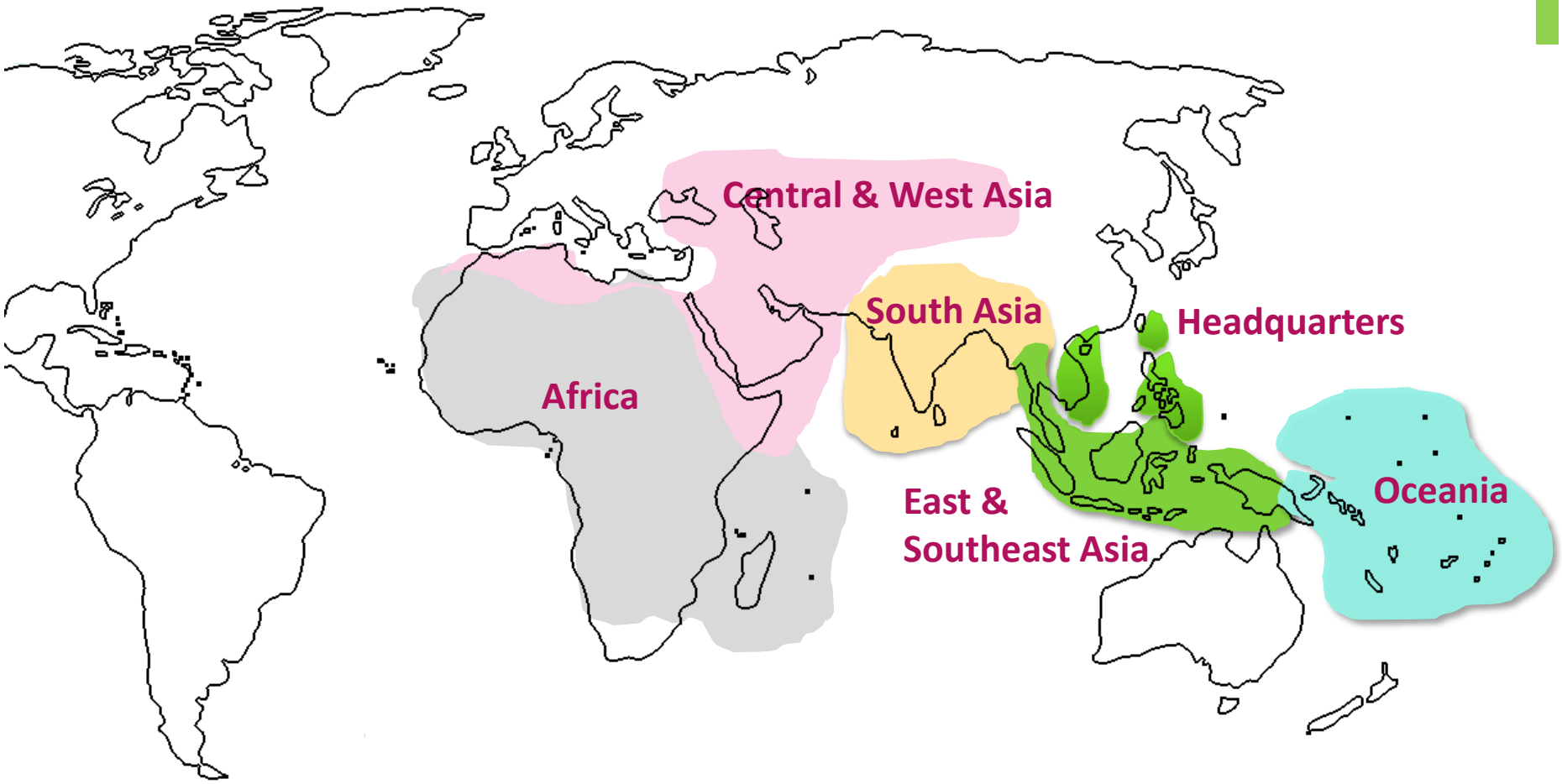
World Vegetable Center

VEGETABLES: for Health and Prosperity

Research to promote development

- Founded in 1971 as the **Asian Vegetable Research and Development Center** with a regional research focus on Asia
- Our research and development is **nonprofit**
- Our research outputs are **global public goods**
- The **World Vegetable Center** has an expanding global role with a growing network of regional offices

