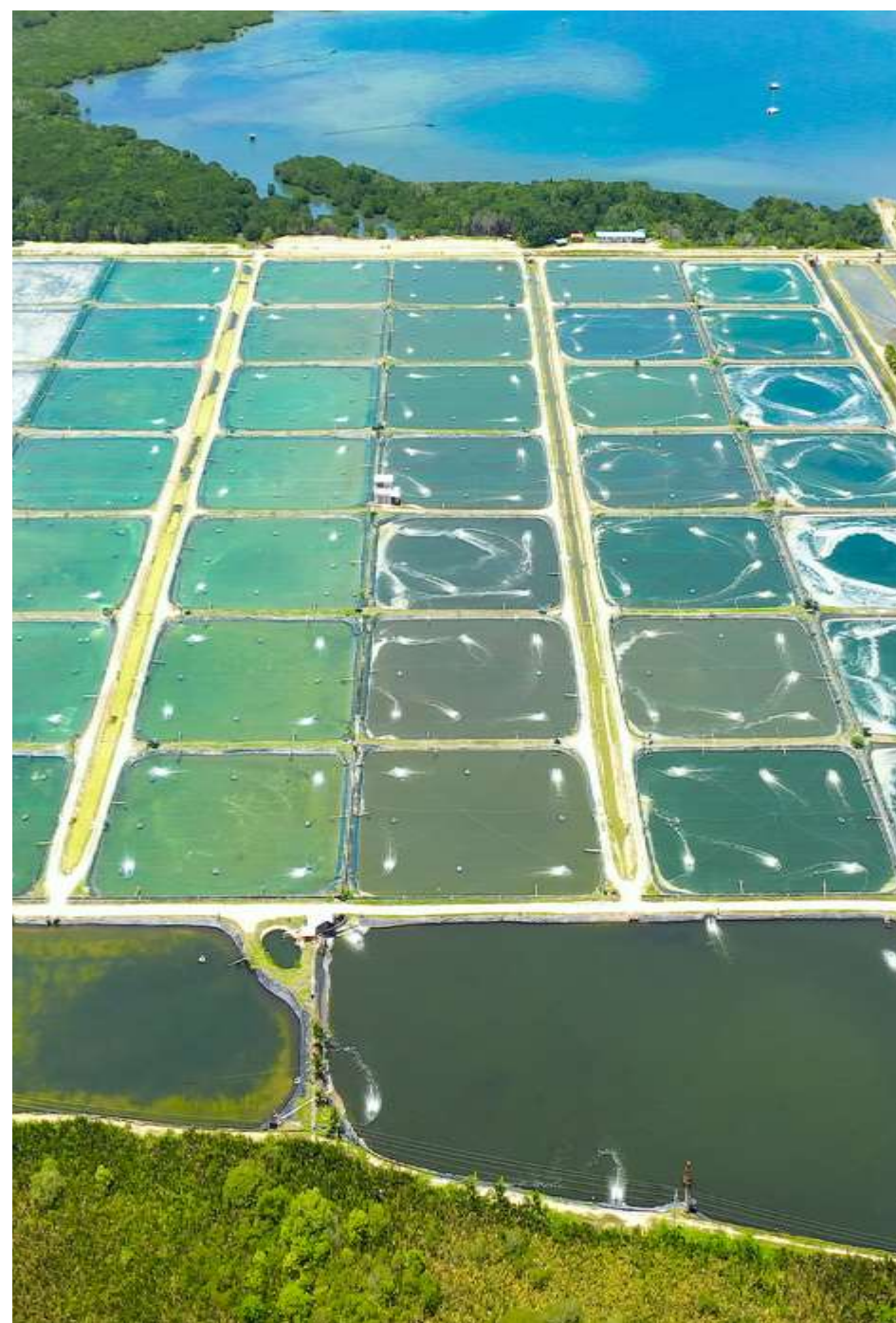


Context

- Food and Nutrition Security
- Climate change and loss of biodiversity



- Food Environment
- Translational Research



The Hungry Folks

Number & prevalence of undernourishment

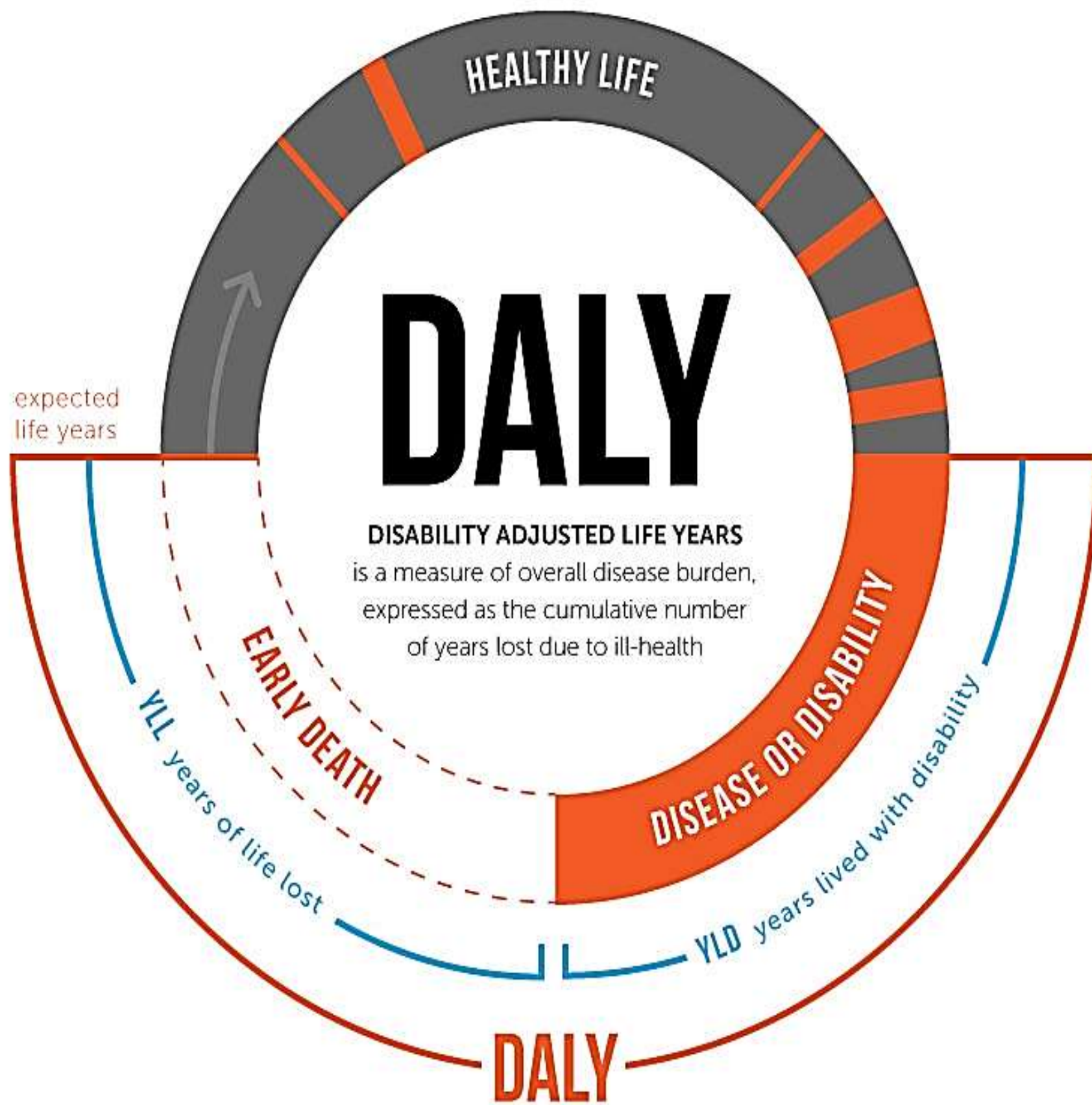
	1990-92		2005-07		2012-14	
	No.	%	No.	%	No.	%
World						11.3
Developing regions						11.5
Developed regions						0.5
Asia						11.0
Latin America & Caribbean						6.1
Latin America						5.1
Caribbean	8.1	27.0	8.4	23.7	7.5	20.1
Latin America	60.3	14.4	40.8	7.7	29.5	5.1

