



AVRDC-The World Vegetable Center: Role of Horticulture in Poverty Alleviation

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Agricultural Economist





AVRDC-The World Vegetable Center





The World Vegetable Center

Mission:

**Alleviate poverty
and malnutrition
in the developing world**

**through increased
production,
marketing and
consumption
of safe vegetables**



Poverty-A Global Challenge

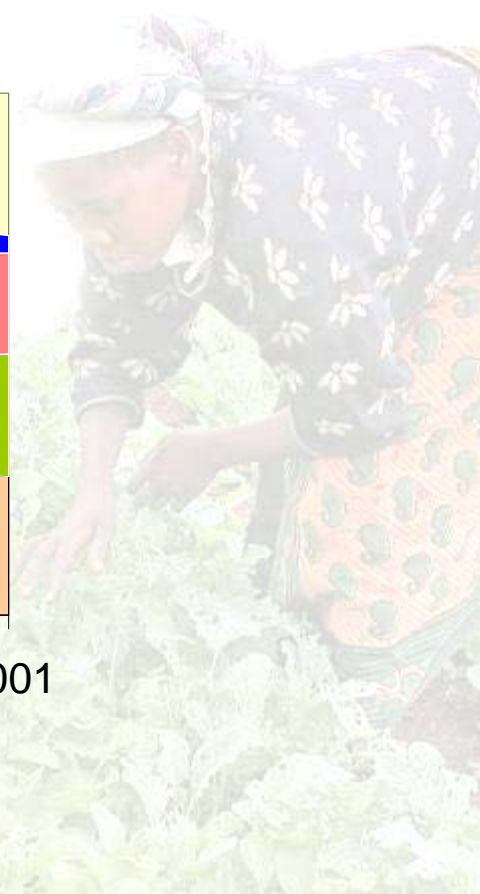
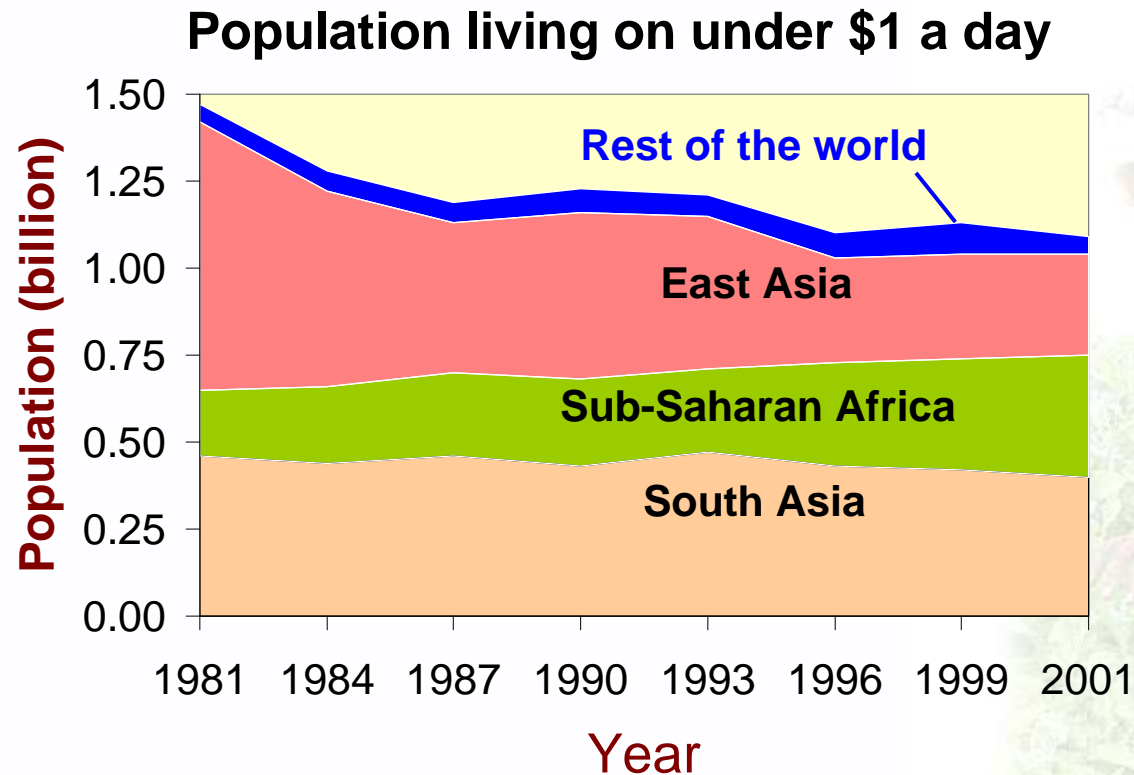
About 1.1 billion people live
on less than US\$1 per day