Alleviate poverty and malnutrition in the developing world through the increased **production** *and* **consumption** *of health-promoting* **vegetables.**



WORLD Vegetable Center

AIRCA: An independent consortium

Association of International Research and Development Centers for Agriculture

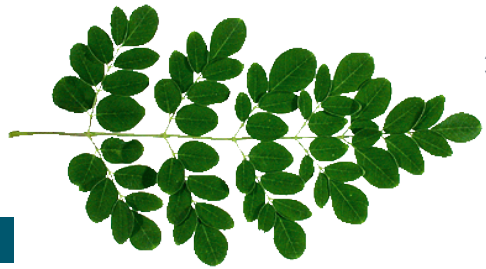
AIRCA
Association of International Research and Development Centers for Agriculture

- World Vegetable Center
- CABI
- Tropical Agriculture Research and Higher Education Center (CATIE)
- Crops for the Future (CFF)
- International Center for Biosaline Agriculture (ICBA)
- International Center for Integrated Mountain Development (ICIMOD)
- Africa Insect Science for Food and Health (*icipe*)
- International Network for Bamboo and Rattan (INBAR)
- IFDC

Our crop portfolio

- **Solanaceae:**
  - **Tomato**
  - **Pepper**
  - **Eggplant**

- **Bulb Alliums:**
  - **Onion**
  - **Garlic**
  - **Shallot**



- **Legumes:**
  - **Mungbean**
  - **Vegetable soybean**

- **Crucifers:**
  - **Pak Choi**
  - **Broccoli**

- **Cucurbits:**
  - **Cucumber**
  - **Pumpkin**

- **Traditional vegetables**

Research and Development: Four global themes

Germplasm	Germplasm conservation, evaluation and gene discovery
Breeding	Genetic enhancement, varietal development, selection of indigenous lines, seed production
Production	Safe and sustainable vegetable production systems
Consumption	Postharvest management and market opportunities; nutritional security, diet diversification and human health

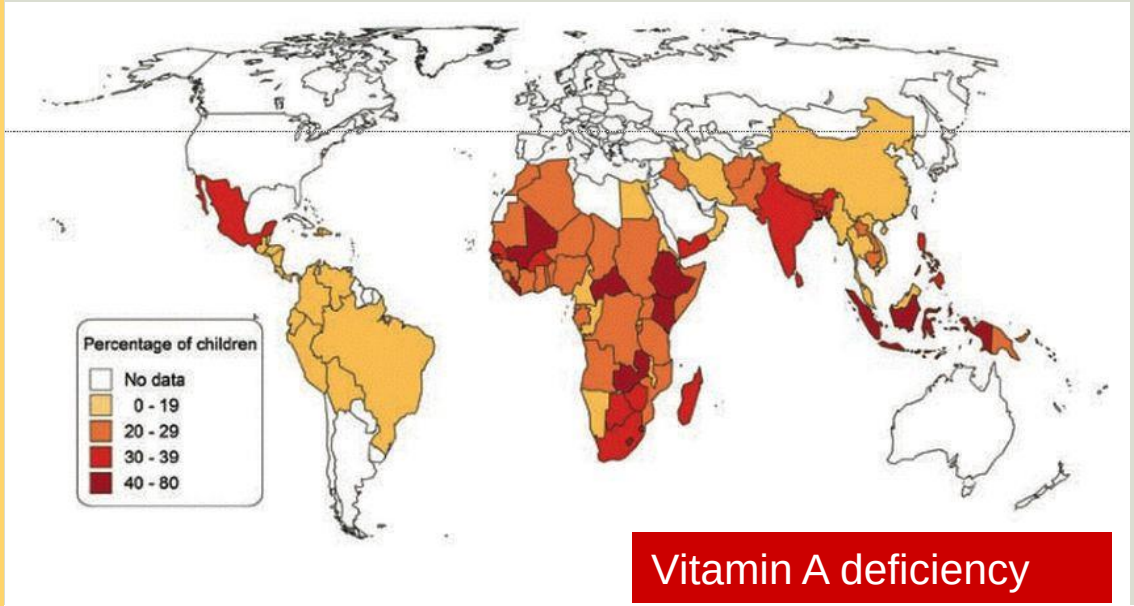
"Hidden Hunger": Micronutrient deficiencies

Each Year

Malnutrition causes nearly half (45%) of deaths in children under five: 3.1 million children each year.