The malnutrition landscape

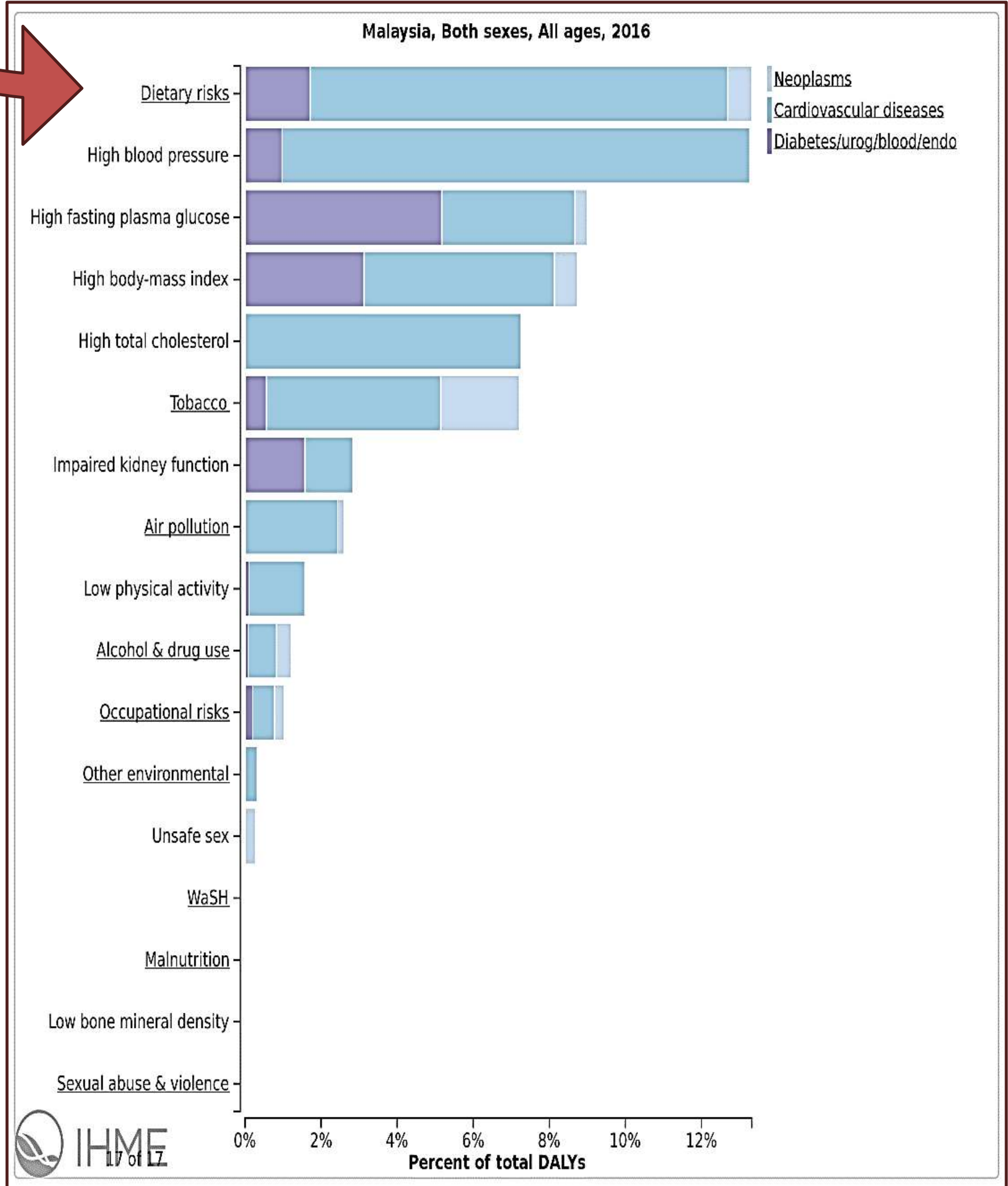
- About half of all **stunted** children live in Asia
- Two-thirds of all **wasted** children live in Asia
- 40% of preschool children are **anemic** in developing countries
- 250million preschool children are **vitamin A deficient** and about 250-500k of these children become **blind** every year.

UNICEF (2014)

Disability Adjusted Life Years (DALY)



Unhealthy Diet is the Highest Risk!