Another 1.6 billion
lives between 1-2US\$
per day



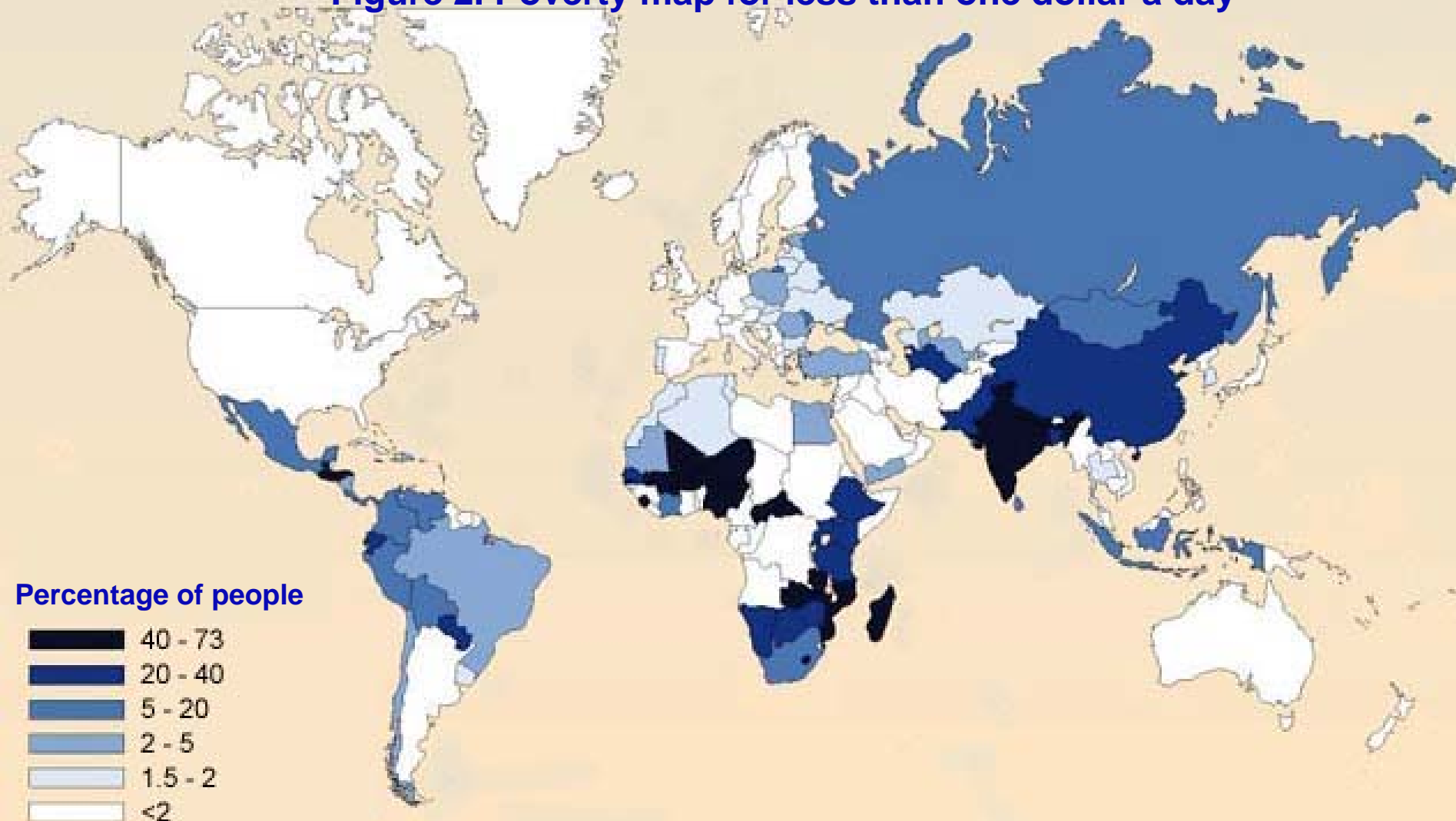
Poverty-A Global Challenge





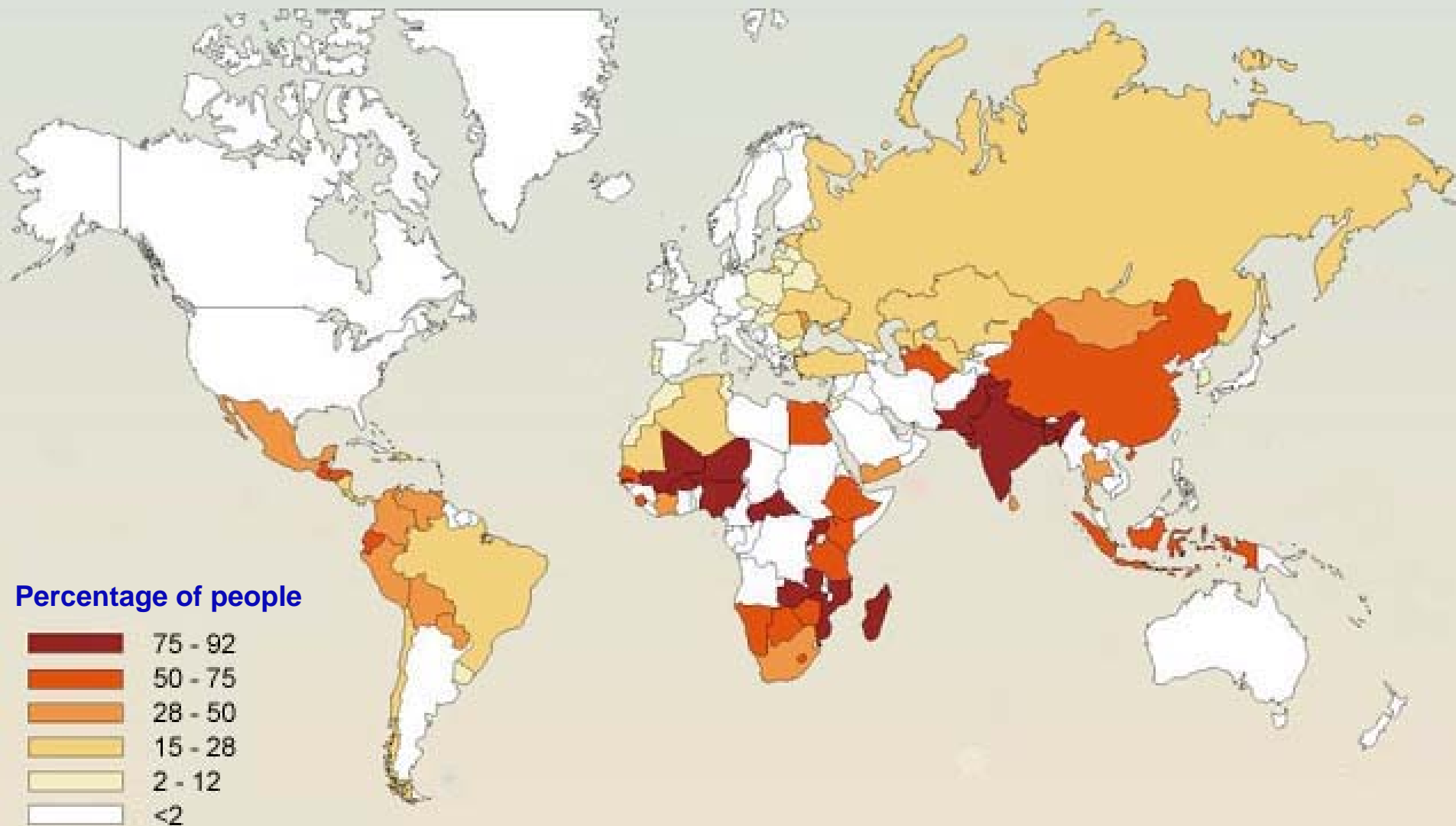
Poverty-A Global Challenge

Figure 2. Poverty map for less than one dollar a day



Poverty-A Global Challenge

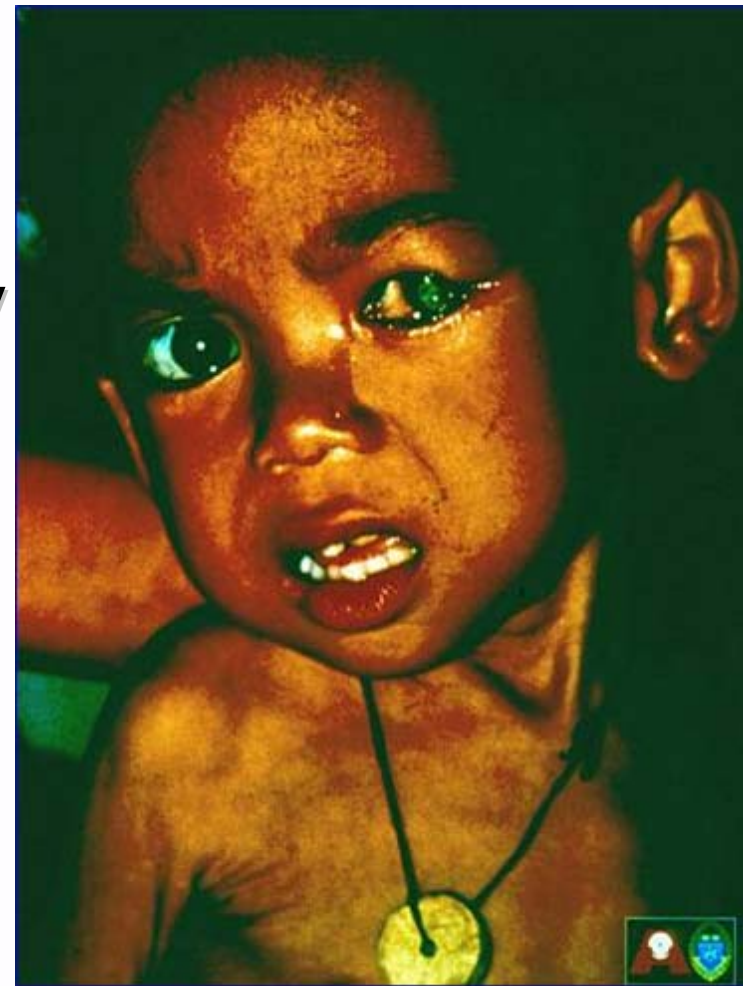
Poverty map for less than two dollars a day





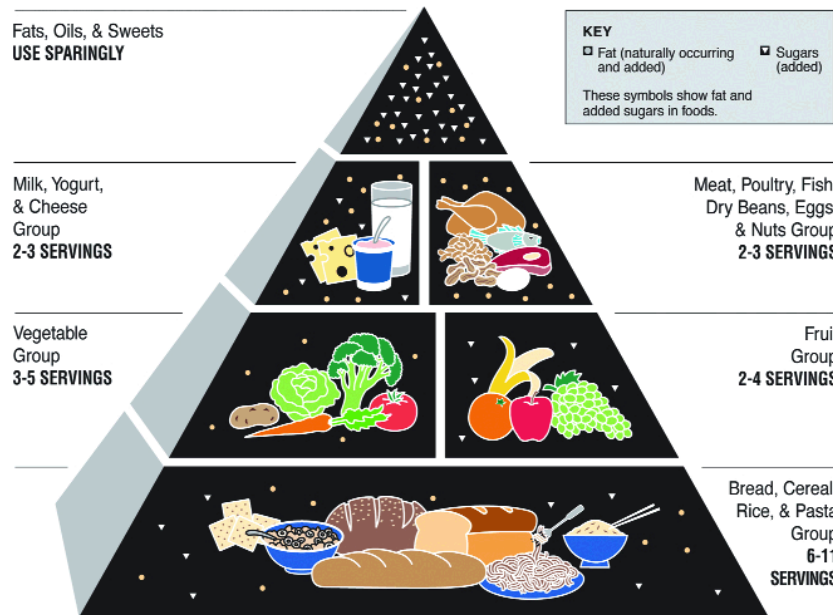
Micronutrient deficiency- Another Global Challenge

- 2 billion affected by micronutrient deficiency
- 1.5 billion by iron deficiency
- 100-250 million preschool children severely affected by vitamin A deficiency
- ◆ 1.3-2.5 million deaths annually



Why Vegetables-Healthy Diets

Food Guide Pyramid A Guide to Daily Food Choices



Source: U.S. Department of Agriculture/U.S. Department of Health and Human Services



5 A Day
Eat 5 to 9
Fruits and
Vegetables for
Better Health

AVRDC Recommendation = minimum required level is 100 g per day or 73 kg per annum

Why Vegetables?