Each Day

- 400 mothers die in childbirth due to iron deficiency
- 1400 children will go blind due to vitamin A deficiency



Vitamin A deficiency

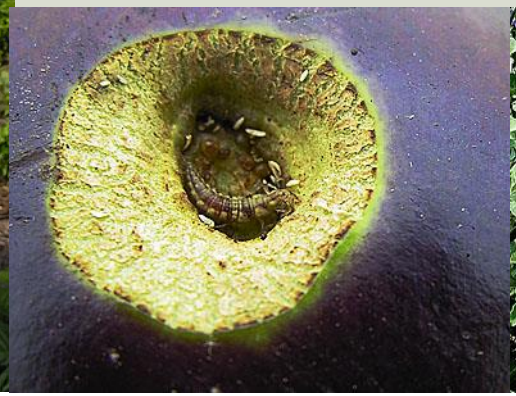
Source: WHO, Micronutrient Deficiencies, 2014

High quality, nutritious: ‘Golden’ tomatoes

- **“Golden tomatoes”**
  - High quality
  - Nutritious
  - Good marketability
  - Resistance to multiple diseases
- **One single improved tomato can provide a person’s full daily vitamin A requirements**

Insects and pesticides: Eggplant fruit and shoot borer

- Most severe pest of eggplant in Asia and East Africa today
- Heavy pesticide spraying (140 and more times during 6 month cropping period)
- **Integrated pest management (IPM)** reduces pesticide use



Field-tested technologies benefit small-scale farmers

Grafting: *Helps farmers overcome flooding and soil-borne diseases*

Simple rain shelters:
Protect high-value crops

Vegetables: a path out of poverty

- Smallholders often have a comparative advantage in producing vegetables, since there are limited economies of scale
- Vegetable production leads to higher farm income and generates more jobs than other crops
- Vegetable value chains strengthen the rural economy

* public sector

The world's largest* collection of vegetable germplasm: AVRDC Genetic Resources and Seed Unit Genebank

Germplasm accessions conserved – 8/2016

	Principal crops	Other crops	Total
No. of accessions	**57,636**	**4,316**	**61,952**
No. of genera			173
No. of species			**442**
Countries of origin			156

Order seed: avrdc.org

Contact | Library | Genebank

AVRDC
The World Vegetable Center

About AVRDC | Our people | Our work | Join us! | Seed | On-Farm | Publications | Media

Home | Seed | Improved lines | Cherry/high beta carotene tomato

AVTO0102
High beta carotene globe shaped fruit for fresh market. Early maturing, good heat tolerance, suited to hot-wet conditions.

AVTO1174
Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong shape and orange color.

AVTO1349
Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong fruit shape and red color.

AVTO1350
Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong fruit shape and red color.

COMPARE PERFORMANCE

- Table of Characteristics

MORE INFORMATION ON EACH LINE

- AVTO0102 (CLN2366B)
- AVTO1174 (CLN3284A)
- AVTO1349 (CLN3284J)
- AVTO1350 (CLN3284G-1)

DATA SHEETS IN EXCEL

- Test location & crop management
- Plant characteristics & reactions to biotic stresses
- Yield & yield components

ALL CROPS

Best widely adapted selections for commercial release:

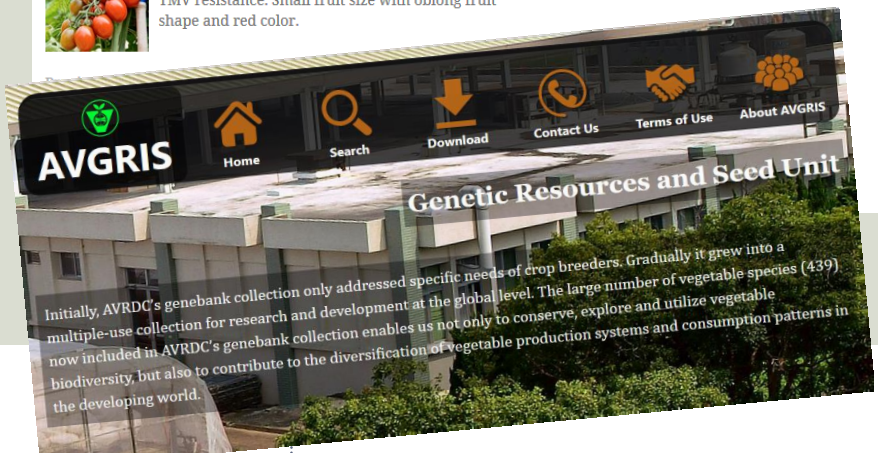
- Chili pepper
- Sweet pepper

For breeding purposes or commercial release with further local testing:

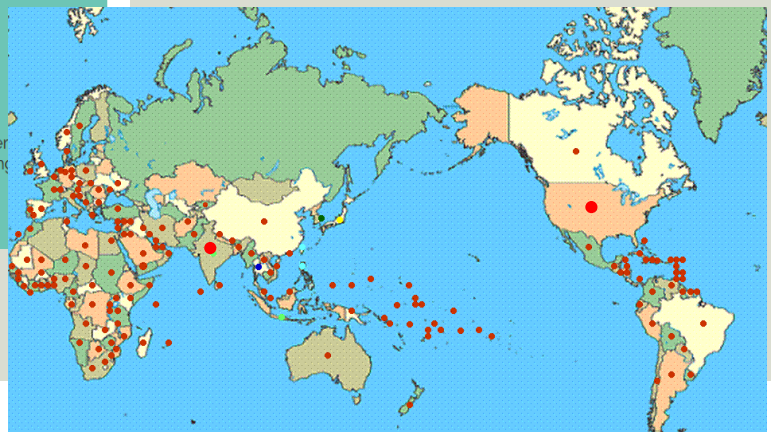
- Fresh market tomato
- Processing/dual purpose tomato
- Cherry tomato and high beta carotene tomato
- Vegetable soybean
- Grain soybean
- Leafy brassicas
- Chinese cabbage
- Shallot
- Bitter gourd
- Onion
- Cucumber
- Winter squash