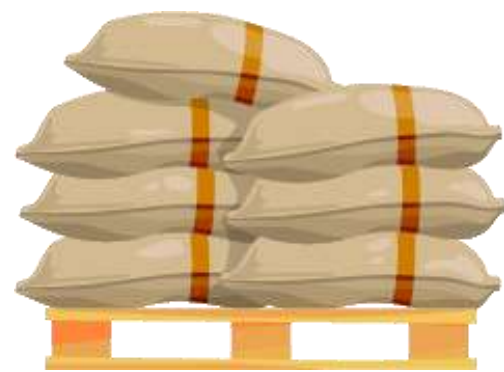
Rice consumed in Malaysia



2 million MT/year



60- 80%
produced
locally



20- 40%
imported



90-91%
White
rice



6-7%
Fragrant
rice



1%
Basmathi



0.1-0.3%
Coloured
rice

Switching to the whole



Quarter quarter half



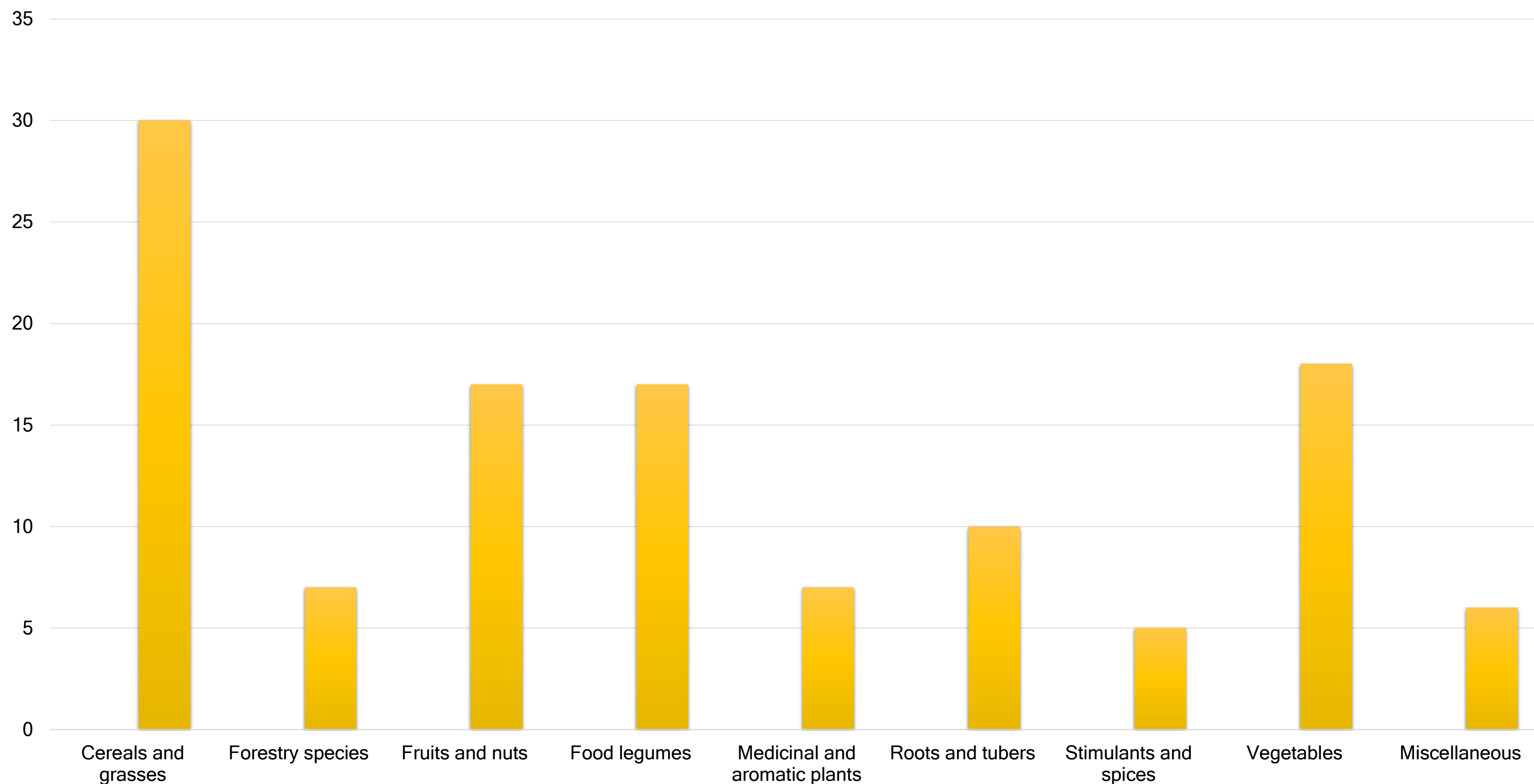
Climate Change

- Increase in greenhouse gas emissions (CO₂, CH₄)
- All regions will become warmer
- Soil moisture will decline
- Sea level will rise globally
- Desertification
- Drought
- Flooding
- Increase in saline areas

Major drivers of climate changes: manufacturing plants/heavy industries, heavy usage of vehicles/mass transportation, deforestation/extensive logging

