# Dietary diversity, global change, and human health

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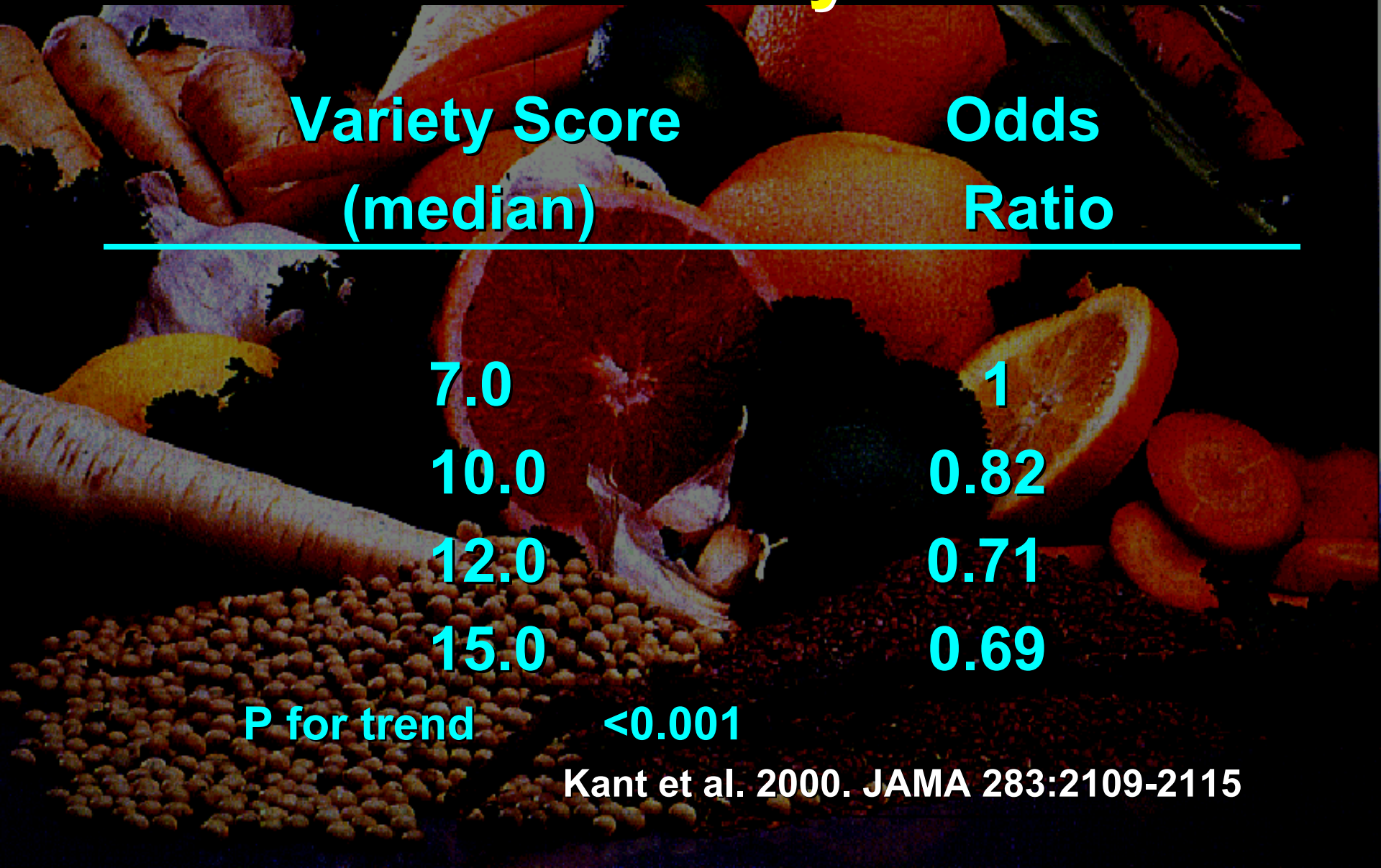
CINE

McGill


Dietary Diversity = Health

# Dietary Diversity & Health
# -Mortality-



| Variety Score (median) | Odds Ratio |
|---|---|
| 7.0 | 1 |
| 10.0 | 0.82 |
| 12.0 | 0.71 |
| 15.0 | 0.69 |
| P for trend | <0.001 |

Kant et al. 2000. JAMA 283:2109-2115

# Dietary Diversity & Gastric Cancer

La Vecchia et al. 1997. *Int. J. Cancer* 72:255-257

| Vegetable diversity | Percentage of Cases | | Odds Ratio |
|---|---|---|---|
| # of items | Stomach cancer | Controls | |
| <5 | 39.9 | 29.4 | 1 |
| 5 | 18.0 | 18.1 | 0.8 |
| 6 | 19.4 | 19.3 | 0.8 |
| ≥7 | 22.7 | 33.2 | 0.5 |
| | | P for trend | <0.001 |


IMPO
Late Bottle

## FOSHU - Japanese Ministry of Health and Welfare

**Functional Foods**

**"Processed foods containing ingredients that aid specific bodily functions in addition to being nutritious".**

## FOOD AND DRUG ADMINISTRATION - USA

**ACCEPTABLE HEALTH CLAIMS**
- NLEA (1990)

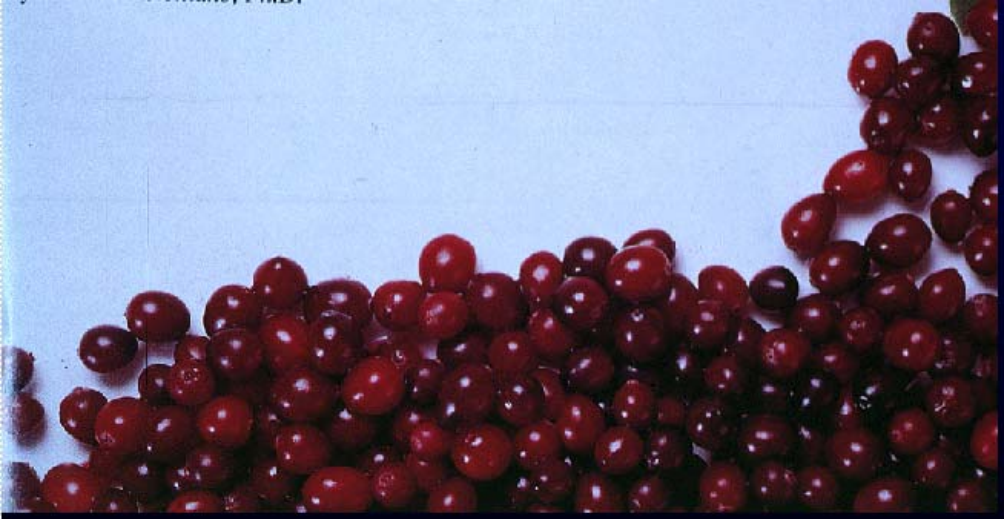
**http://vm.cfsan.fda.gov/-dms/fdhclm.html**


Cirkulin
Odourless
Garlic Pearls
standardized
180 pearls
Bioforce
MONTRÉAL, TORONTO, VANCOUVER
Bioforce