International nurser sets for local testing

- Chili pepper
- Sweet pepper

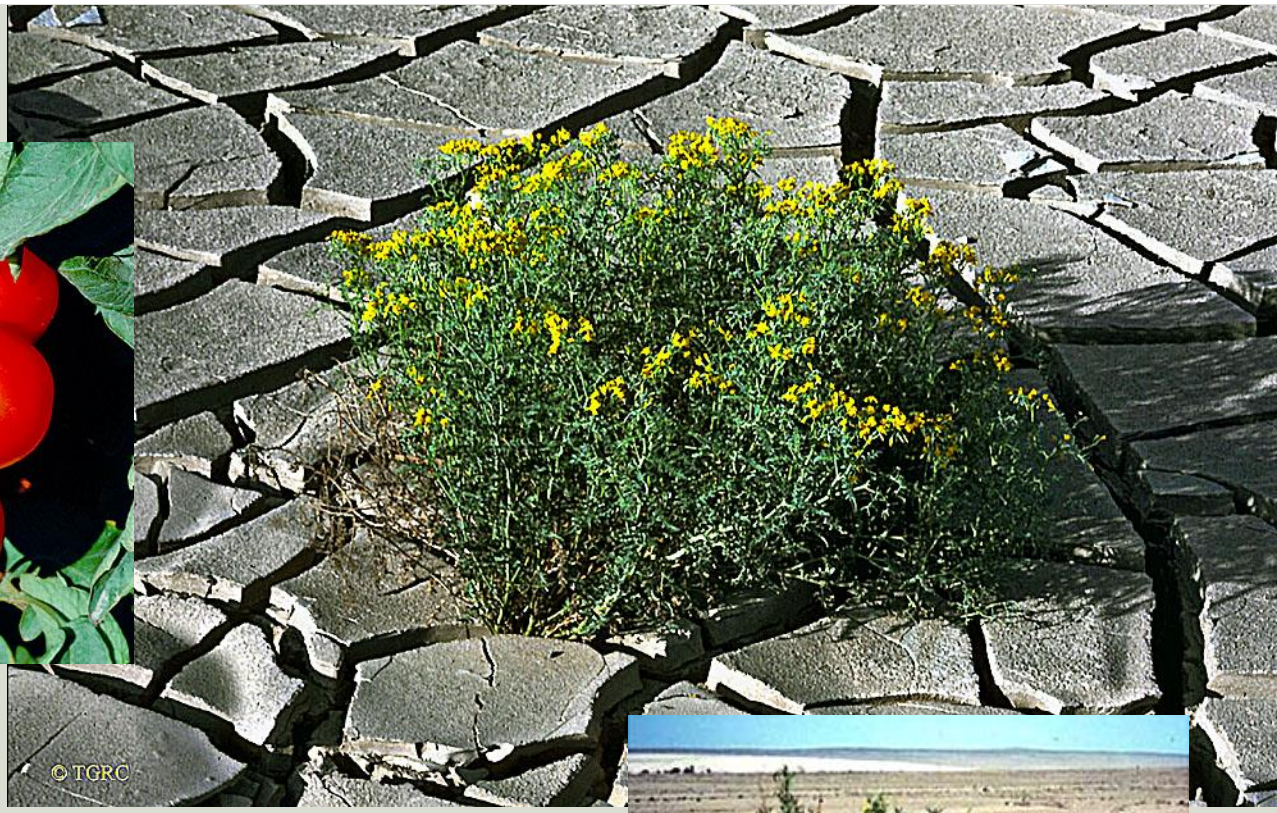


Where does the seed go?



Improving tolerance to environmental stress

High yielding tomato variety



Wild tomatoes - source of drought tolerance

Food security: 15 crops...or 2,000 crops?!

Traditional treasures: diet diversity

Spider plant

African eggplant

Nightshade

Cowpea

Amaranth

Ethiopian kale

Traditional vegetables: Rich in nutrients

Micronutrient content of common and traditional vegetables

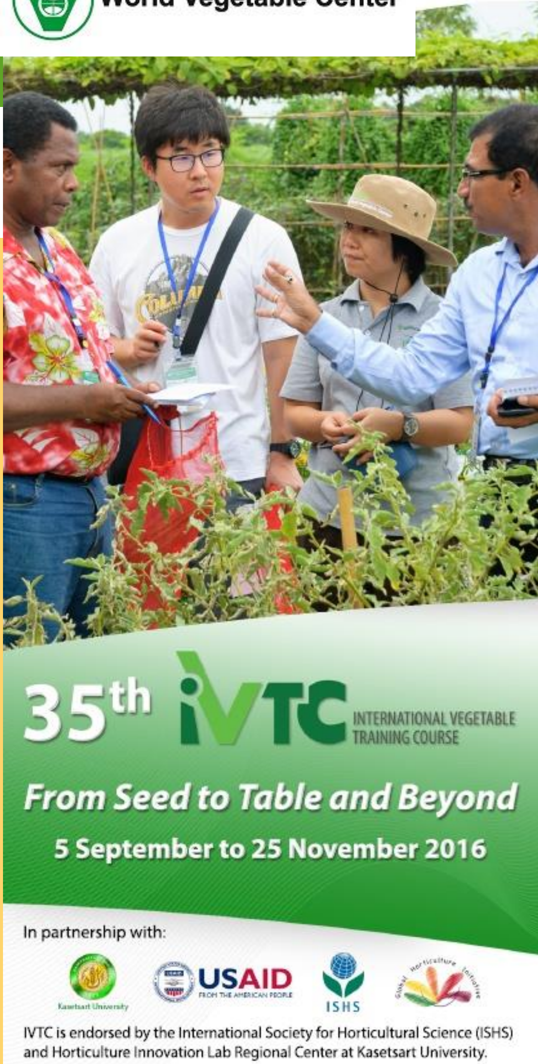
	Ranges	Cabbage	Moringa	Amaranth	Aibika	Sweet potato leaf
β-Carotene,mg	0.0 - 22	0.00	15.28	9.23	5.11	6.82
Vit C, mg	1.1 - 353	22	459	113	82	81
Vit E, mg	0.0 - 71	0.05	25.25	3.44	4.51	4.69
Iron, mg	0.2 – 26	0.30	10.09	5.54	1.40	1.88
Folates, µg	2.8 – 175	ND	93	78	177	39
Antioxidant activity, TE	0.6 - 82,000	496	2858	394	560	870