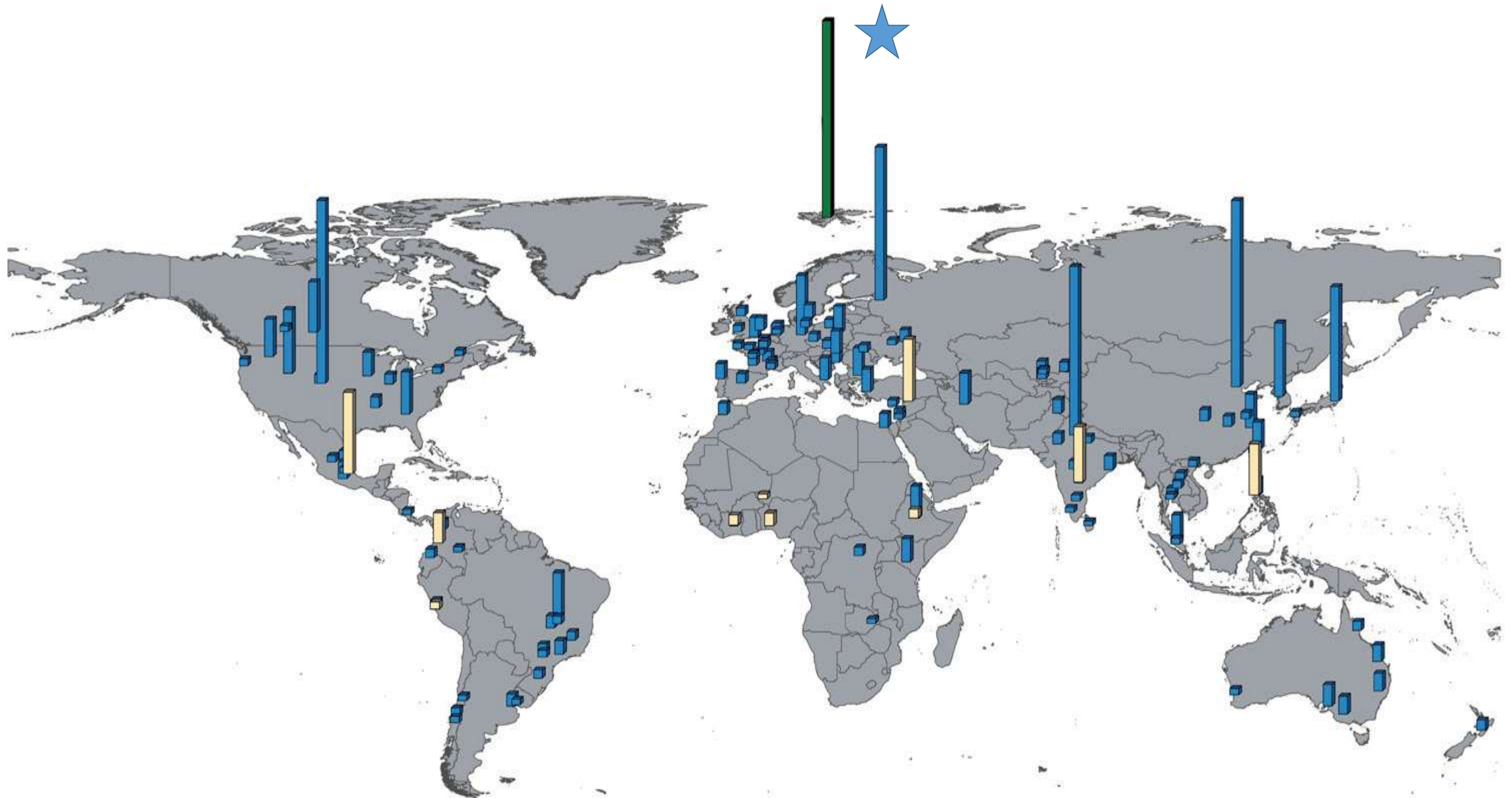


Number of countries reporting genetic erosion of crop groups



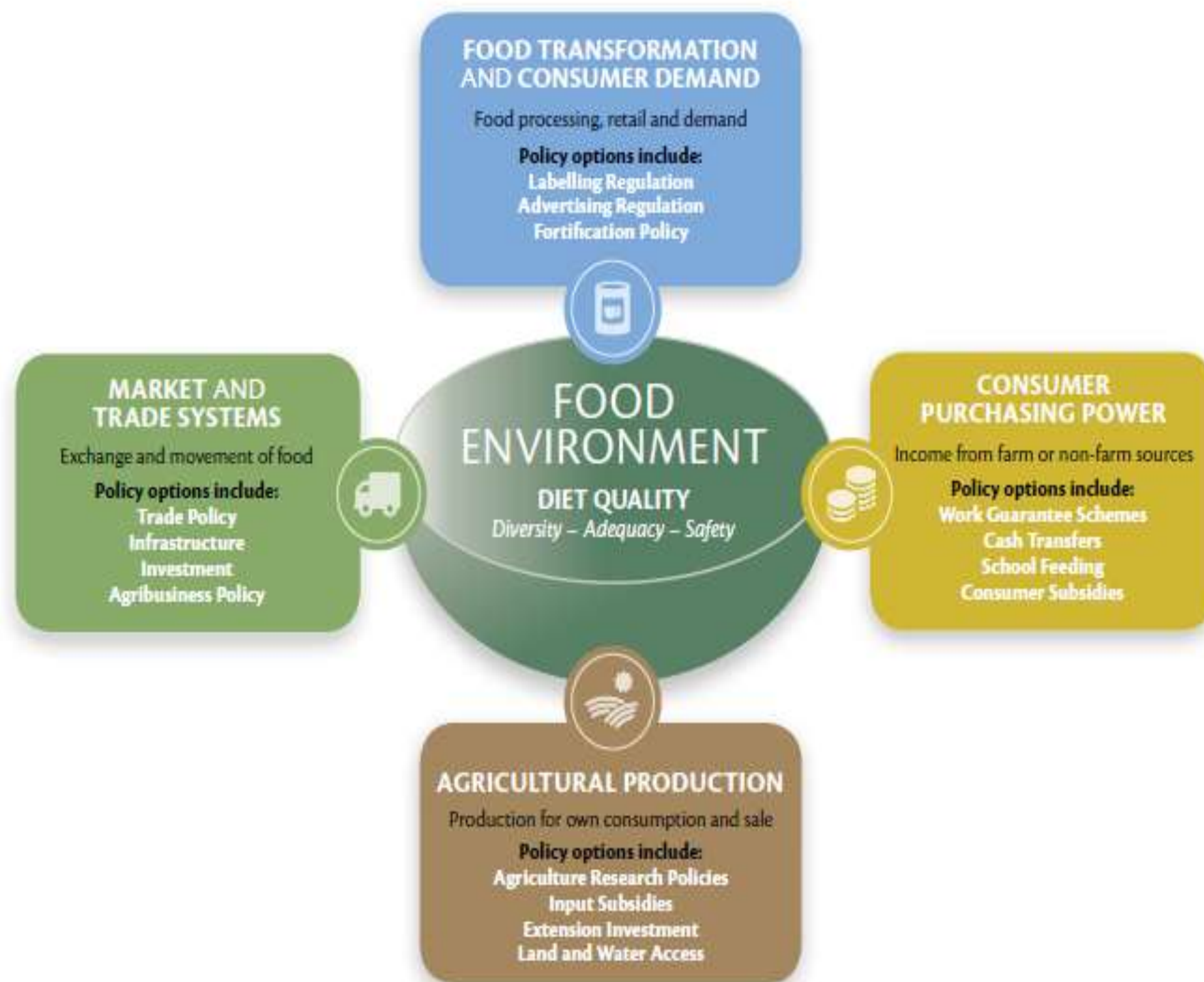
Source: The Second Report on The State of the World's Plant Genetic Resources for Food and Agriculture, 2010, Commission on Genetic Resources for Food and Agriculture, FAO

Geographic distribution of genebanks with holdings of >10,000 accessions (National and regional genebanks in blue; CGIAR centre genebanks in beige; Svalbard Global Seed Vault (SGSV) in green)



What is Food Environment ?

Figure 1: Conceptual framework of links between diet quality and food systems²



- It is **the interface that mediates the acquisition of foods** to people within the wider food system.
- **Key dimensions of food environments include food availability, accessibility, affordability, desirability and convenience**
 - this complex food environment affects one key outcome i.e. the quality of dietary choices available to consumers.
- **Interventions in agricultural production can contribute to a healthier food environment to stimulate consumer choices.**