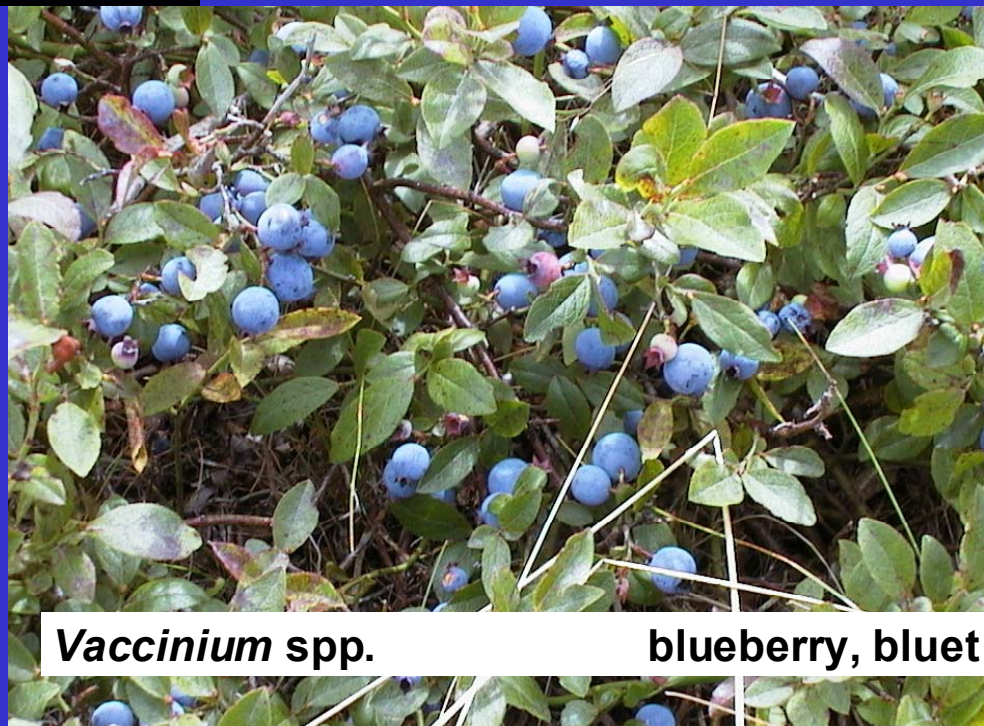

Soy Beverage
ORIGINAL
Enriched with vitamins and minerals
Rich in calcium
no cholesterol • no lactose
946 mL
ISOFLAVONES 50 mg PER SERVING


HEINZ
57
TWIN PACK
EMBALLAGE DUO
HEINZ
TOMATO
HEINZ
Pure
Tomato
Paste

# Urinary tract infections



*Vaccinium macrocarpon*
cranberry; canneberge



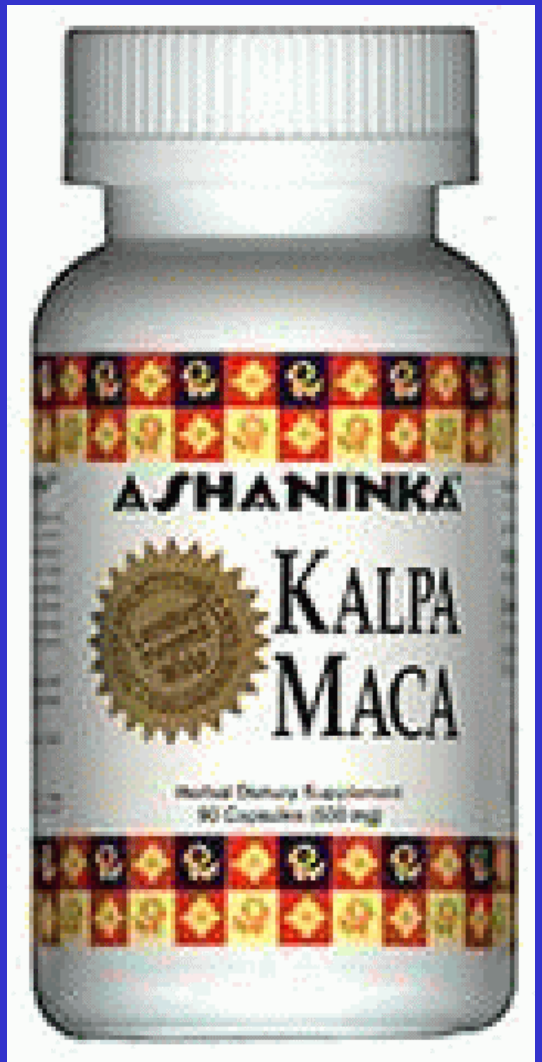
*Vaccinium* spp. blueberry, bluet

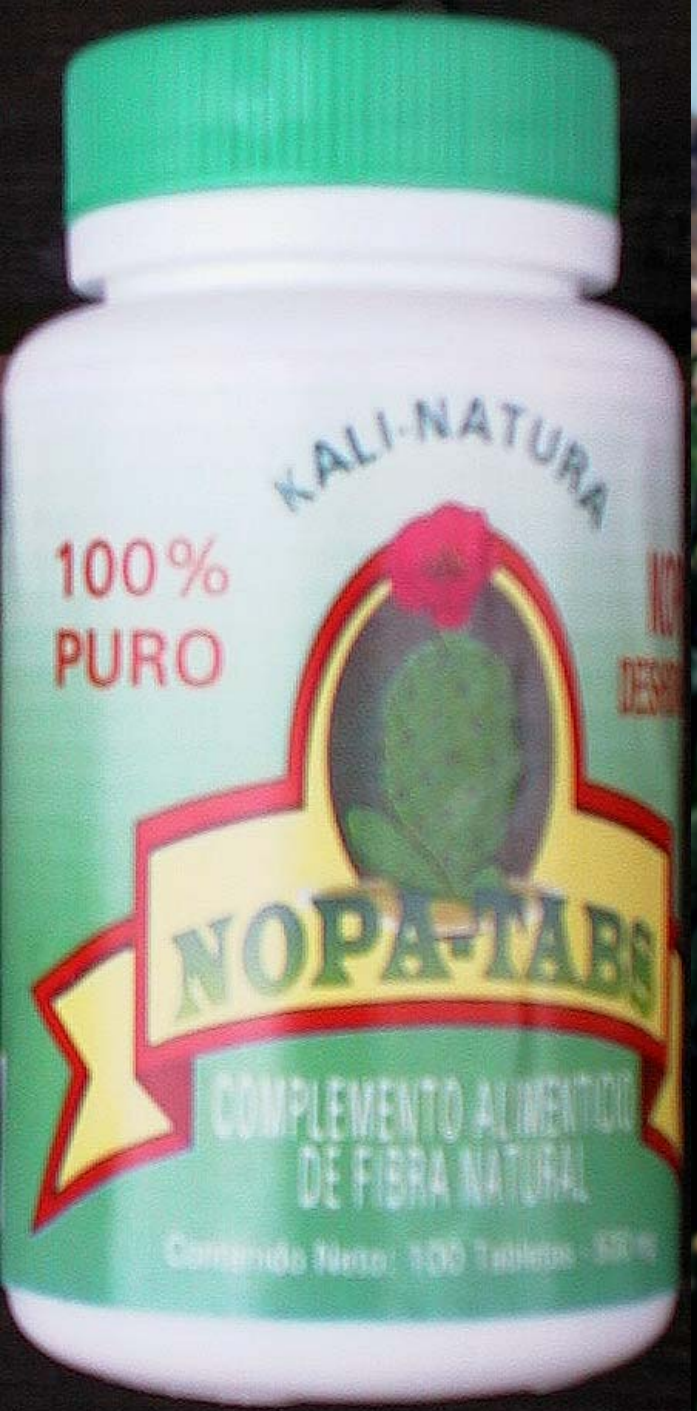
# *Lepidium meyenii*
# maca

Johns 1981. *Journal of Ethnobiology* 1:208-212.