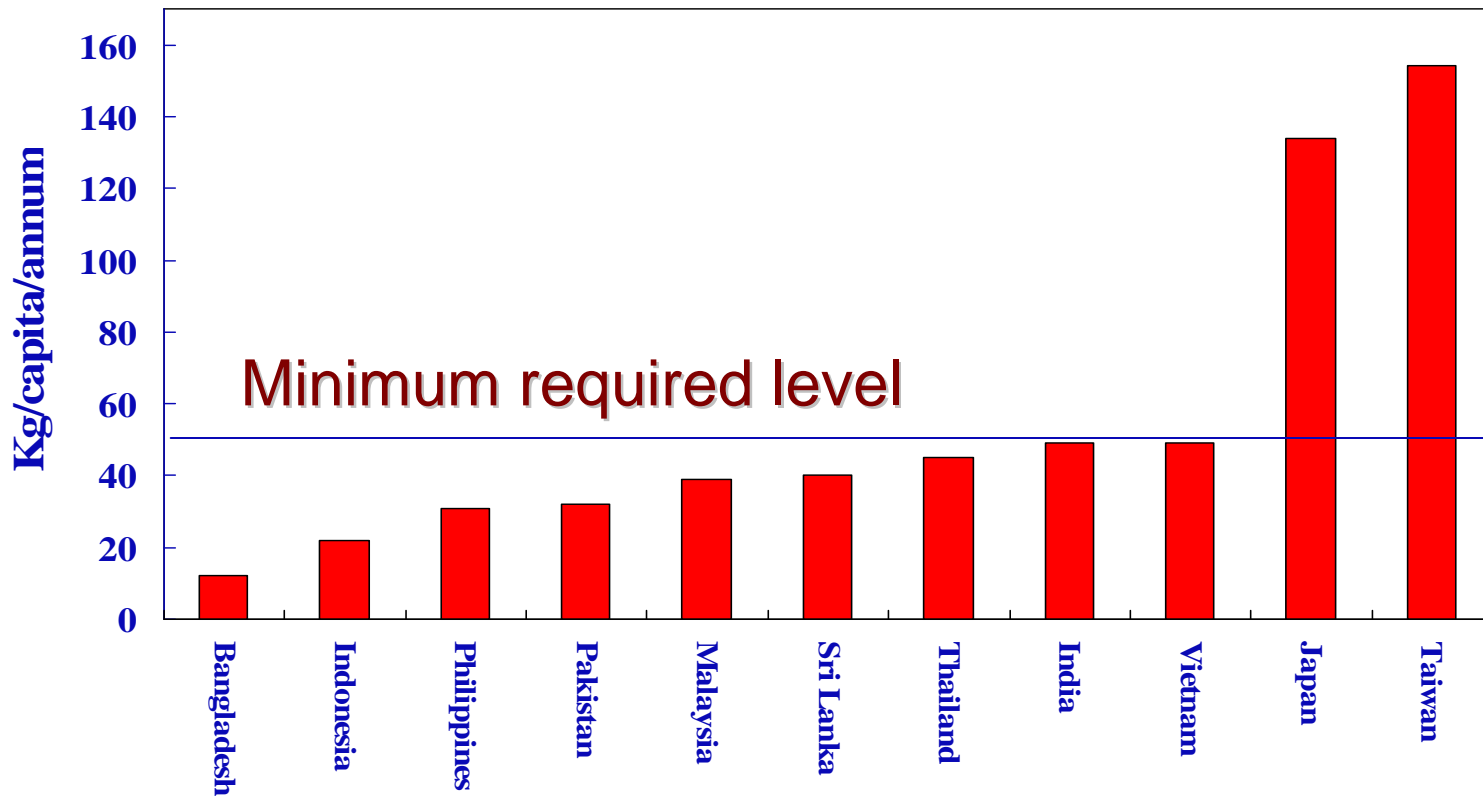
Little hope from traditional agricultural production because of declining prices and reduced farm holding





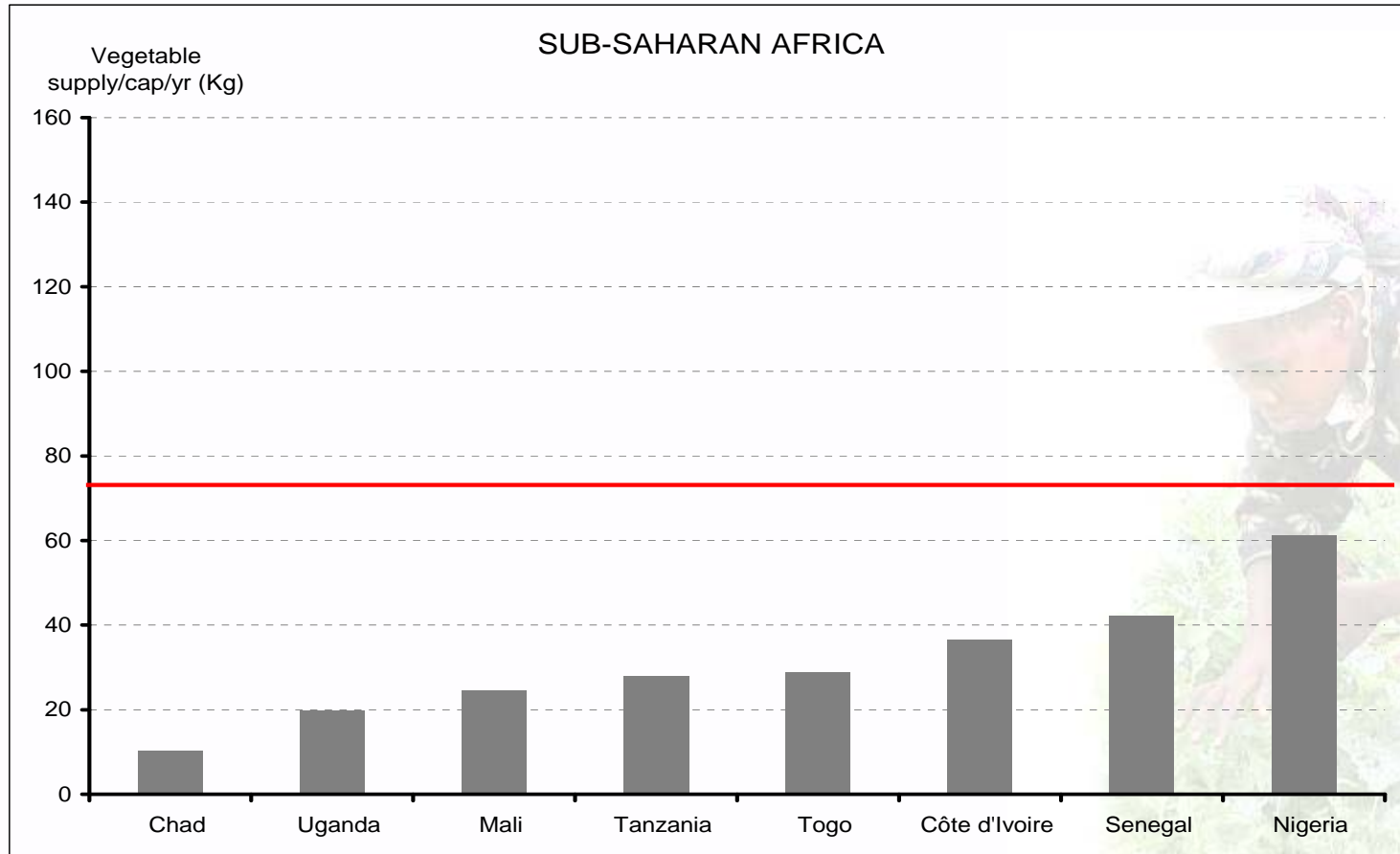
Why Vegetables?

Per capita vegetable availability

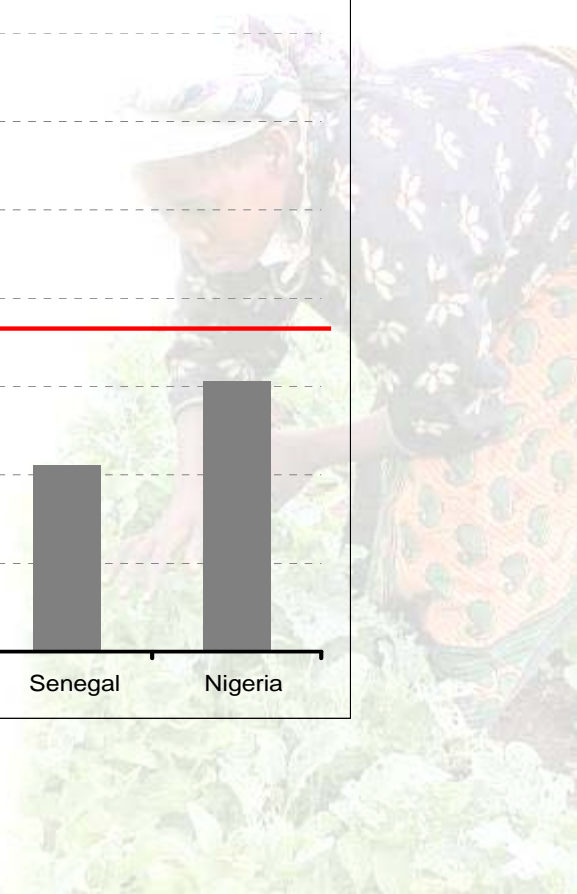




Why Vegetables?



Source: FAOSTAT data, 2005.





Why Vegetables

An engine for economic growth

Vegetables:

- **Create jobs**
- **Generate higher incomes**
- **Alleviate malnutrition**
- **Improve learning capacities**
- **Improve role of women**



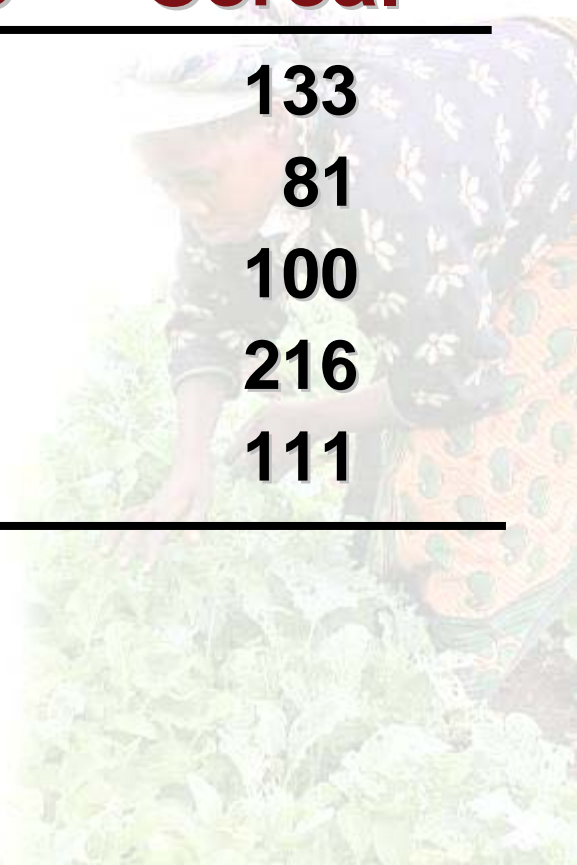


Why Vegetables-Alleviate poverty

A. Providing farm employment

Crop	Days/ha	
	Vegetable	Cereal
Bangladesh	338	133
Cambodia	437	81
Laos	223	100
North Vietnam	468	216
South Vietnam	297	111