Source: AVRDC Nutrition Lab

Building capacity for resilience

World Vegetable Center

Capacity Building and Networking




Dr. Somsiri Sangchote leading the participants in the seed health sessions.

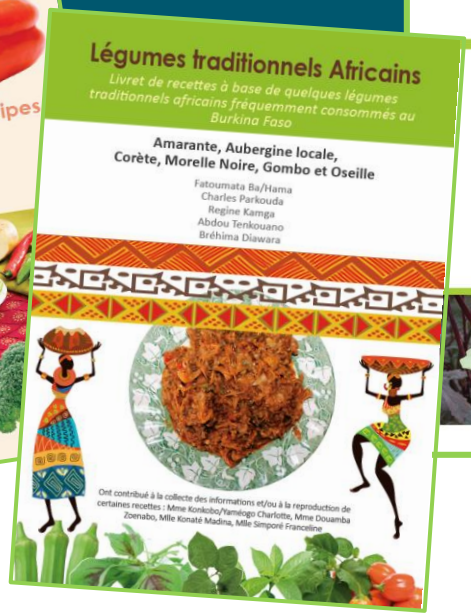

Evaluating lettuce plants at the Agri-Technology Complex.

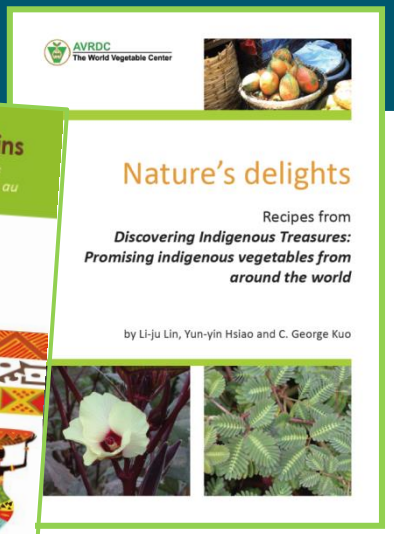

Learning how to graft vegetable seedlings.


Accomplished grafters show their handiwork.

East and Southeast Asia															South Asia						Africa										Others																	
Brunei	Cambodia	China (PR)	Hongkong	Indonesia	Korea	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Taiwan	Timor Leste	Thailand	Vietnam	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka	Burkina Faso	Cameroon	Gambia	Kenya	Malawi	Zambia	SouthAfrica	Nigeria	Sudan	Swaziland	Afghanistan	Kazakhstan	Jordan	Lebanon	Iraq	Egypt	Papua NG	Tuvalu	Nauru	Palau	Rep of Kiribati	Sao Tome	Solomon Islands	Netherlands	UK	Venezuela	Male	Female
	1		2	6	1					1			4		1		2		4	5	1				1			1		1			2	1		2				1	1	1	1				31	9
2	75	139	7	59	18	60	11	71	23	7	4	3	59	102	47	18	10	9	8	34	3	1	1	1	1	1	1	2	1	3	24	20	4	1	2	2	4	1	1	1	1	1	1	1	1	1	585	269
640															126						15										66																69%	31%

Healthy diets begin with knowledge





Healthy Home Garden Kits

- For farmers, trainees, or any private individual and to public and private agencies upon request
- Each kit includes seed of high yielding & nutritious vegetables
- Enough seed (2-50 g) of each crop to plant a home garden and sustain a healthy diet for a family of 4 for a year