TRANSLATIONAL RESEARCH

Phase 1



Research Problem



Market/National Relevance



Research Team & Funding



Filing for Intellectual Property



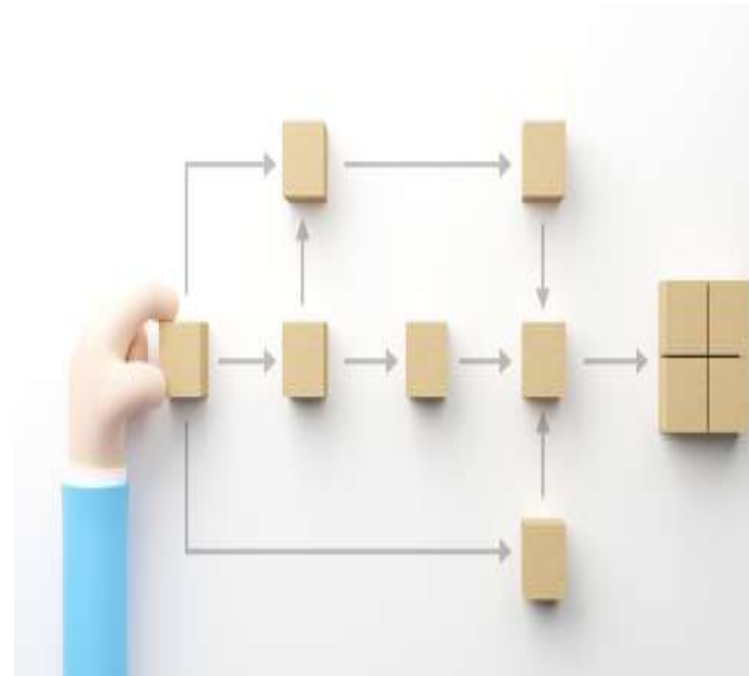
Novelty of Findings

TRANSLATIONAL RESEARCH

Phase 2



Commercialisation team & funding



Proof of concept



Market acceptance



Market access & Regulatory issues



Upscaling

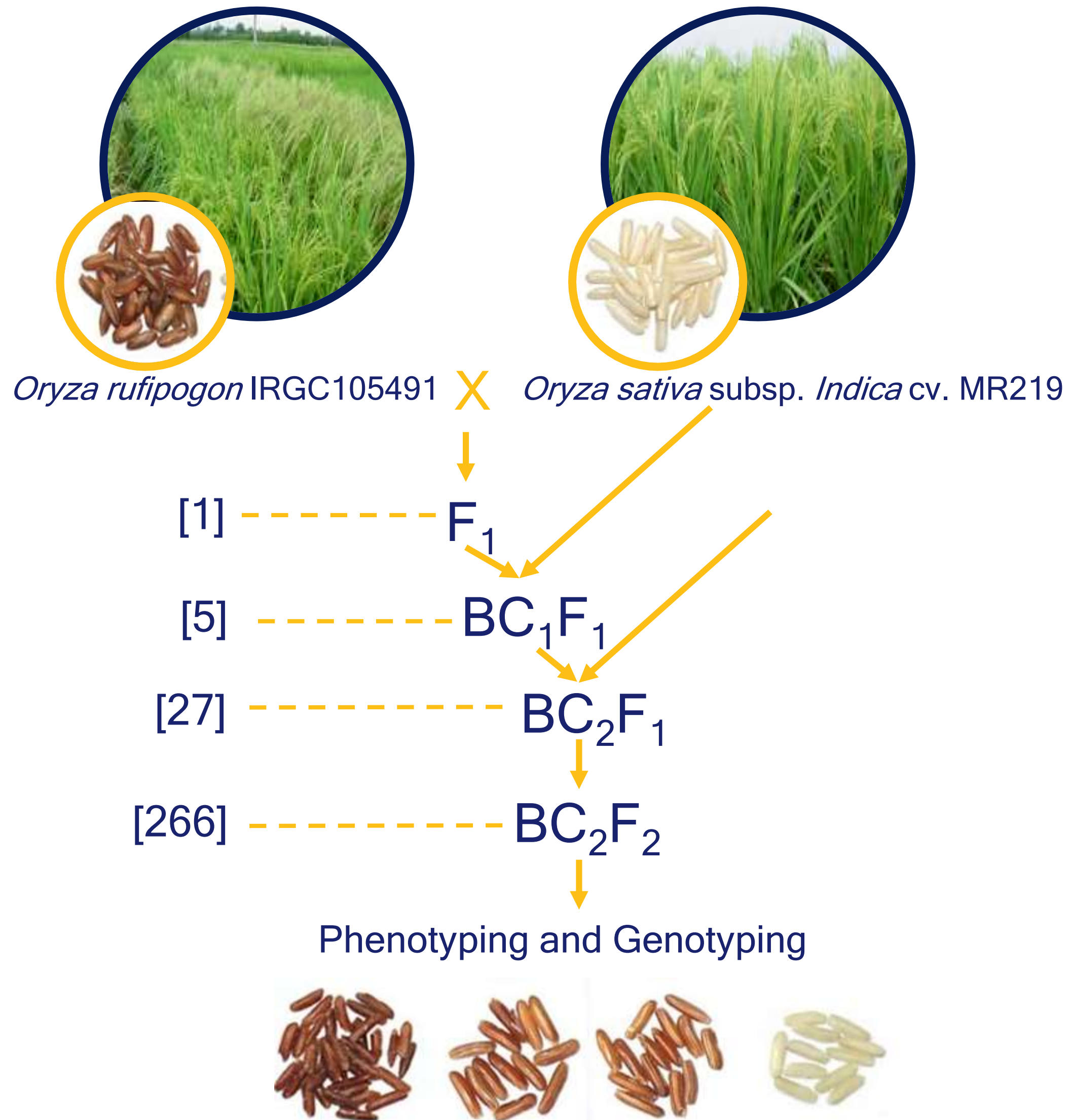


Investors



**New ideas/
new IPs**

Interspecific hybridisation and introgression



Random Controlled Trial (RCT) – Phase 2 Clinical Trial



Project Title : A Randomized and Open Label Phase 2 Clinical Trial of Low-GI, Polyphenol-Rich UKMRC-9 Red Rice on Cardiometabolic Parameters in Patient with Type 2 Diabetes



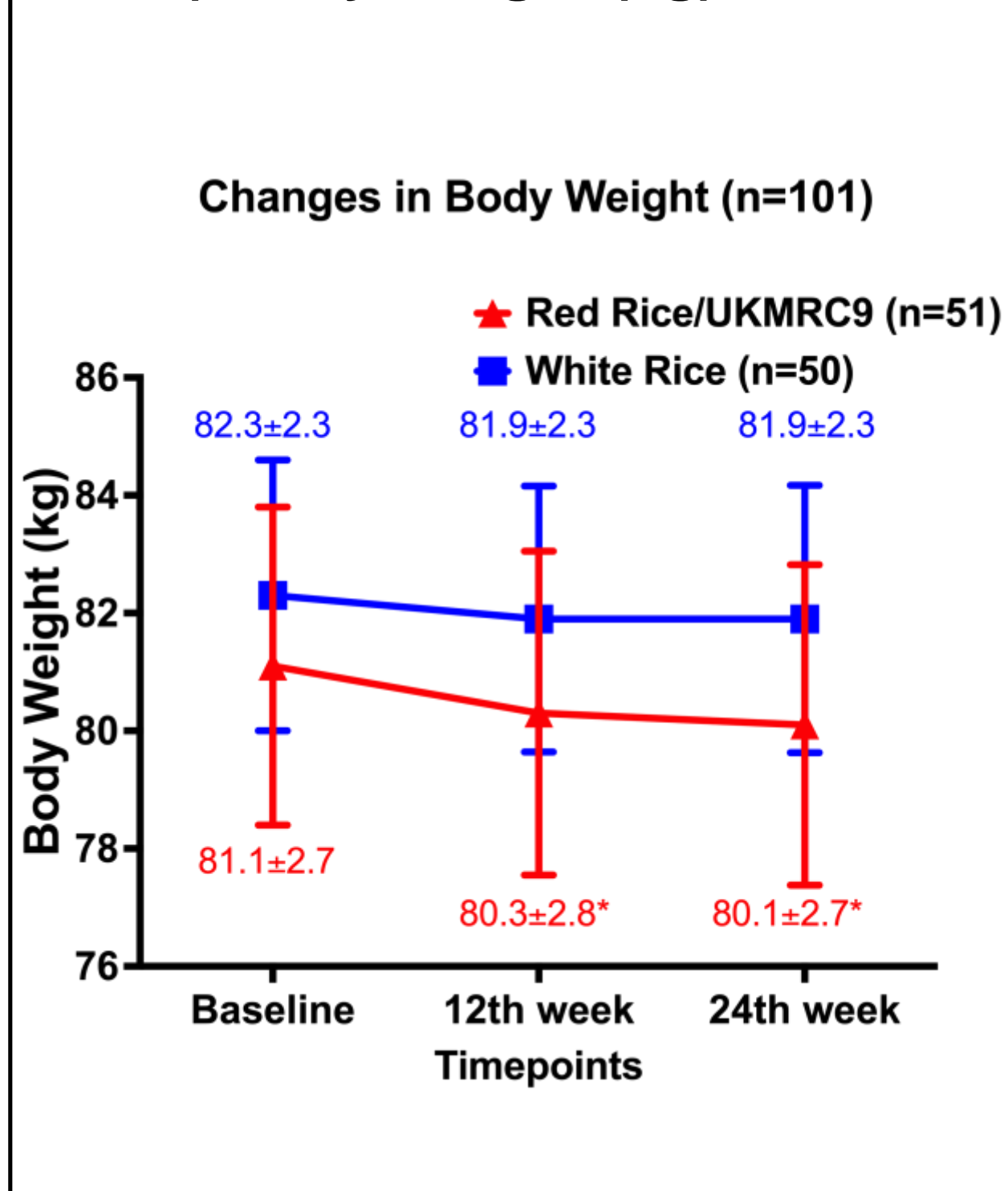
Clinically proven that consuming Primera Red Rice for 24-weeks can lead to:

- 1) improved blood sugar levels
- 2) significant weight loss
- 3) reduction in waistline inches.