Source: Ali and Abedullah, 2002





INPUT USE ON VEGETABLES

Input use on vegetables versus cereals

Input/Crop	South Vietnam	Laos	Cambodia	Bangladesh
Pesticide (No. of spray)				
Vegetables	7.7	1.5	7.3	6.5
Cereals	3.2	0.1	2.6	1.3
Irrigation (No.)				
Vegetables	31	39	43	3
Cereals	6	2	3	2
Fertilizer (kg/ha)				
Vegetables	534	91	148	276
Cereals	197	75	46	113
Cash cost (US\$/ha)				
Vegetables	658	117	406	428
Cereals	233	53	78	143



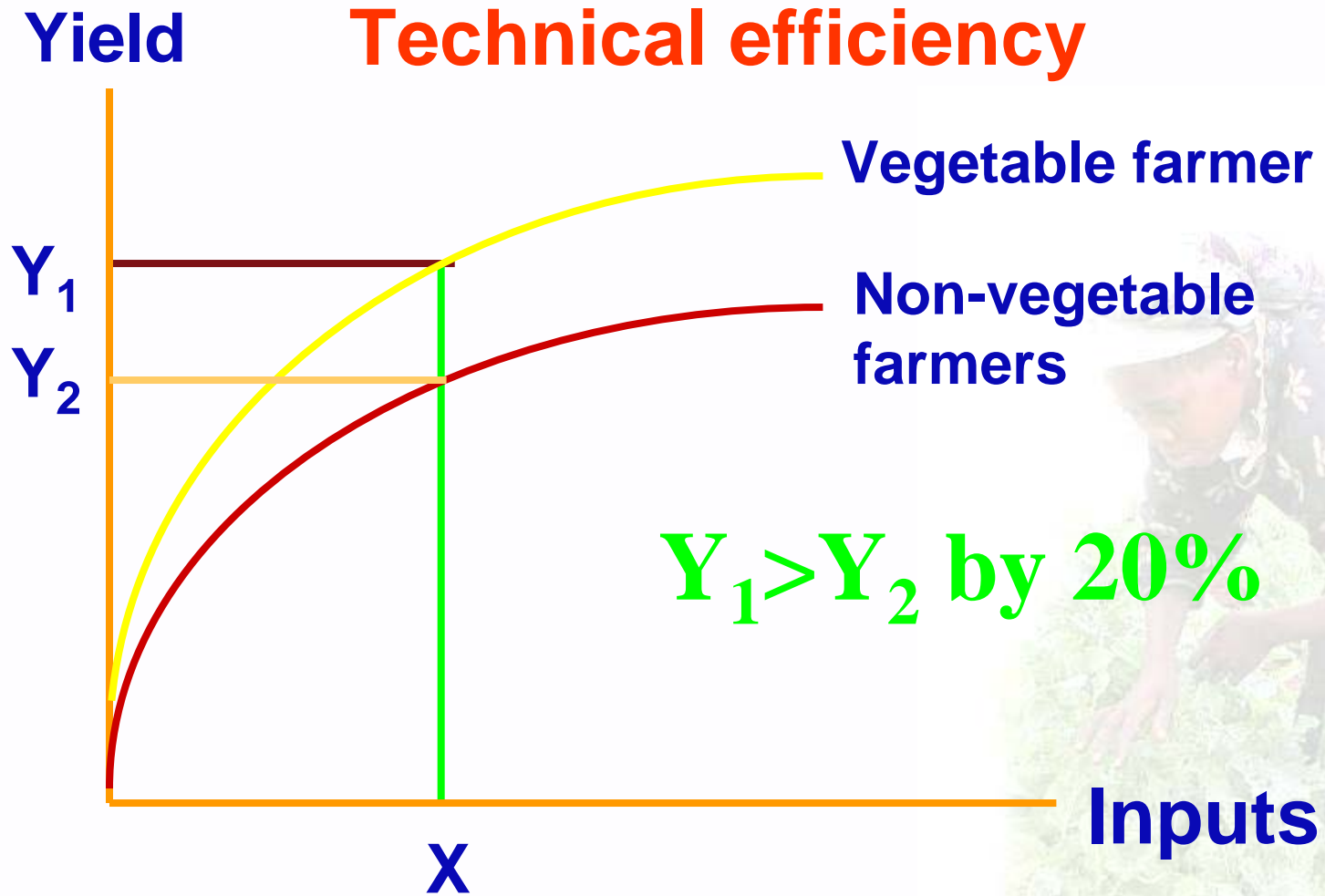


ECONOMIC BENEFITS OF THE DIVERSIFICATION

Resource use efficiency

Crop/input	S. Vietnam	Laos	Cambodia	Bangladesh
Land (US\$/ha)				
Vegetables	1252	834	515	553
Cereals	158	152	73	30
Labor (US\$/labor day)				
Vegetables	8.4	13.9	4.1	4.4
Cereals	4.8	8.8	2.8	1.4
Water (% return on water cost)				
Vegetables	88	396	52	65
Cereals	37	144	26	40
Benefit-cost ratio (%)				
Vegetables	105	116	38	81
Cereals	35	81	33	13

ECONOMIC BENEFITS OF THE DIVERSIFICATION



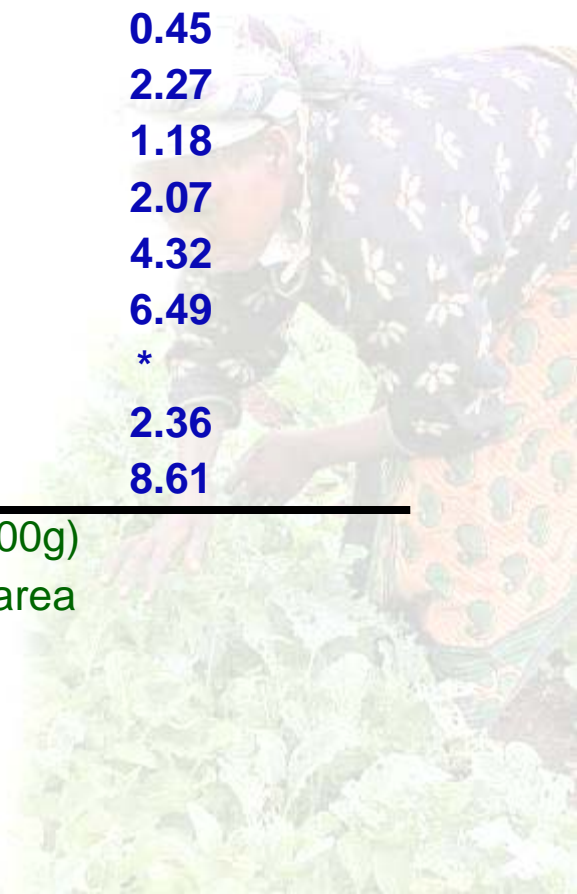


A. Efficient Nutrient Source

	Philippines	Bangladesh
Rice	1.72	1.04
Beef	0.41	1.28
Chicken	1.10	0.33
Fish	0.40	0.45
Carrots	1.78	2.27
Pakchoi	1.76	1.18
Pepper	1.42	2.07
Soybeans	2.67	4.32
English Spinach	2.09	6.49
Horse Radish	4.87	*
Jute Leaves	5.63	2.36
Amaranth	*	8.61

Efficiency = Nutritive value (US\$/100g) / Average price (US\$/100g)

* Implies that the commodity was not consumed in the survey area







RESEARCH UNITS





Genetic Resource Unit

- **Collect Germplasm**
- **Exchange Germplasm**
- **Characterization of germplasm**
- **Standardized collections**
- **Indigenous knowledge**



SINGER Knowledge makes the difference



AVGRIS
AVRDC Vegetable Genetic Resources
Information System





Breeding Program



Paul Gniffke (pepper) Peter Hanson (tomato)

Breeding Priorities

Tomato

- **Tomato leaf curl virus**
- **Bacterial wilt**
- **Antioxidants**
- **Heat tolerance**