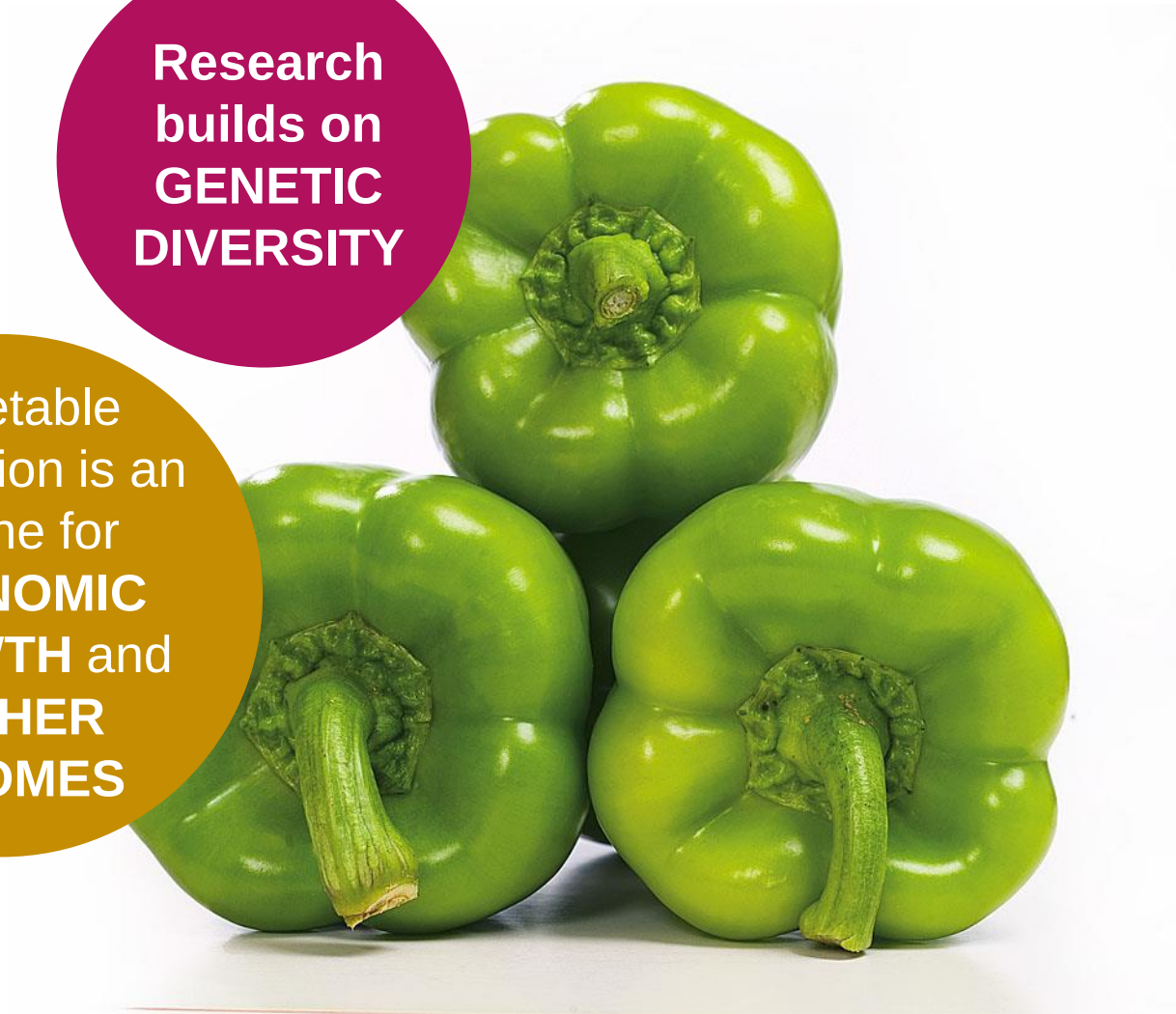
avrdc.org

Key points

Vegetables are essential for HEALTH

Research builds on GENETIC DIVERSITY

Vegetable production is an engine for **ECONOMIC GROWTH** and **HIGHER INCOMES**



Thank you!

World Vegetable Center