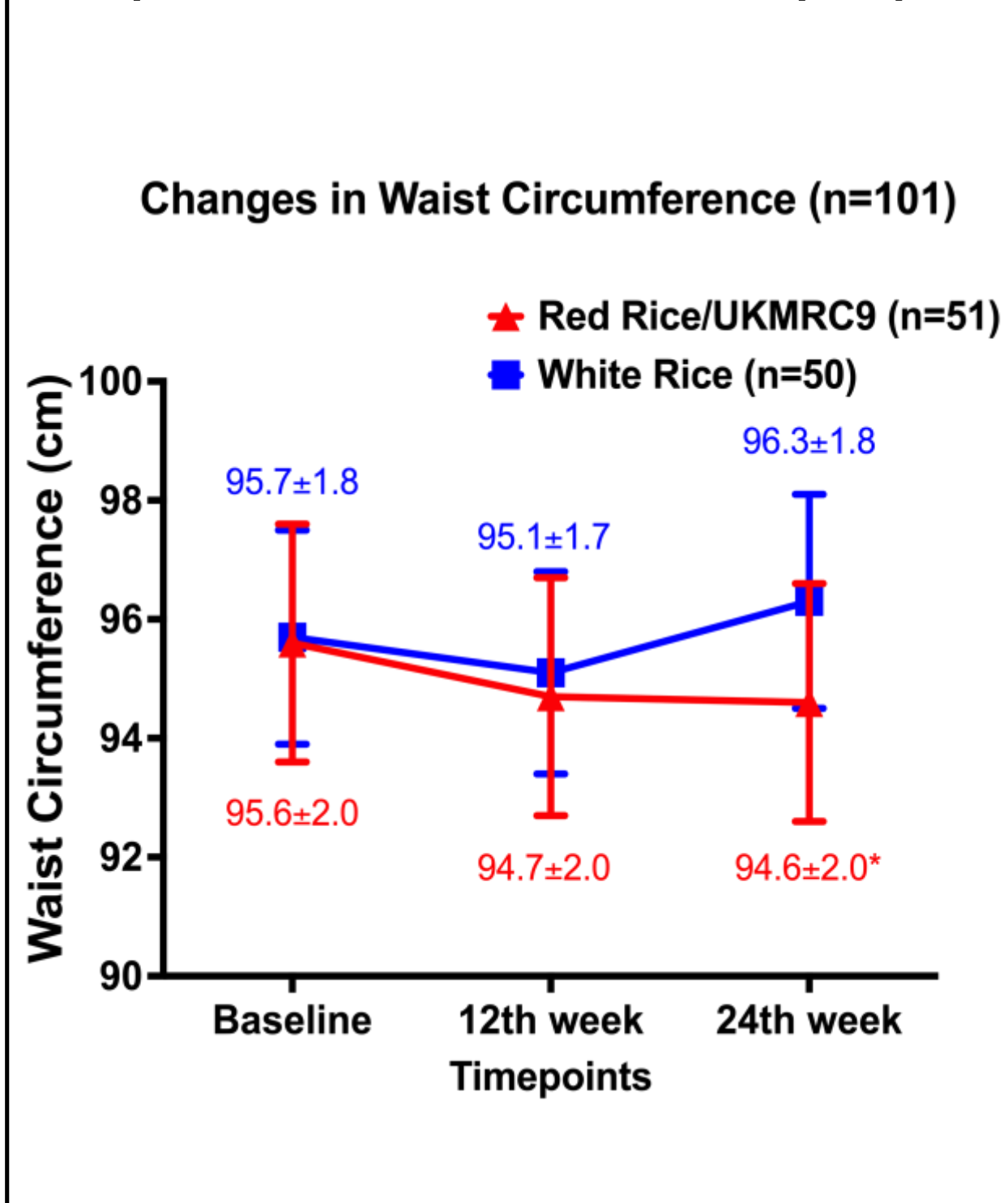
Concluded on 12th Aug 2024, Nottingham University

Statistically Significant Improvements (Diabetes Arm)

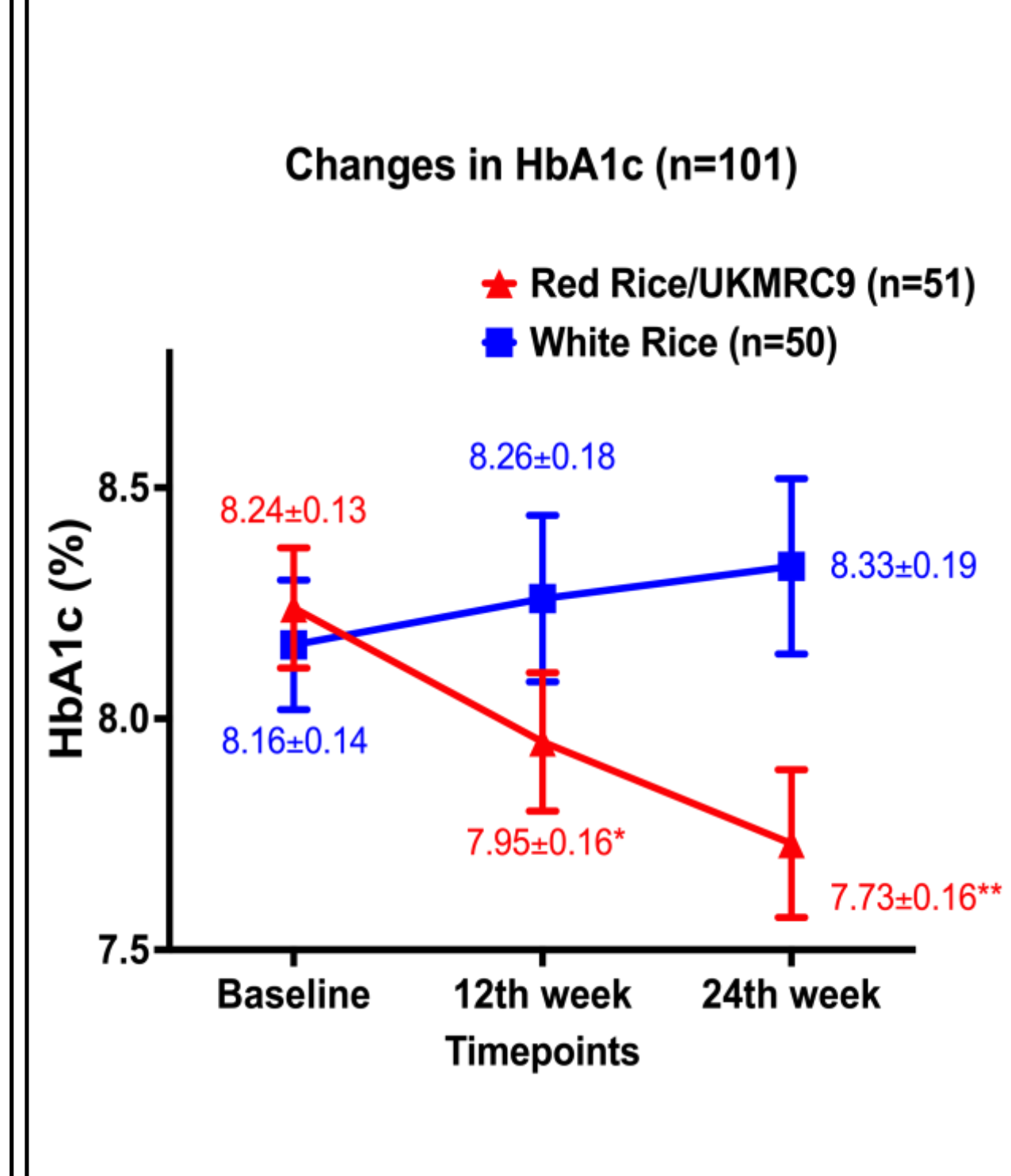
a) Body Weight (kg)