Breeding Priorities

Pepper

- **Anthracnose**
- **Viruses**
- **Phytophthora blight**
- **Heat tolerance**



Breeding Priorities

Cucurbits

- **Diseases/Insects**
- **Landraces**
- **Export markets**
- **Nutraceuticals**



Breeding Priorities

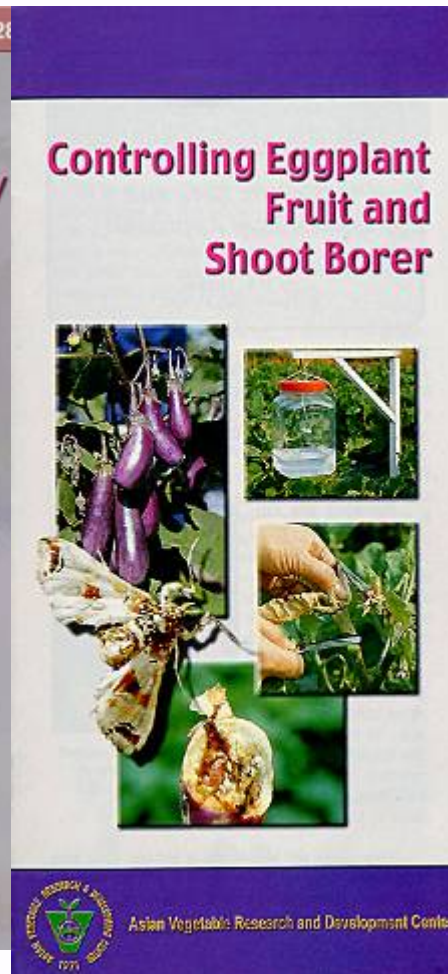
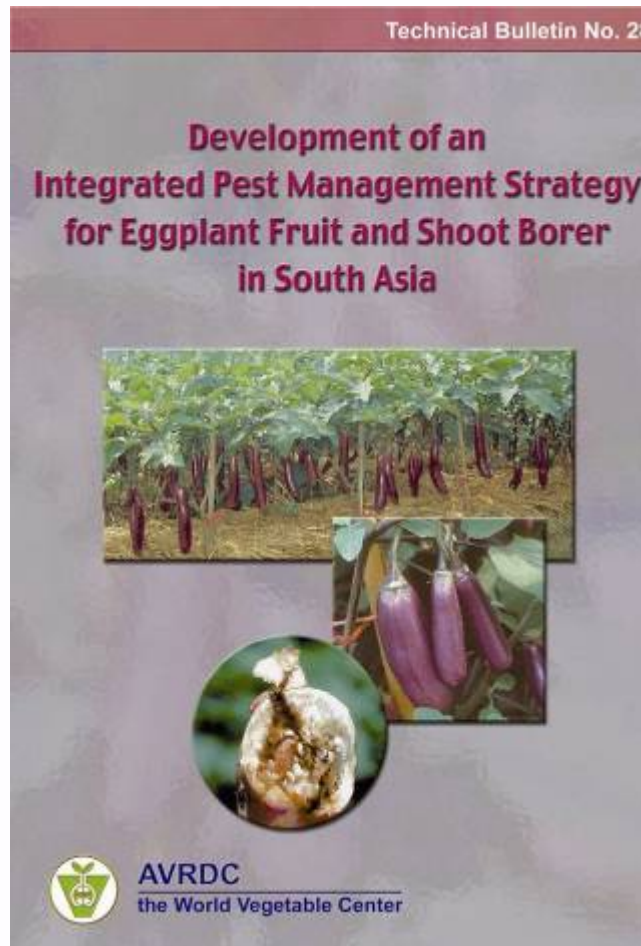
Misc.

- **Onion storage**
- **Indigenous leafy vegetables**
- **Anti-oxidants**
- **Summer broccoli**





Integrated Pest-Management

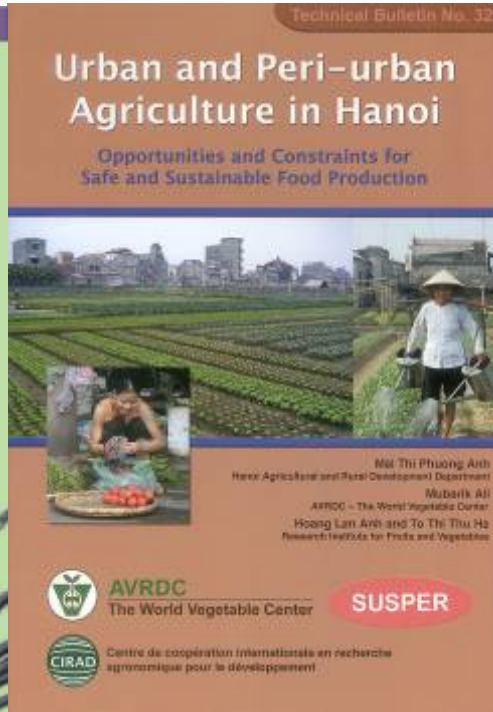
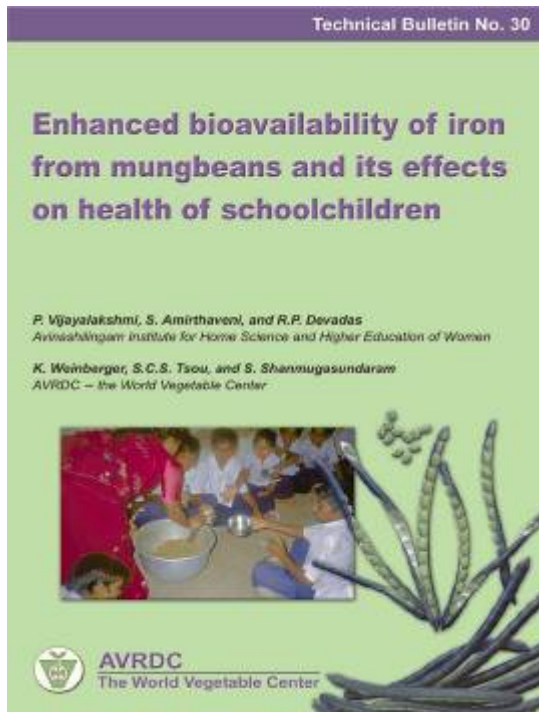


1. Biological control
2. In-host plant resistance
3. Cop Management strategies
4. Optimizing the chemical use





Economics and Nutrition



1. Dynamism in the horticulture sector
2. Ex-ante and ex-post Impact of vegetable and vegetable technologies (income, employment, nutrition, etc.)
3. Role of vegetables in the farming system (peri-urban, rice-based, upland).
4. Prioritization of horticulture research.
5. Methods to enhance bioavailability from vegetables



CROP MANAGEMENT



Develop sustainable vegetable technologies which can enhance small farmers income without damaging environment

(Organic Agriculture)