Johns 1981. *Journal of Ethnobiology* 1:208-212.

# *Lepidium meyenii*
# maca
# ("Peruvian ginseng")






*Opuntia ficus-indica*

# Food Functionality for Developing Areas

?

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## CONSIDERATIONS

- traditional ecology

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- traditional ecology
- urbanization

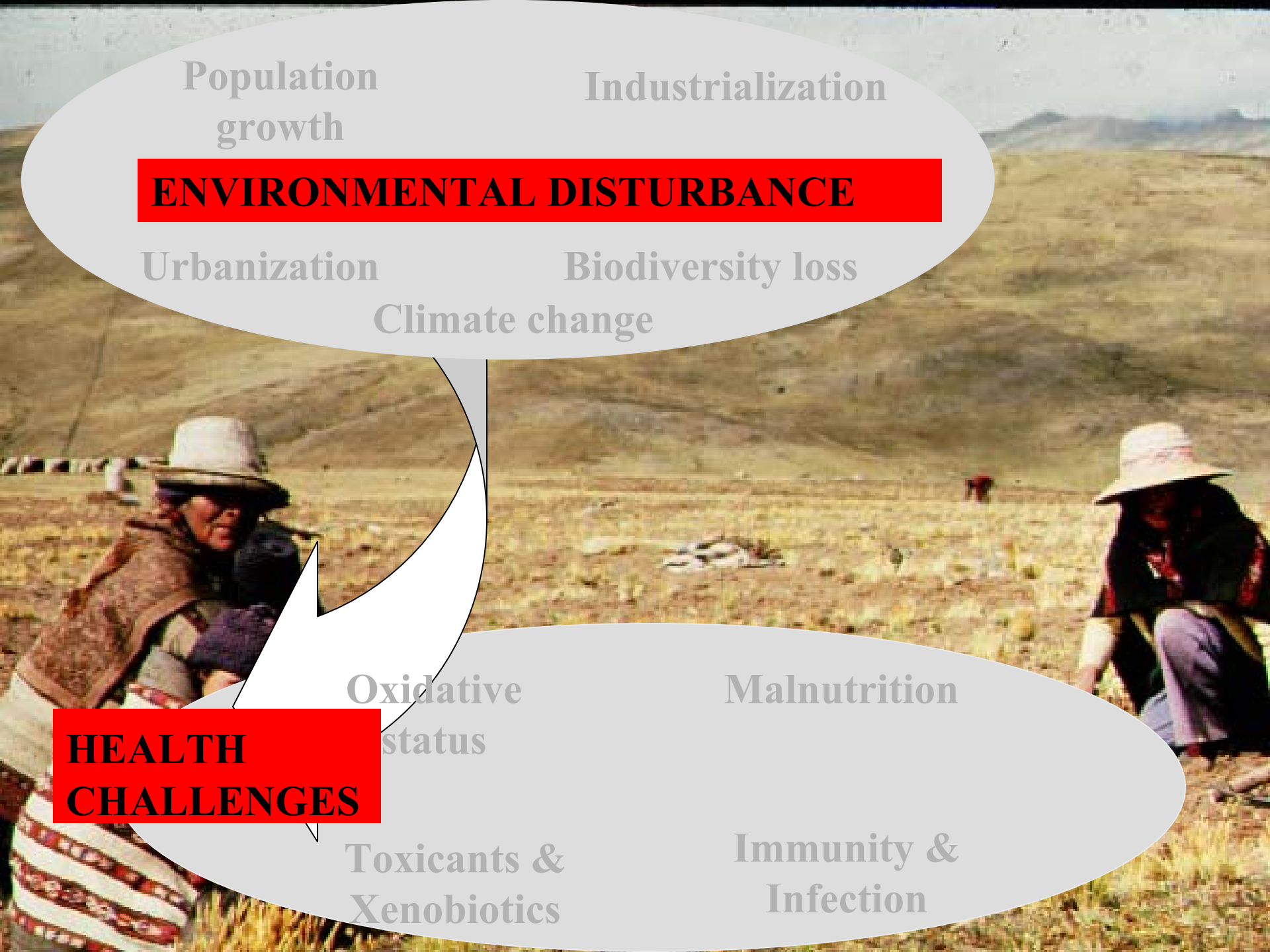
# Food Functionality for Developing Areas