b) Waist Circumference (cm)



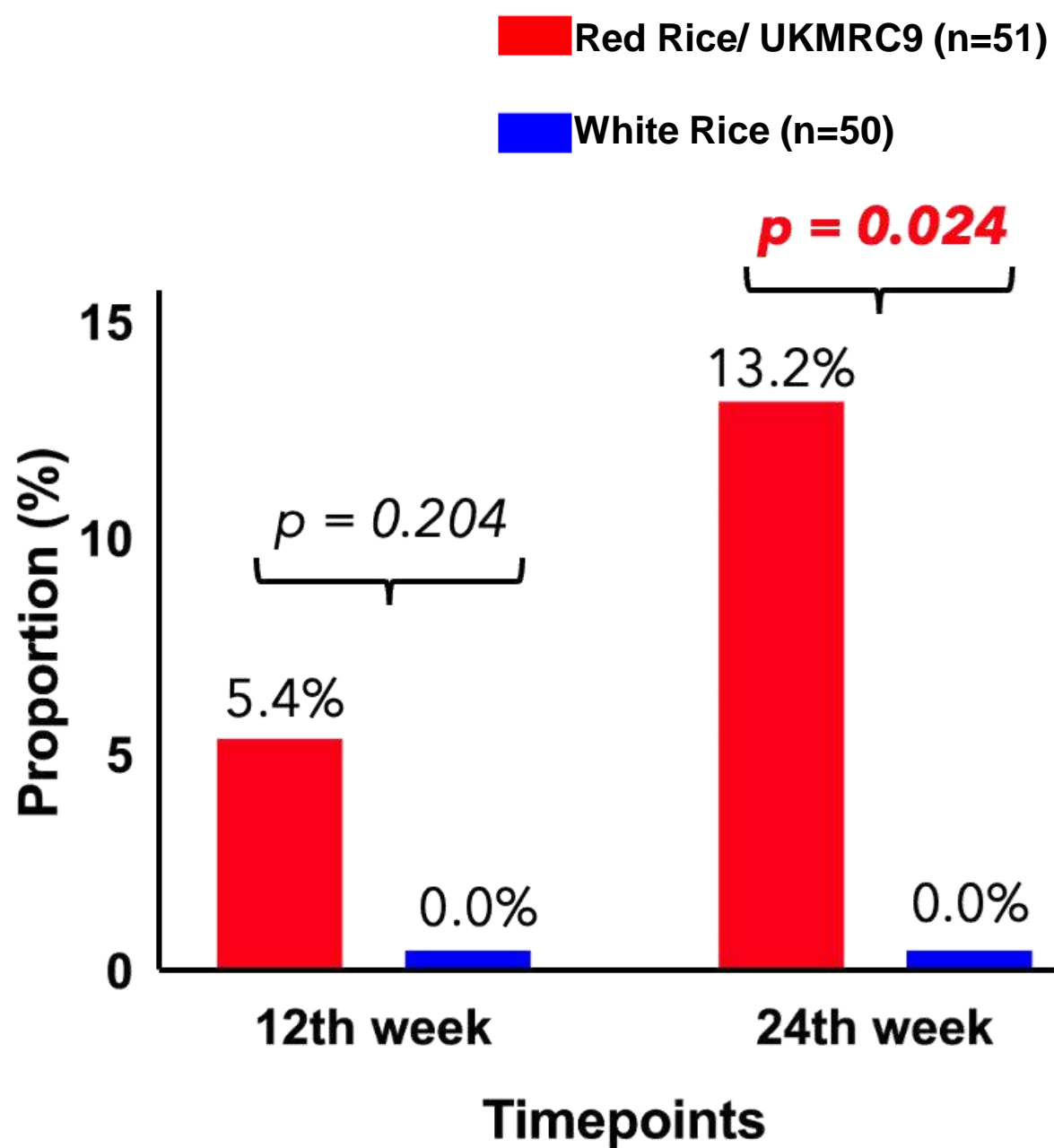
c) Glycemic Control (HbA1c,%)



Clinically Significant Improvements (Diabetes Arm)