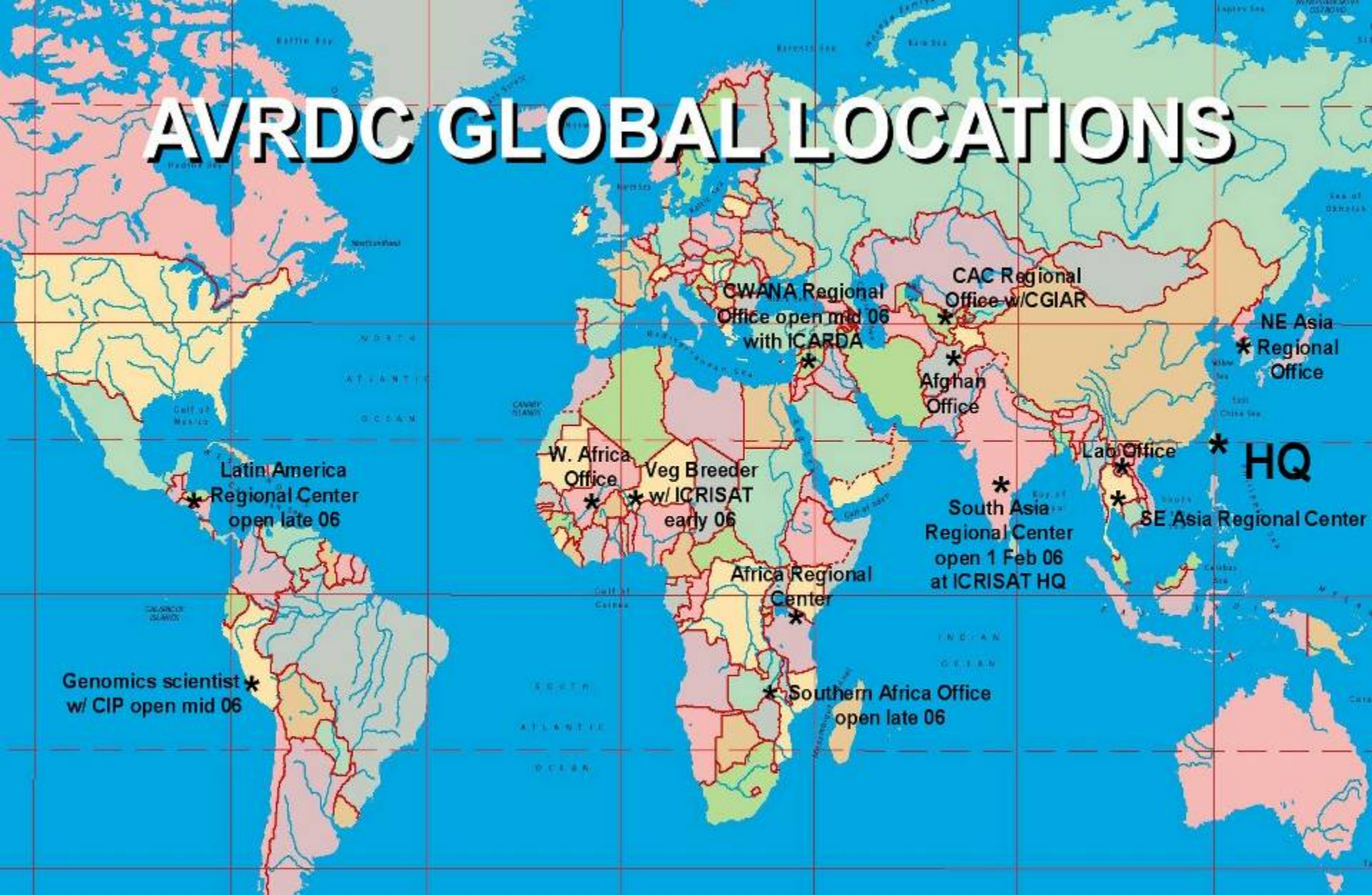




Training Activities

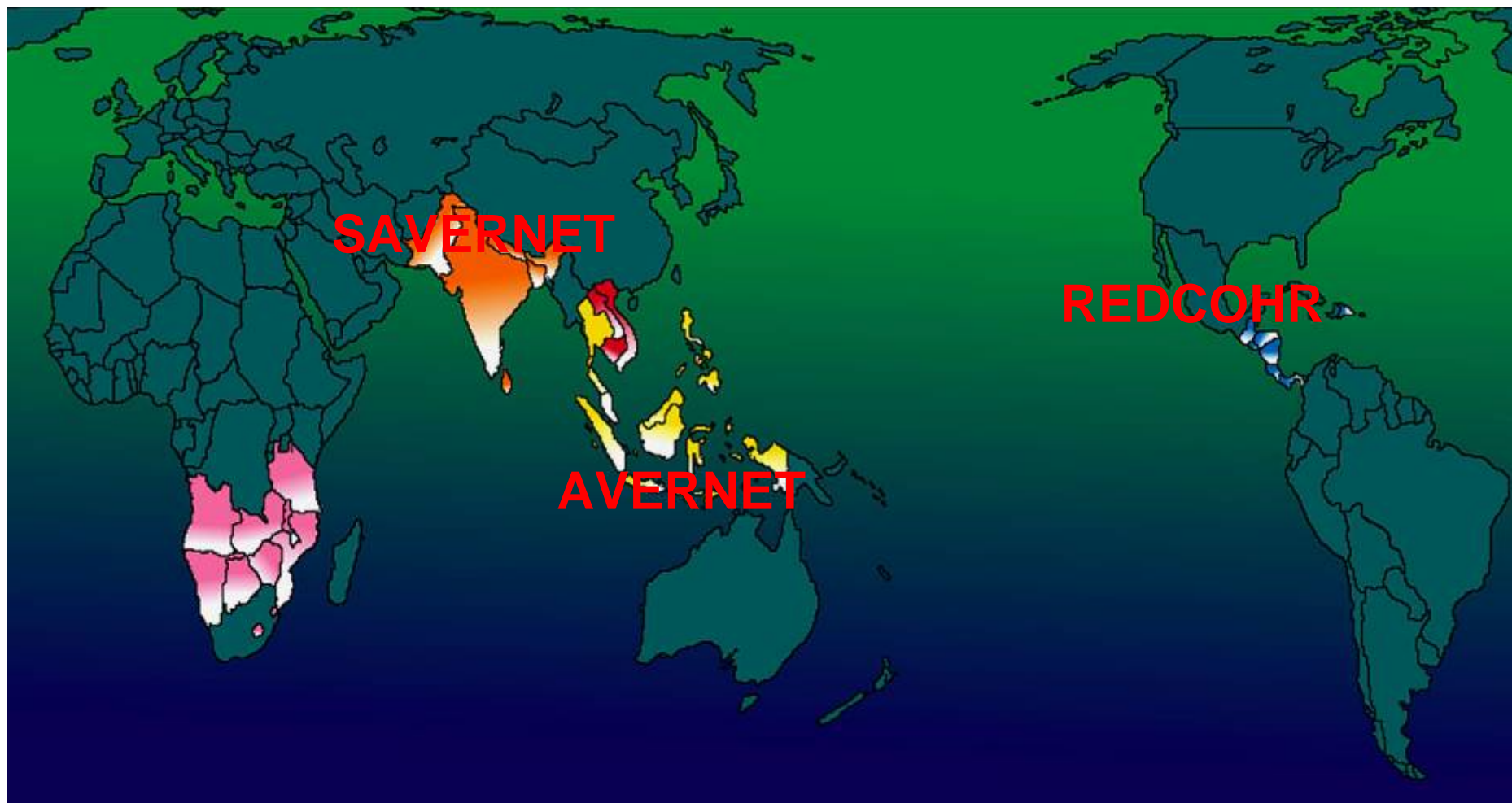


AVRDC GLOBAL LOCATIONS





MULTILATERAL NETWORKING





Private Sector

Another link connecting AVRDC with farmers

- 72% of vegetable seed companies in Asia use improved lines from AVRDC
- APISA, Bayer, CropLife fund research





ACHIVEMENTS





ACHIEVEMENTS OF AVRDC RESEARCH

Germplasm

Accession collected = 49339

No. of species = 343

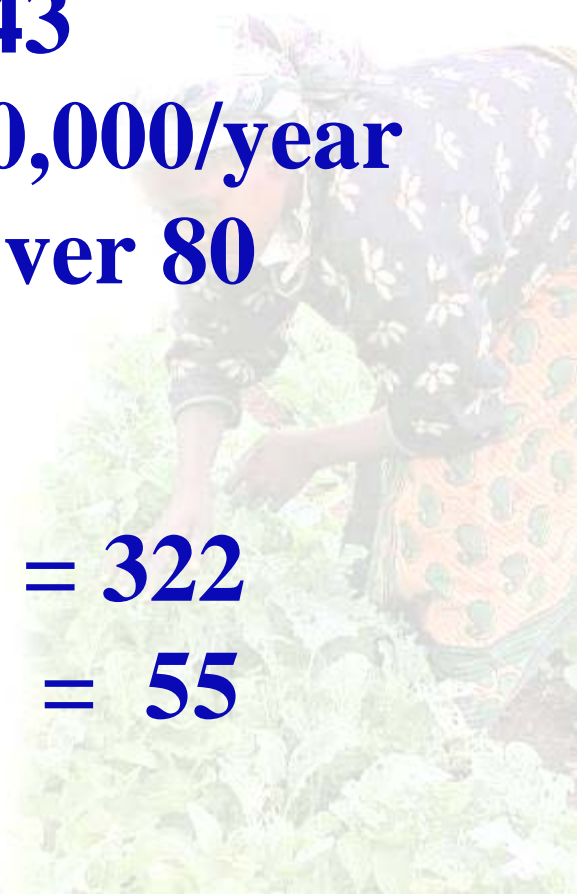
Package distributed = 20,000/year

No. of countries = Over 80

Varieties released

No. of varieties released = 322

No. of countries = 55





ACHIEVEMENTS OF AVRDC RESEARCH



**Multiple
Disease
Resistant,
high
yielding,
and mildly
pungent
Chili
Varieties**





ACHIEVEMENTS OF AVRDC RESEARCH

Heat Tolerant

Tomato





ACHIEVEMENTS OF AVRDC RESEARCH

Cherry Tomato



ACHIEVEMENTS OF AVRDC RESEARCH

Processing Tomato



ACHIEVEMENTS OF AVRDC RESEARCH

High-Beta Carotene Tomato



ACHIEVEMENTS OF AVRDC RESEARCH

Heat Tolerant Cabbage





ACHIEVEMENTS OF AVRDC RESEARCH



**High
Yielding
Vegetable
Soybean**





ACHIEVEMENTS OF AVRDC RESEARCH



High yielding,
YMV
Resistant,
Short
Duration, and
synchronized
Mungbean
Varieties





ACHIEVEMENTS OF AVRDC RESEARCH



**AVRDC's grafting
method**

**570,000 grafted tomato
seedling during 2000
valued at 2.3 million
NT\$**





ACHIEVEMENTS OF AVRDC RESEARCH

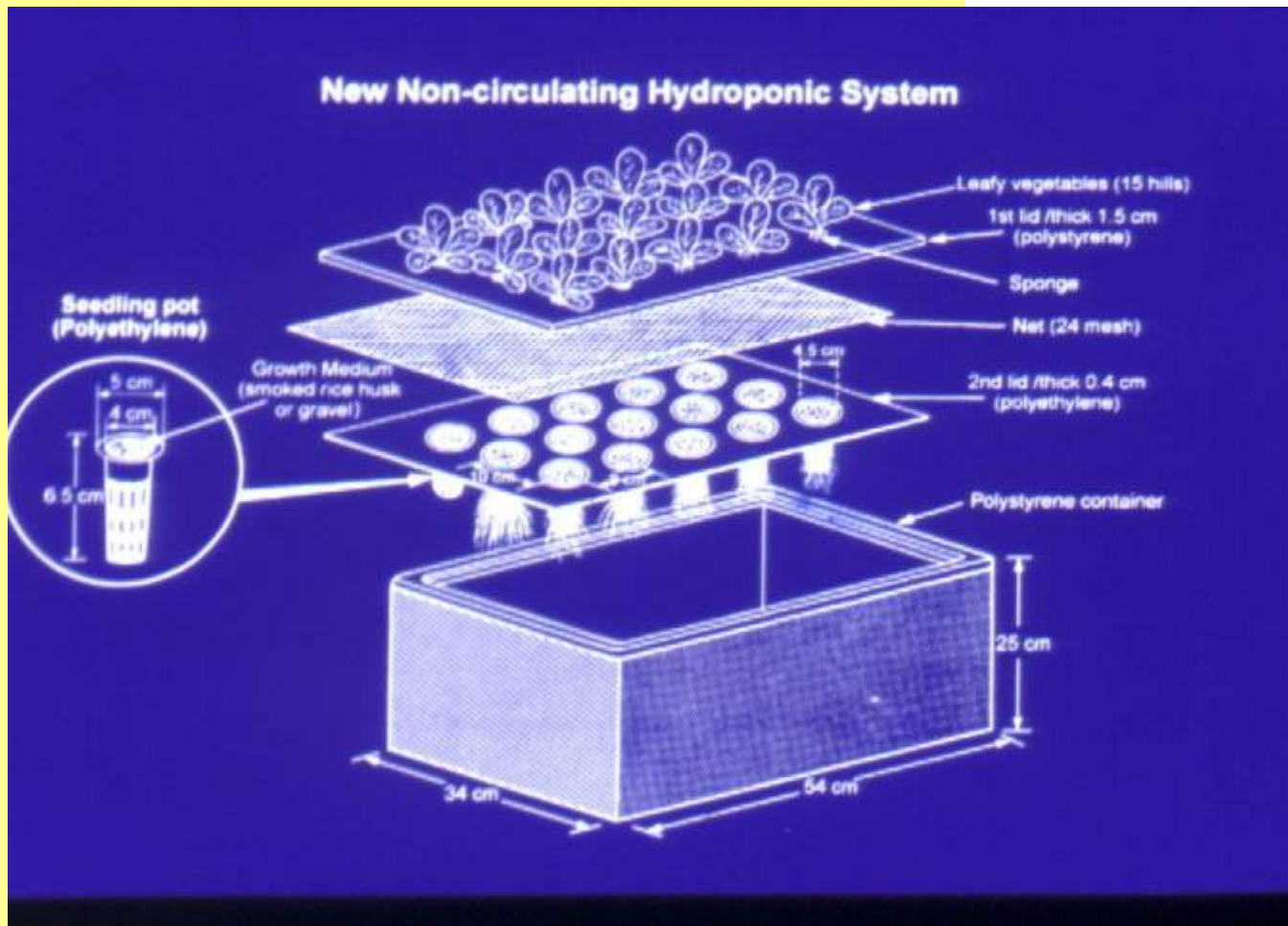
Grafted cherry tomato with eggplant rootstock in net house