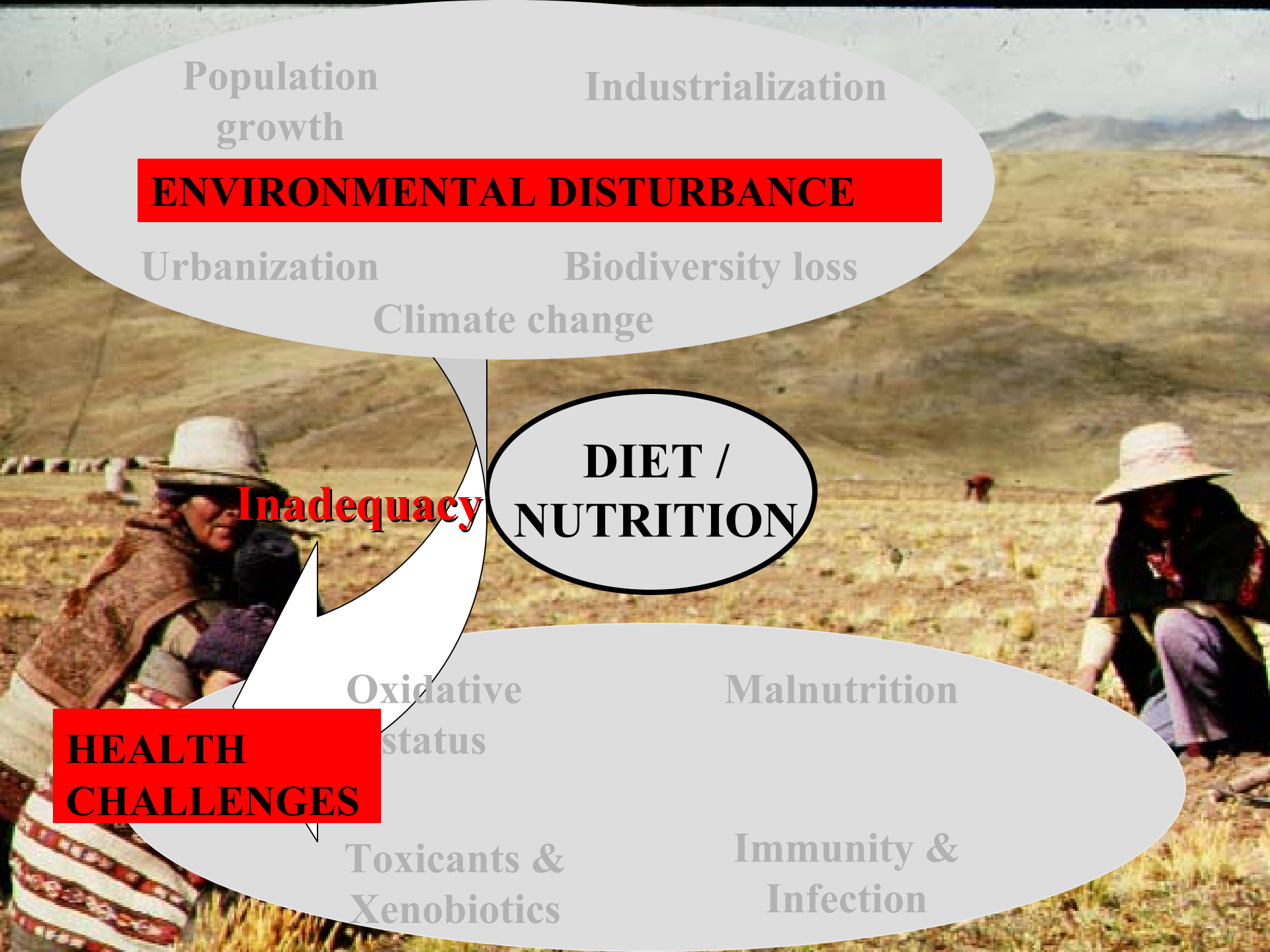
**CONSIDERATIONS**

- traditional ecology

➔ **dietary transition**

- urbanization


Population growth
Industrialization
ENVIRONMENTAL DISTURBANCE
Urbanization
Biodiversity loss
Climate change
Oxidative status
Malnutrition
HEALTH CHALLENGES
Toxicants & Xenobiotics
