



Penelope Nestel

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Micronutrient malnutrition

Magnitude

- 2 billion people suffer from iron and/or zinc deficiency
- 250 million children—and untold pregnant women—are deficient in vitamin A

Consequences

- More severe illness
- More infant and maternal deaths
- Lower cognitive development
- Retarded growth
- Lower work productivity
- Huge economic burden



Program strategy

Develop micronutrient dense staple crops using the best traditional breeding practices and modern biotechnology to achieve **provitamin A, iron, and zinc** concentrations that can have measurable effects on nutritional status



HarvestPlus
Breeding Crops for Better Nutrition

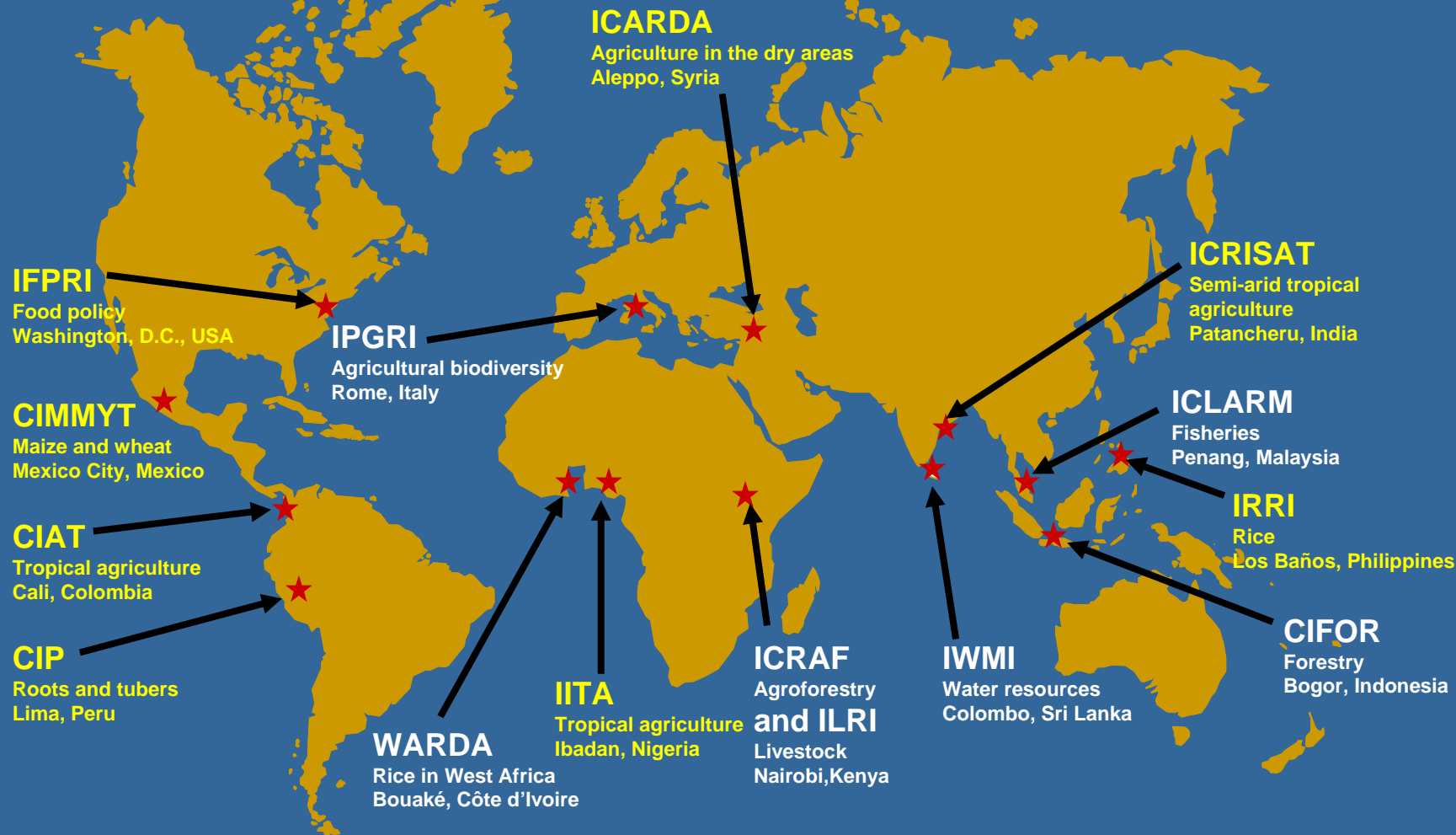
Phase 1

- Rice
- Wheat
- Maize
- Cassava
- Sweetpotato
- Beans

Phase 2

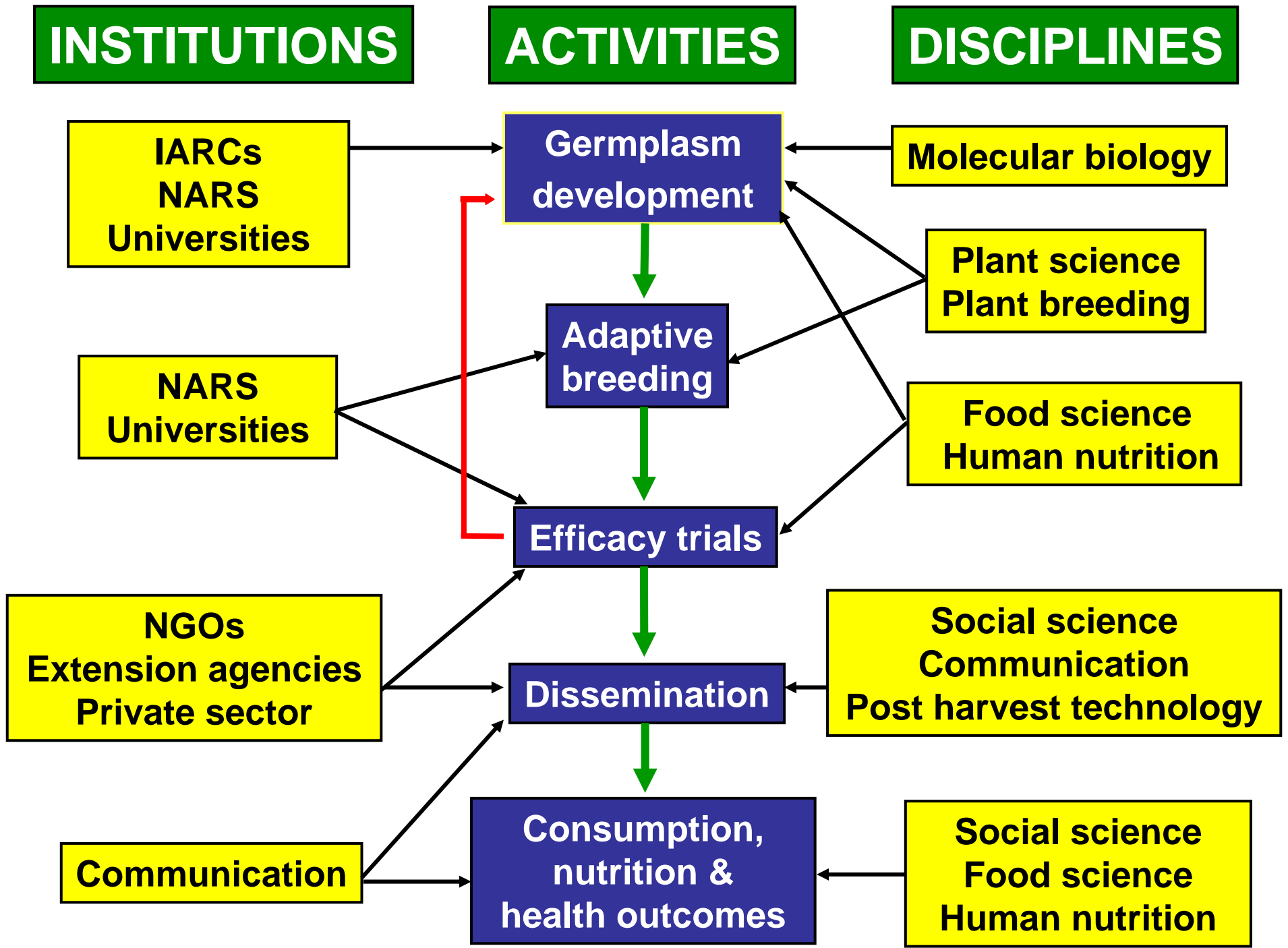
- Banana/Plantain
- Barley
- Cowpeas
- Groundnuts
- Lentils
- Millet
- Pigeon peas
- Potato
- Sorghum
- Yams





CGIAR Research Centers

CIAT and IFPRI co-convene HarvestPlus



HarvestPlus: coordinating a multidisciplinary program

Function	Rice	Maize	Wheat	Cassava	Sweet potato	Bean
1. Breeding						
2. Biotechnology						
3a. Food processing						
3b. Human nutrition						
4a. Behavior change						
4b. Reaching end-user						
5. Impact/policy						
6. Communication						