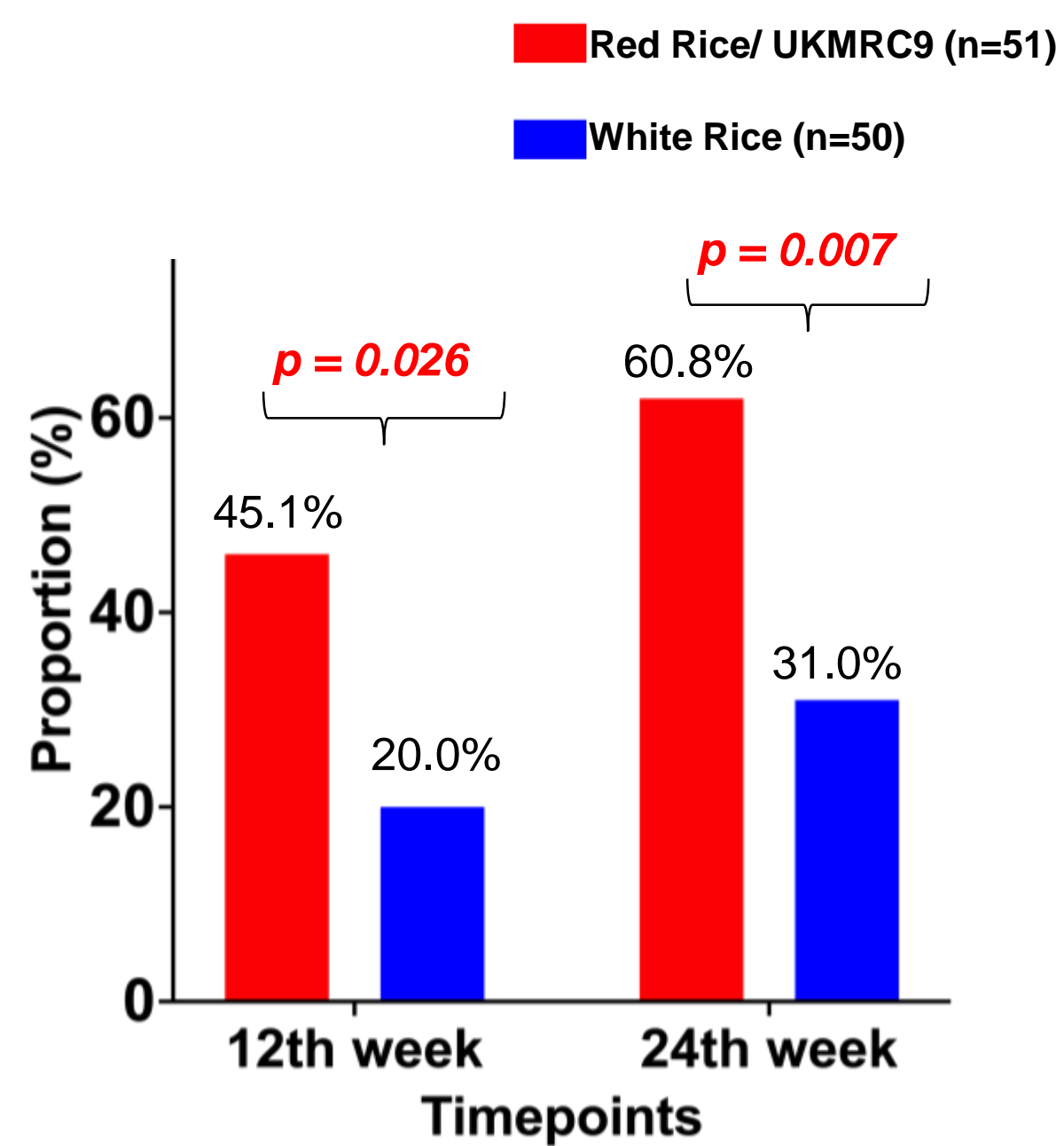
a) Body Weight

Proportion of Participants with Weight Loss (5-10%)



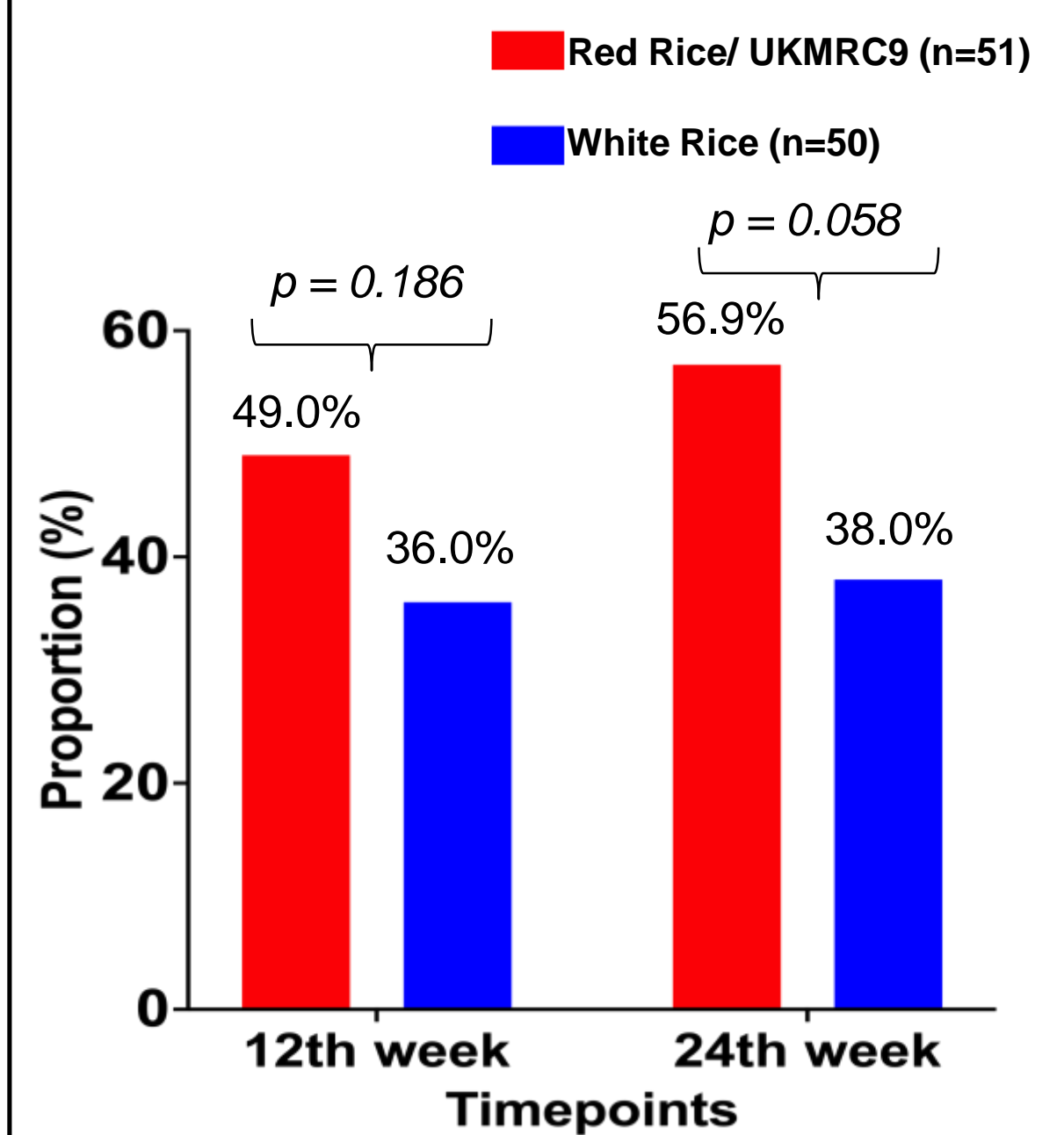
b) Glycemic Control

Proportion of Participants with HbA1c reduction $\geq 0.5\%$



c) Insulin Resistance

Proportion of Participants with HOMA-IR ≤ 2.9



Development of UKMRC12 & UKMRC37 through Marker Assisted QTLs Pyramiding

IR77298-14-1-2-10
(NIL $qDTY_{2.2}$)

IR81896-B-B-195
(NIL $qDTY_{3.1}$)

IR84984-83-15-18-B
(NIL $qYDT_{12.1}$)

X

MR219



Selection under limited water conditions from F_2 - F_6 generations



UKMRC12 (DTF: 67-70 days after sowing, flowered 2-3 weeks earlier than MR219,)

MR219

MLT, Teluk Chengai, Kedah



UKMRC12

(mature earlier, tolerant to limited water condition, potential yield > 10 t/ha)

X

IR64-Sub1

Selection under limited water condition & submergence stress from F_2 - F_6 generations



LVT, Teluk Chengai, Kedah



UKMRC37

(mature earlier, tolerant to limited water condition & submergence, potential yield > 10 t/ha)



14 days after de-submerged



MR219 (susceptible)



Thank you



Nomatech Sdn Bhd
(1167119-K)
TGB-01, UKM MTDC
Technology Centre, 43650
Bangi, Selangor

www.primerarice.com
www.nomatech.com.my



Primera Rice