Immunity & Infection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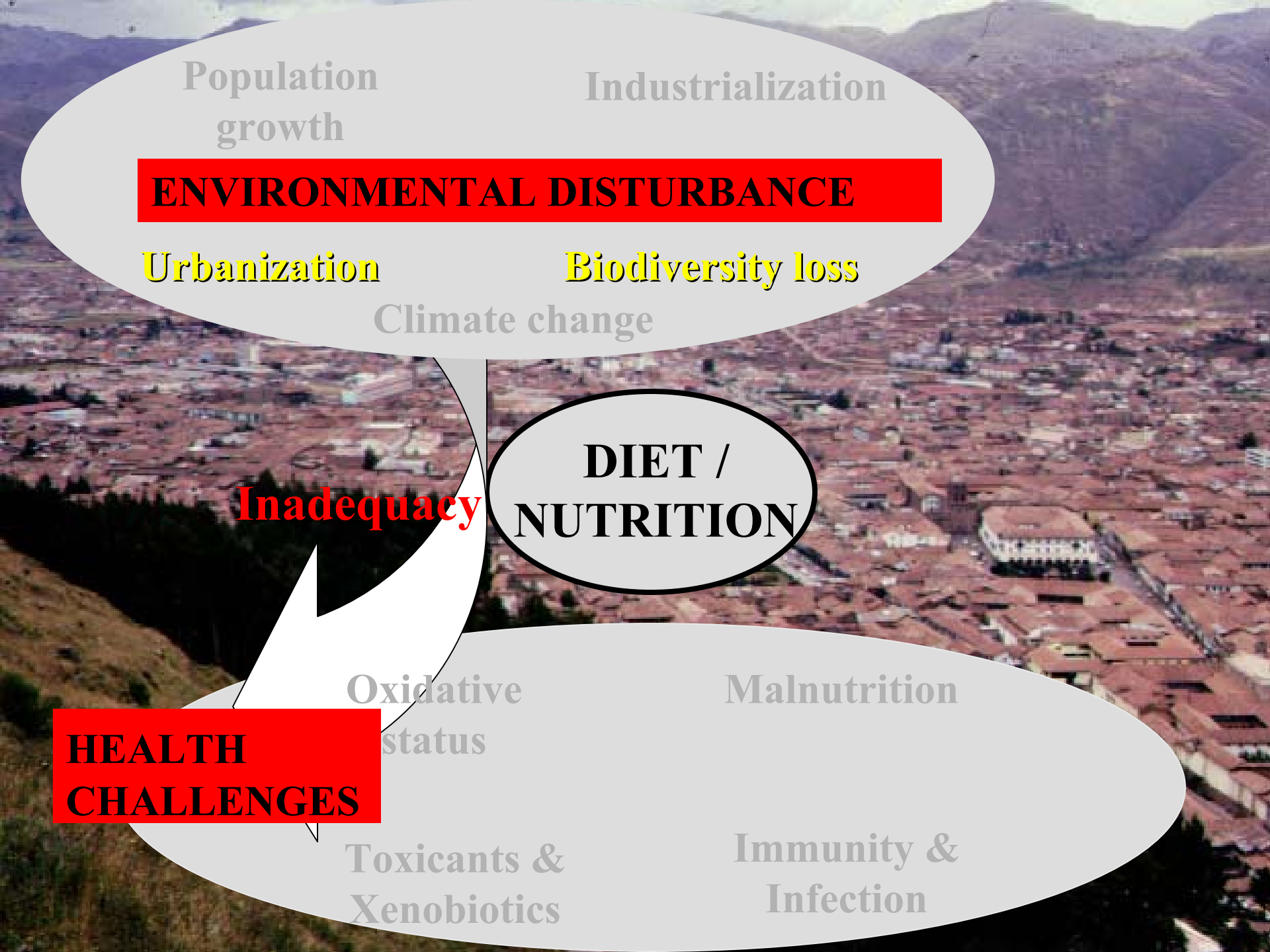
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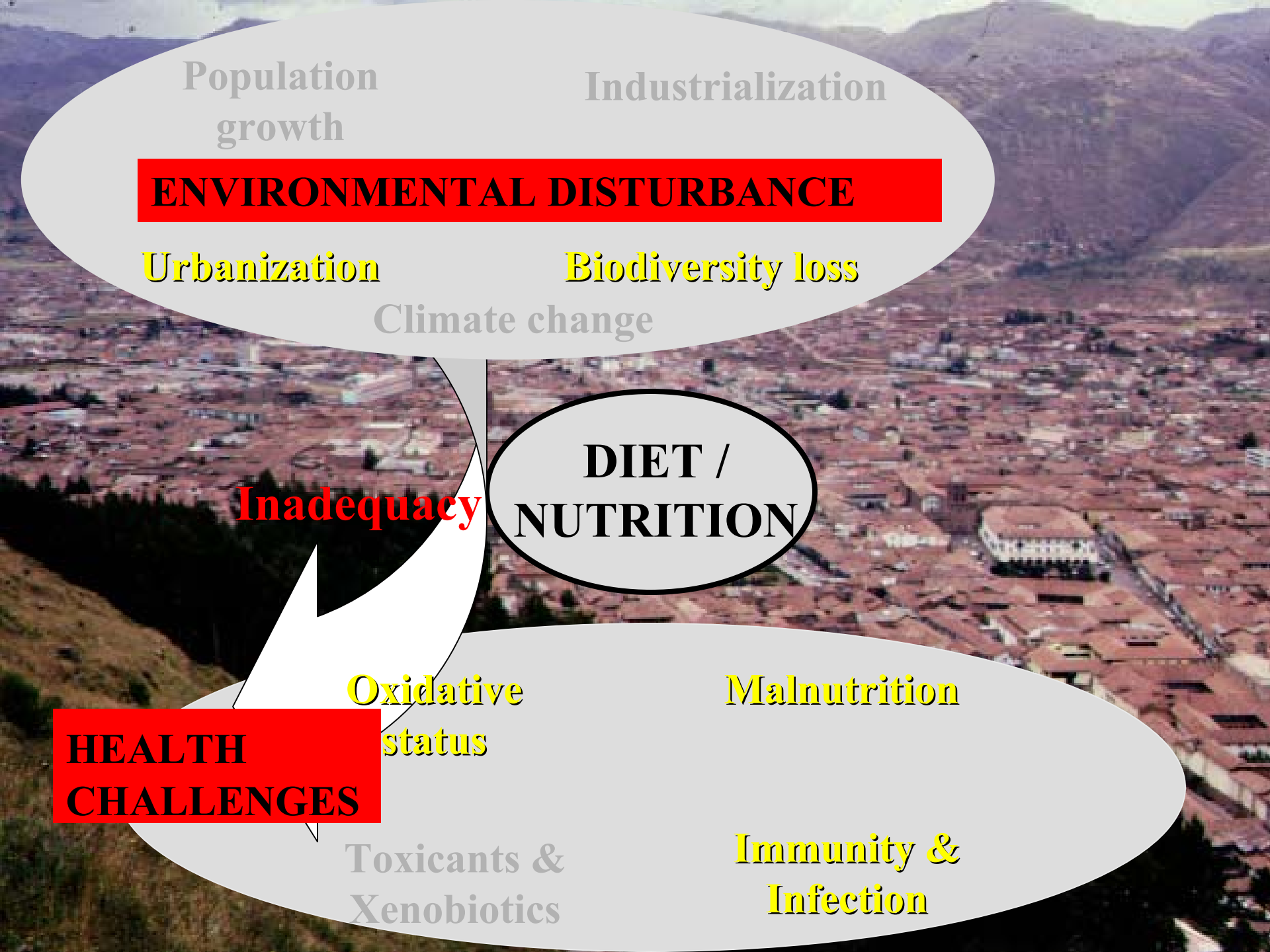
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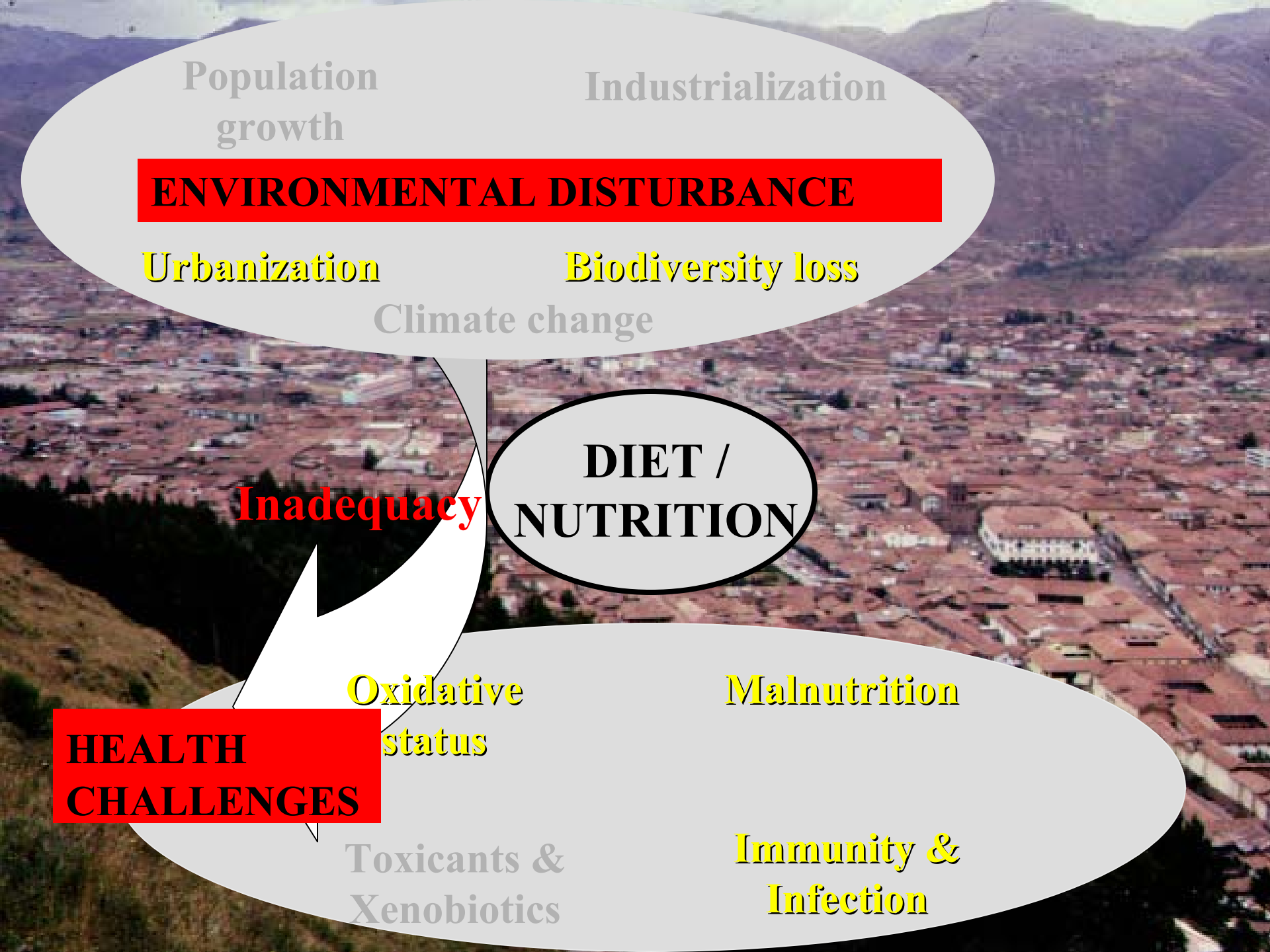
# Premature Mortality Rates (45-64 years of age/1000)
## Ratios Relative to Canada