ACHIEVEMENTS OF AVRDC RESEARCH

Non-circulating Hydroponics for Small farmers



ACHIEVEMENTS OF AVRDC RESEARCH

Diamondback moth



Parasite of DBM





ACHEIVEMENTS OF AVRDC RESEARCH

Training the national partners

- *Training at ARC/AVRDC*
- *On the job training*

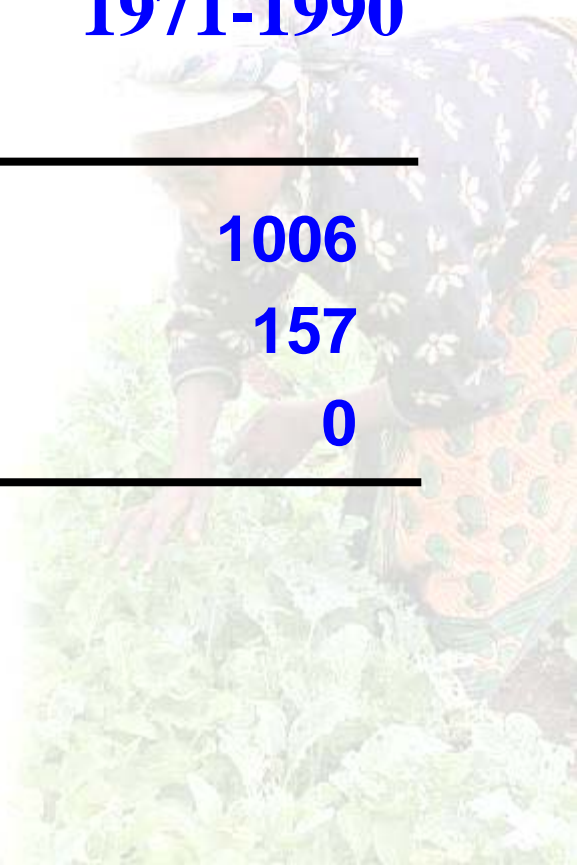




ACHEIVEMENTS OF AVRDC RESEARCH

Number of trainees trained

Headquarter/ Regional Center	1991-2000	1971-1990
Headquarter	1028	1006
ARC, Thailand	272	157
RCA, Arusha	608	0