African Agricultural Technology Foundation
AfriCare–CARE
ARC-Roodeplaat, Pretoria
Awassa Agricultural Research Centre
Center of Rural Development and Applied Research
Centre Africain de Recherches sur Bananiers et Plantains
Chitedze Agricultural Research Station
Crops Research Institute
Department of Agriculture Research and Development
East and Central Africa Maize and Wheat Network
Ethiopian Agricultural Research Organization
Ethiopian Health and Nutrition Research Institute
Food Basket Foundation International
Helen Keller International
Ilonga Agricultural Research Station
Institut d'Economie Rural (IER)
Institut de la Recherche Agronomique de Guinee
Institut des Sciences Agronomiques du Burundi
Institut des Sciences Agronomiques du Rwanda
Institut National de la Recherche Agronomique
Institut National de la Recherche Agronomique
Institut National de la Recherche Agronomique du Niger
Kenya Agricultural Research Institute
Kenya Industrial Development Institute
Kenya Medical Research Institute
Kenya Plant Health Inspectorate Service
Makerere University,
Mansa Technology Assessment Site
South African Medical Research Council
Michigan State University
Ministry of Agriculture
Ministry of Health
National Agricultural Research Institute
National Agricultural Research Organization
National Institute for Agricultural Research
National Root Crops Research Institute
Obafemi Awolowo University
PRONANUT (Projet National de Nutrition)
University of Kinshasa
Projet de Sécurité Alimentaire (PROSECA)
Root and Tuber Improvement Programme
Savannah Agricultural Research Institute
Selian Research Centre
Tanzania Food and Nutrition Centre
University of Ibada
University of Nairobi
University of Zimbabwe
West African Seed Development Unit
Agriculture University of Indonesia
Agriculture Universities of India
Agriculture University of Vietnam
Banaras Hindu University

Bangladesh Agricultural Research Institute
Bangladesh Agricultural University
Bangladesh Rice Research Institute
Cuu Long Delta Rice Research Institute
Delhi School of Economics
Dhaka University
Indian Agricultural Research Institute
Indian Council for Agricultural Research
Maulana Azad Medical College
M.S. Swaminathan Foundation
National Agricultural Research Council
National Center for Agricultural Economics Policy Research
National Institute of Nutrition
NEFORD, Faizabad, Uttar Pradesh
Nepal Agricultural Research Council
North South University Dhaka
Pakistan Agricultural Research Council
Philippine Rice Research Institute
Punjab Agricultural University
Research Institute for Food Crop Biotechnology
Research Institute for Rice
Thai Nguyen University of Agriculture and Forestry
The Aga Khan University
University of the Philippines
Agricultos y Pecuarias (INIFAP)
Agropecuaria (INTA-CNIA)
Centre Recherche de Agriculture
Centro Nacional de Tecnología Agropecuaria
Centro Nacional de Pesquisa de Mandioca e Fruticultura Tropical
Dirección de Investigación de Ciencias y Tecnología Agrícola
Escuela Agrícola Panamericana
Fundación para la Investigación y el Desarrollo Agroindustrial Rural
Instituto de Ciencia y Tecnología Agrícolas
Instituto de Investigación Nutricional
Instituto Nacional de Investigaciones Forestales
Instituto Nacional de Tecnología Agropecuaria
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Universidad St. Cruz de la Sierra
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University of Costa Rica
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Danish Institute of Agricultural Sciences

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International Cereal Research Center
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Syngenta
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Tulane University
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USDA-ARS Plant, Soil and Nutrition Lab
USDA-ARS Children's Nutrition Research Center
USDA-Human Nutrition Laboratory
Women and Children's Hospital, Adelaide
ICARDA
CIMMYT
ICRISAT
IITA
IFPRI
IITA
INIBAP
CIP
IRRI
WARDA

HARVESTPLUS COLLABORATORS

Partnerships with Europeans

Breeding

- Katholieke Universiteit Leuven, Belgium
- KVL, Denmark
- Riso National Laboratory, Denmark
- Institute of Agricultural Sciences, Denmark
- U. Bath, UK

Biotechnology

- U. Aarhus, Denmark
- INRA, France
- U. Freiburg, Germany
- WUR, Netherlands
- *U. Ghent, Belgium*
- *ETH, Switzerland*
- *U. York, UK*

Human nutrition

- KVL, Denmark
- ETH, Switzerland
- Institute of Food Technology, UK

Impact and Policy

- Institute of Sustainable Economic Development, Austria
- U. Hohenheim, Germany

REU

- *U. Greenwich, UK*

HarvestPlus' uniqueness

- **Uses agriculture as a low cost sustainable public health intervention**
- **Targets harder-to-reach, undernourished, rural populations in a sustainable way at low cost**
- **Links upstream scientific research with downstream impact**
- **Addresses end-users from the beginning**
- **Multi-disciplinary alliance of institutions**
 - **North/South, public/private/NGO**
 - **CGIAR at the nexus**