| Country | CVD | Diabetes |
|---|---|---|
| Chile | 2.9 | 1.5 |
| Argentina | 4.4 | 2.0 |
| Mexico | 1.9 | 8.2 |
| Nicaragua | 4.6 | 4.7 |

Albala et al. 2001. *Nutrition Reviews* 59:170-176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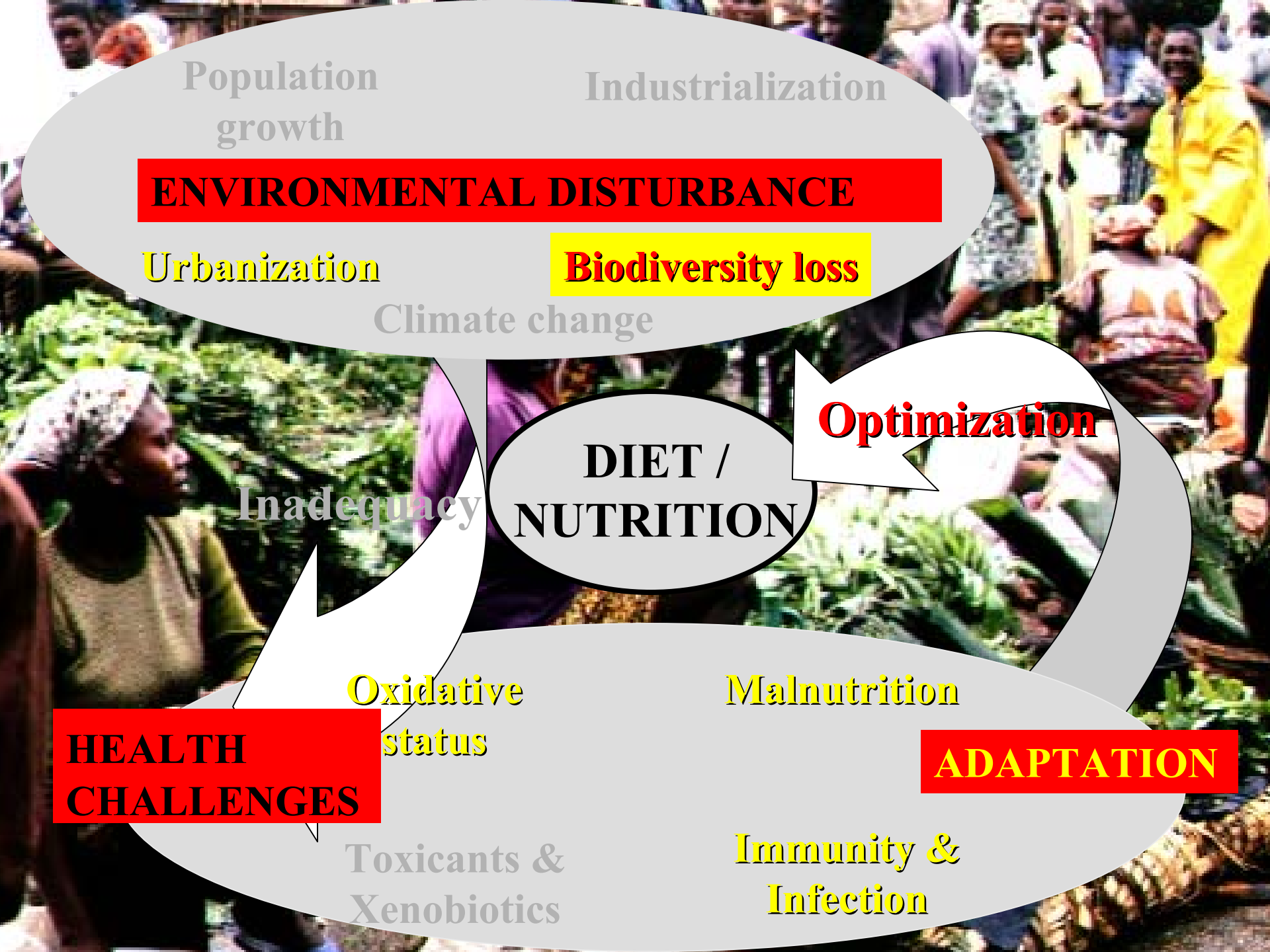
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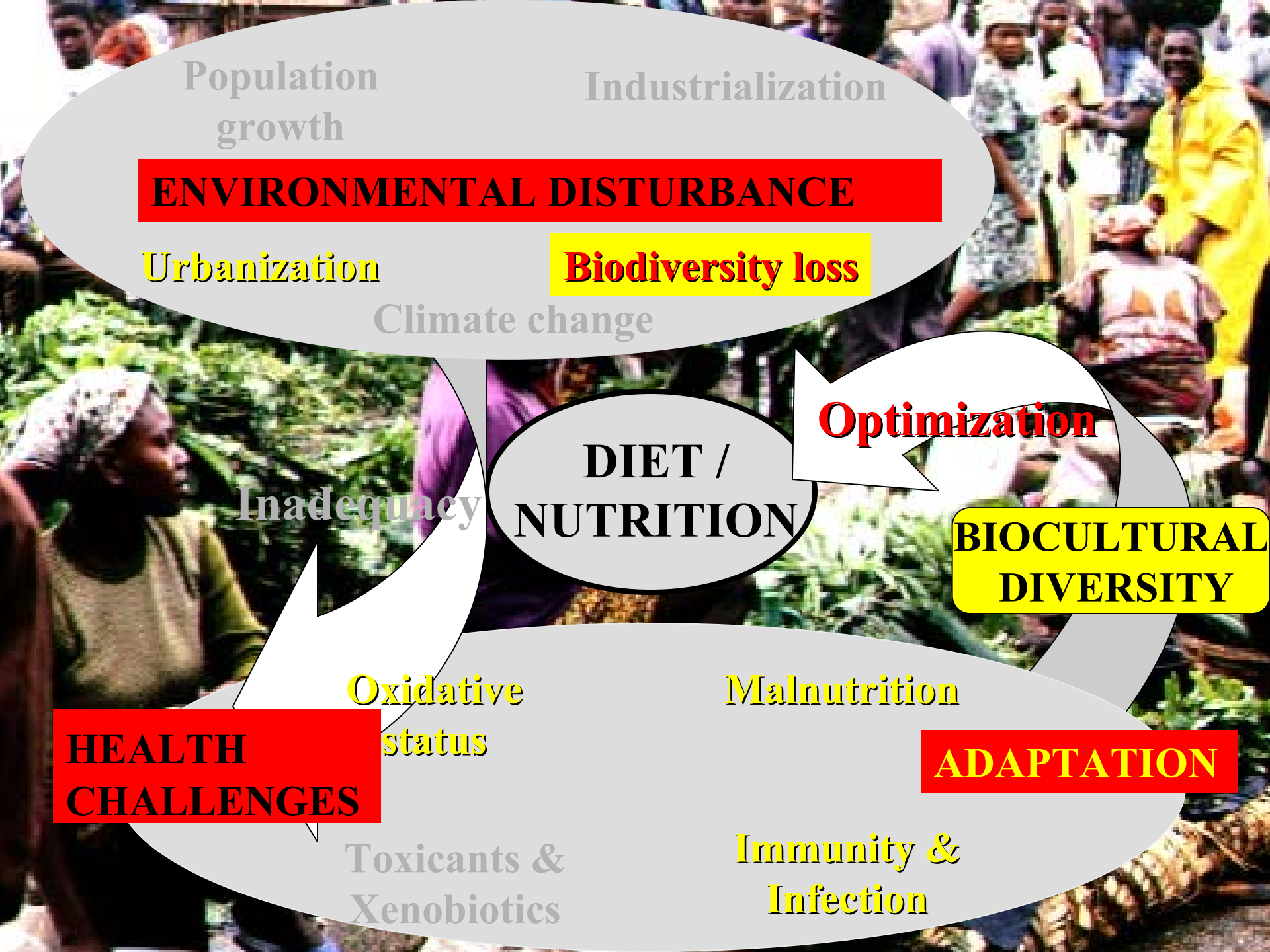
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# Functionality of Ingested Phytochemicals

- Nutrition
- Gastrointestional function
- Antioxidants
- Glycemic control
- Antibiotic
- Immunostimulant
- Nervous system
- Detoxification
- Anti-inflammatory / anti-gout