Tsunami Relief Project



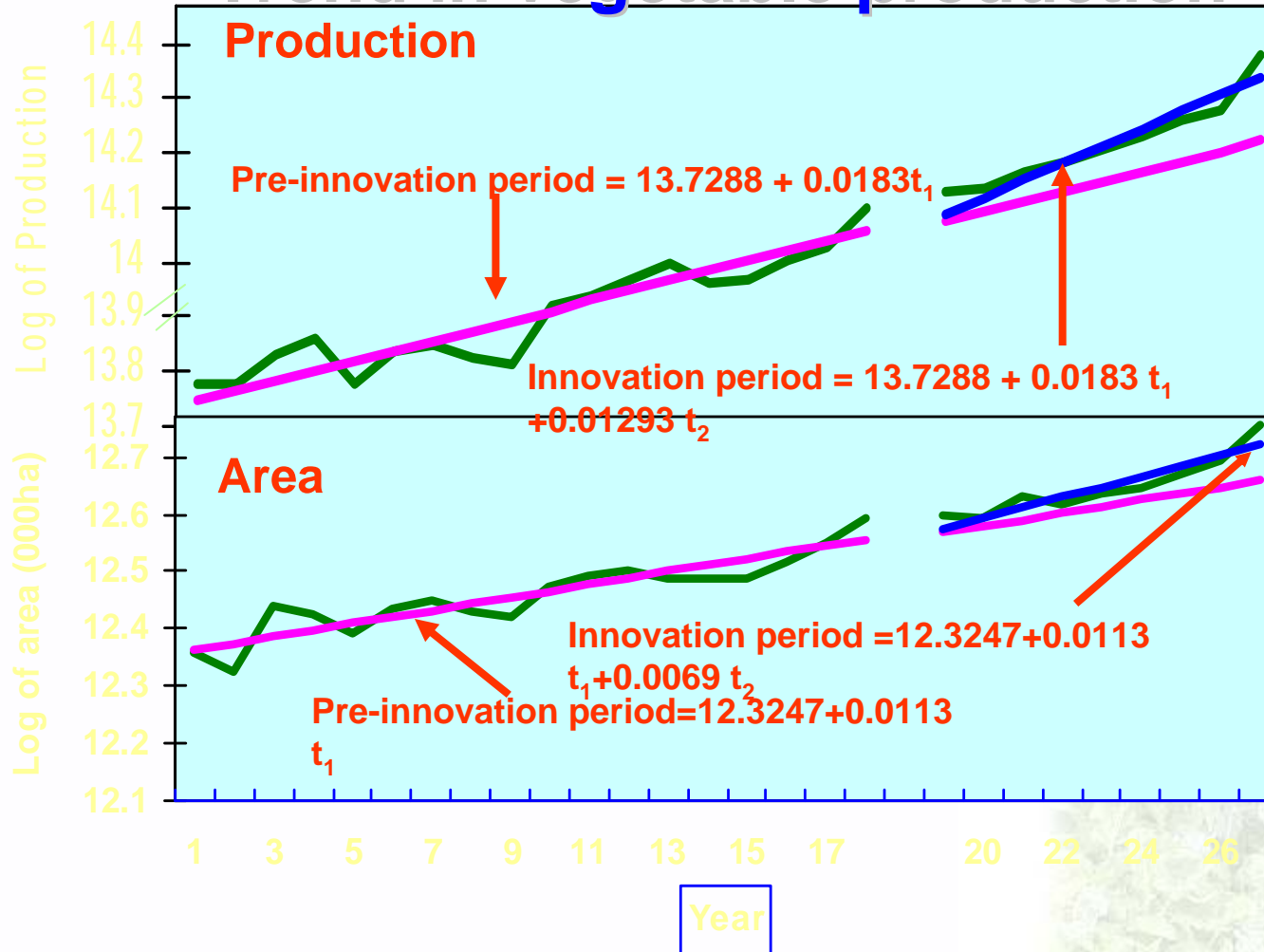


IMPACT



Impact of AVRDC in Bangladesh

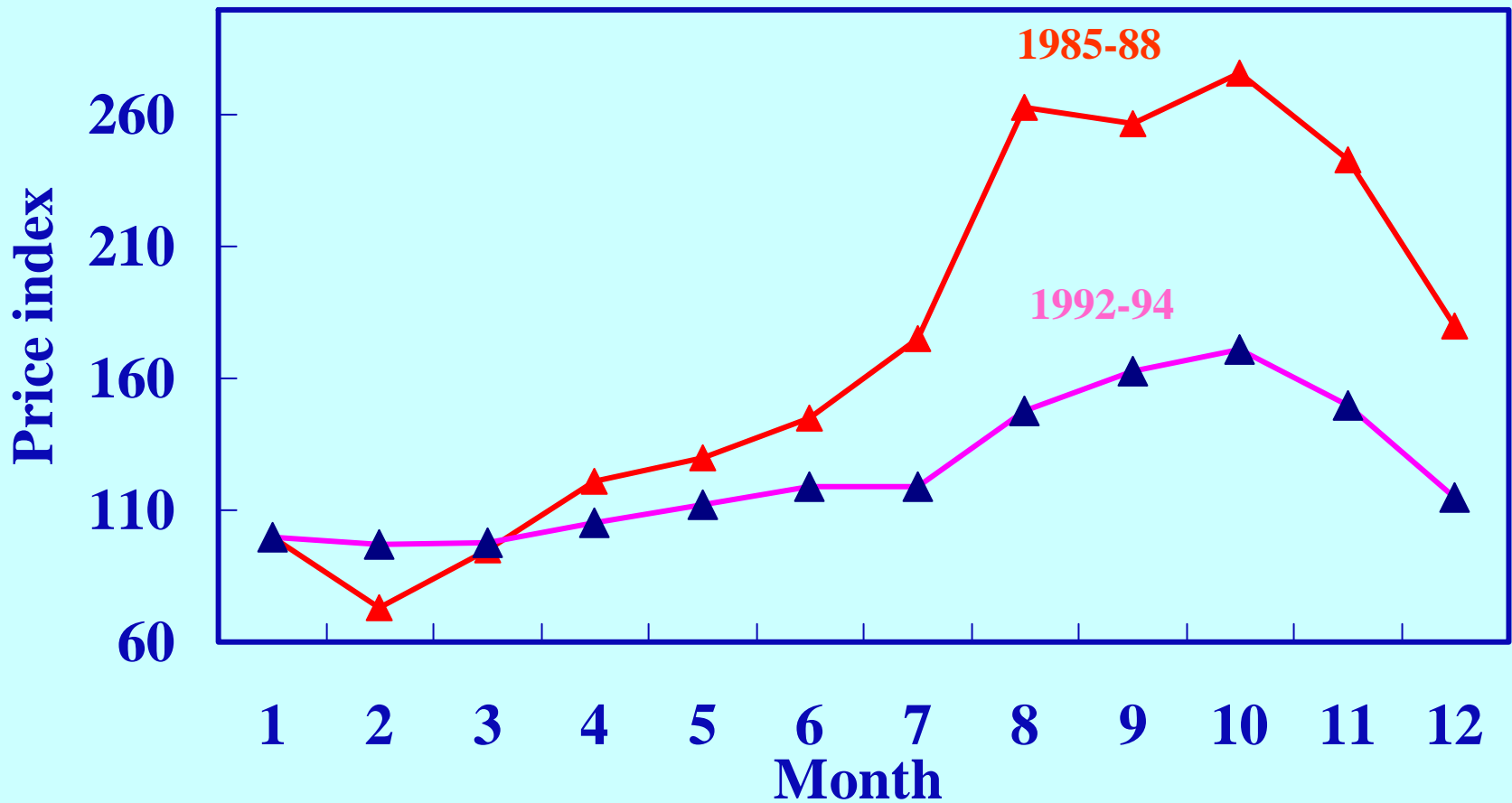
Trend in vegetable production





IMPACT OF VEGETABLE RESEARCH

Improvement in seasonal vegetable supply in Taiwan





IMPACT OF AVRDC

- **25,000 vegetable gardening kits to Sri Lanka and Indonesia**

APSA donated 5,500 kg of seeds

Distribution by NARES





IMPACT OF AVRDC RESEARCH

Economic surplus

IARC	Economic surplus in billion US\$		
	Producers	Consumers	Total
AVRDC	8.422	9.461	17.8
IRRI	3.020	6.221	9.2
ICRISAT	0.799	0.516	1.3

Source: Asian Development Bank (2000)



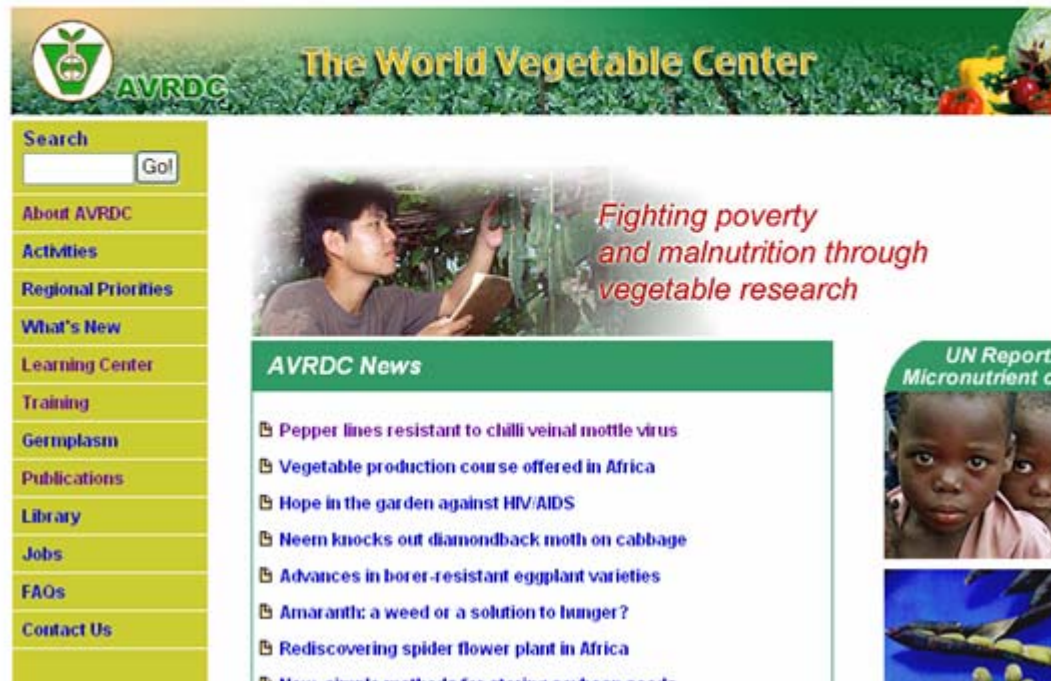
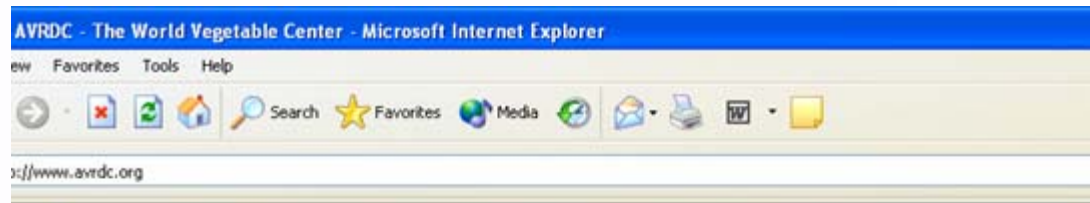


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Fighting poverty and malnutrition through vegetable research

AVRDC News

- Pepper lines resistant to chilli veinal mottle virus
- Vegetable production course offered in Africa
- Hope in the garden against HIV/AIDS
- Neem knocks out diamondback moth on cabbage
- Advances in borer-resistant eggplant varieties
- Amaranth: a weed or a solution to hunger?
- Rediscovering spider flower plant in Africa
- New, simple methods for storing sweet potatoes

UN Report: Micronutrient cr





Thank you



Illustrated Issues





Indigenous Vegetables



GMOs

A photograph showing two men in a rural agricultural setting. The man on the left, wearing a striped shirt and glasses, is kneeling and holding a small amount of seeds in his hands. The man on the right, wearing a yellow shirt, is also kneeling and looking at the seeds. They are surrounded by green crops and a blue tarp. In the background, there are trees, a thatched structure, and a brown cow. The text "Seed Production and Quality" is overlaid on the image in a white box with black text.

Seed Production and Quality



Seed Sources



OP vs Hybrid



Pesticides Misuse

CYPERMETHRIN 10% E.C.

SUPERKILLER-10

..... SYNTHETIC PYRETHROID INSECTICIDE

साइपरमेट्रिन १०% ई.सी.

सुपरकिलर-१०

..... संश्लिष्ट पाइरिथाइड कीटनाशक



REG. NO.
गिर. नं.
MFG. LIC. NO.
बनारों नं. सं.
BATCH NO.
बैच नं.
MFG. DATE
बनारों की ति.
EXPIRY DATE
समाप्ति की ति.
MAX. RETAIL
PRICE IN
INCL. TAX

20% 200
100 मि.ली.
30 %
100 %
400 001.



DIMETHOATE 30% EC

INSECTICIDE कीटनाशक

A systemic organophosphorus insecticide with a broad spectrum of biological activity.
Mfg. Lic. No. : Aundipatti 213/82
Registration No. 5-29 (43)/
Dimethoate (EC)-84
NET CONTENT/VOLUME : 100 ml

Composition	m/m
Dimethoate content	30%
Emulsifiers, Solvents, etc.	Q.S.
	100%

• Inflammable • Keep out of reach of Children • Keep away from heat and open flame • Destroy

डाइमिथोएट

R



Diseases



Insects





Year-round and Protected Production



Transportation



Post Harvest & Marketing Chain



बाहर

चौ. हीरा सिंह थोक सब्जी मंडी, आजादपुर, दिल्ली
CH. HIRA SINGH WHOLESALE VEGETABLE MARKET, AZADPUR, DELHI

OUT

Cold Chain



Supermarkets



Traditional Markets



New Initiatives

- Organic vegetable production
- Cucurbit & onion breeding
- Private Sector Partners
- Global Horticultural Needs Assessment – Hort CRSP
- **Global Horticulture Initiative**





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- Rediscovering spider flower plant in Africa
- New, simple methods for storing sweet potatoes

UN Report: Micronutrient cr





Thank you





A Growing Center

New Scientists and Management



Jackie Hughes
DDG - Research



Chang Yin-fu
DDG - A&S



Leonidas Fereol
CIRAD Allium
Embryologist



Hidekazu Sasaki
JIRCAS Functional
Properties of IV



R. Srinivasan
Post-Doc
Entomology



Manuel Palada
Head
Crop Management



M. Takahashi
JIRCAS Legume
Breeding



Virginie Levasseur
Mali Coordinator
AVRDC-WARDA



R. Mavlyanova
Central Asia
Coordinator



Peter Juroszek
Organic Veg
Production



Ehsanullah Ehsan
Afghanistan
Coordinator



**IPM Outreach
Coordinator**