# Dietary Variety and Nutritional Adequacy in Mali

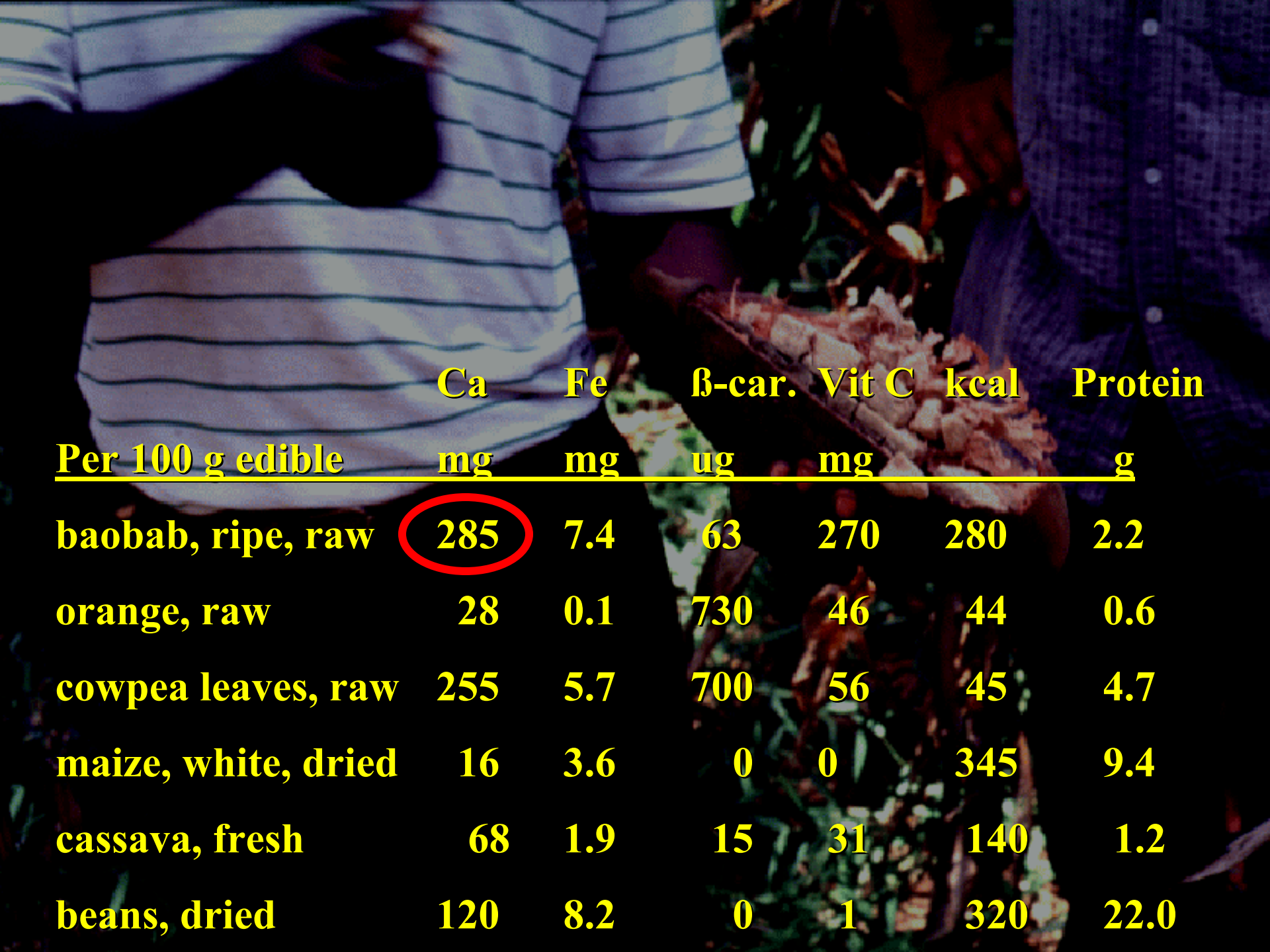
Hatløy et al. 1998. *European J. Clinical Nutrition* 52:891-898.

## Correlation Between Nutrient Adequacy Ratio (NAR) and Food Variety

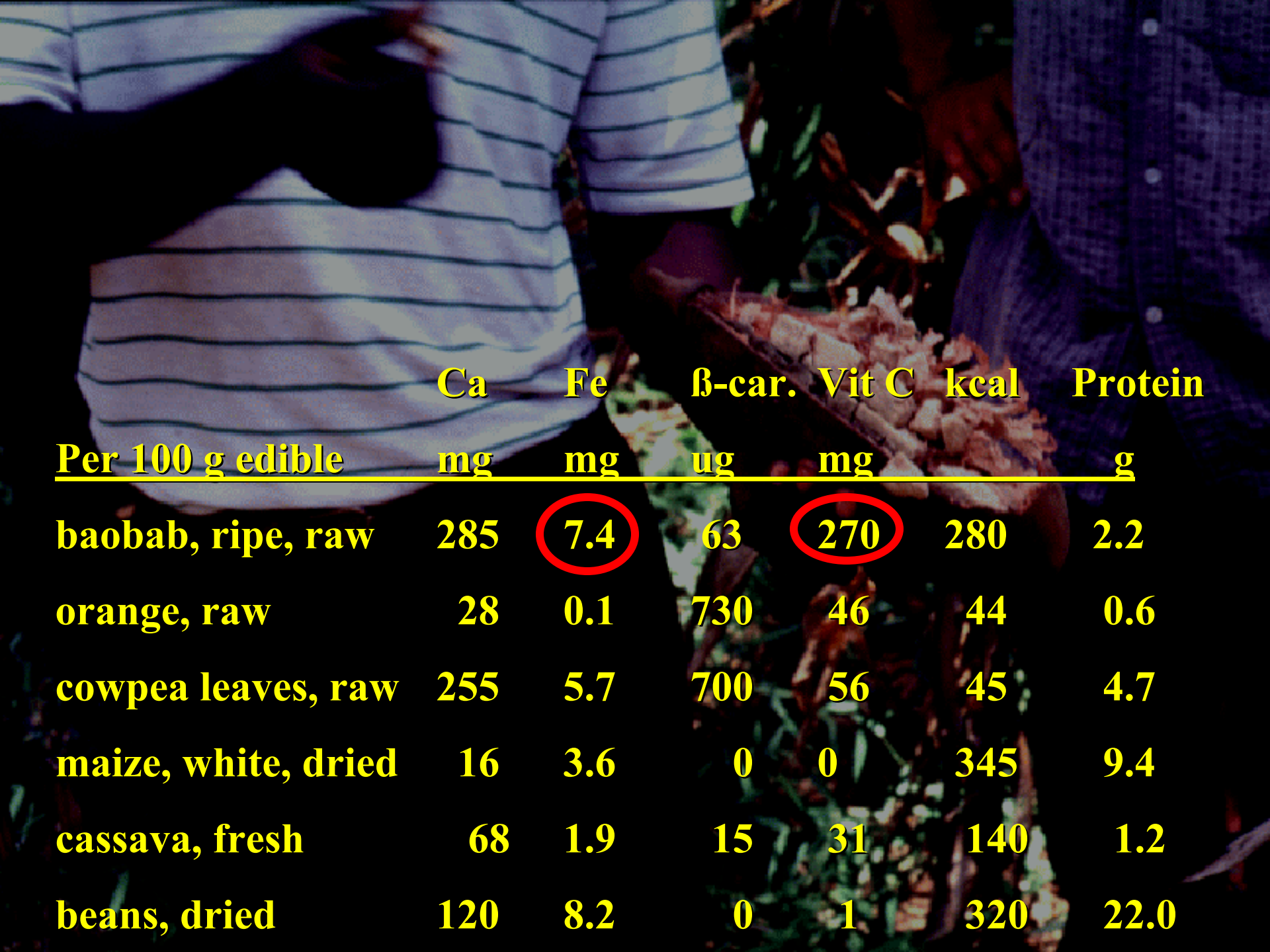
| NAR | Food Variety Score Correlation |
|---|---|
| Energy (MJ/d) | 0.01 |
| Fat Energy (%) | 0.29* |
| iron (mg/d) | -0.15 |
| vitamin C | 0.38** |
| vitamin A | 0.27* |
| Mean Adequacy Ratio (MAR) | 0.33** |

*Adansonia digitata*

**baobab**



| Per 100 g edible | Ca mg | Fe mg | ß-car. ug | Vit C mg | kcal | Protein g |
|---|---|---|---|---|---|---|
| baobab, ripe, raw | 285 | 7.4 | 63 | 270 | 280 | 2.2 |
| orange, raw | 28 | 0.1 | 730 | 46 | 44 | 0.6 |
| cowpea leaves, raw | 255 | 5.7 | 700 | 56 | 45 | 4.7 |
| maize, white, dried | 16 | 3.6 | 0 | 0 | 345 | 9.4 |
| cassava, fresh | 68 | 1.9 | 15 | 31 | 140 | 1.2 |
| beans, dried | 120 | 8.2 | 0 | 1 | 320 | 22.0 |



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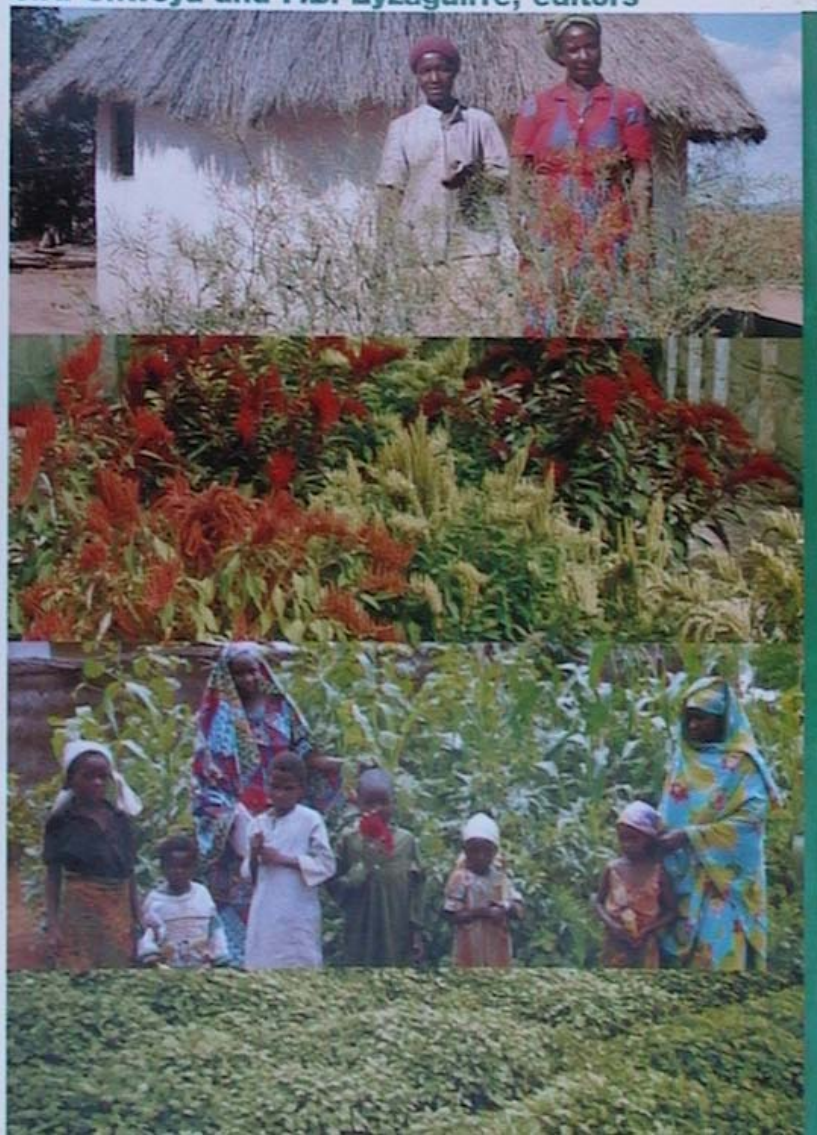
IPGRI

# The biodiversity of traditional leafy vegetables

J.A. Chweya and P.B. Eyzaguirre, editors

Netherlands Ministry of Foreign Affairs
Development Cooperation



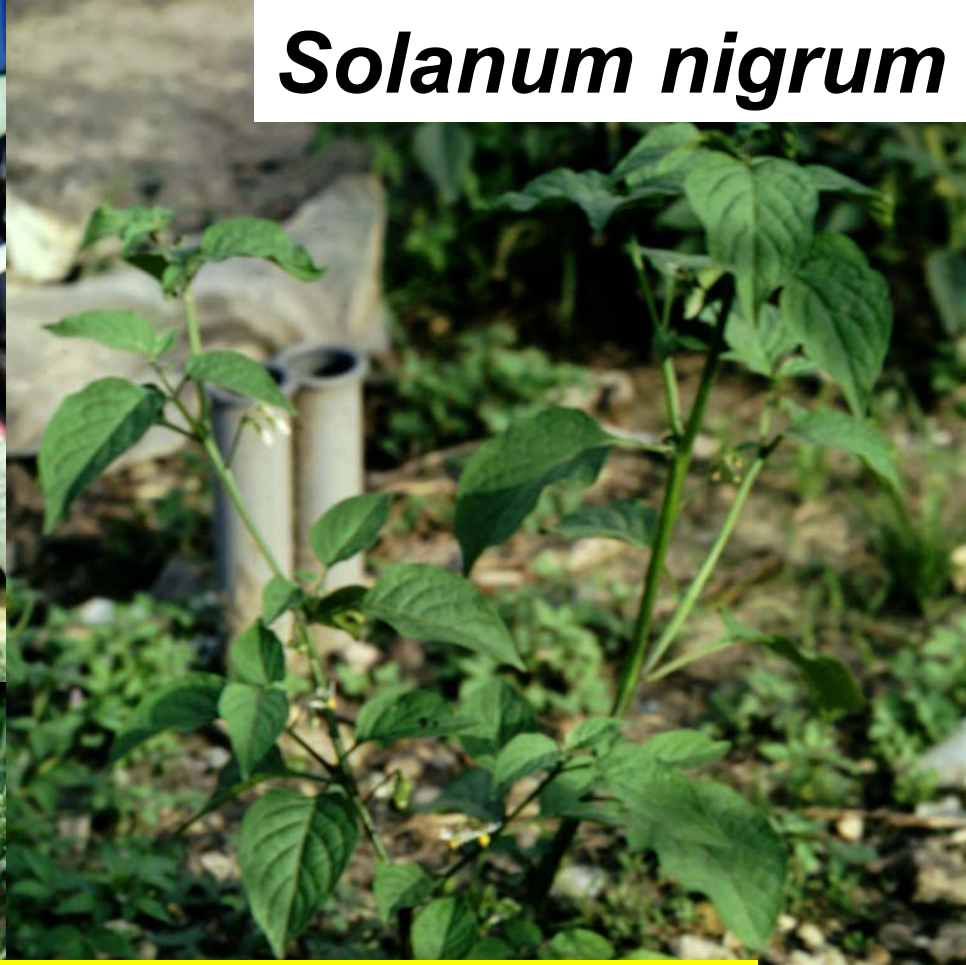
**> 4900 μg β-carotene per 100 g edible portion**

**Uiso and Johns, 1996. *Ecology of Food and Nutrition*, 35:59-69.**

***Crotalaria brevidens***

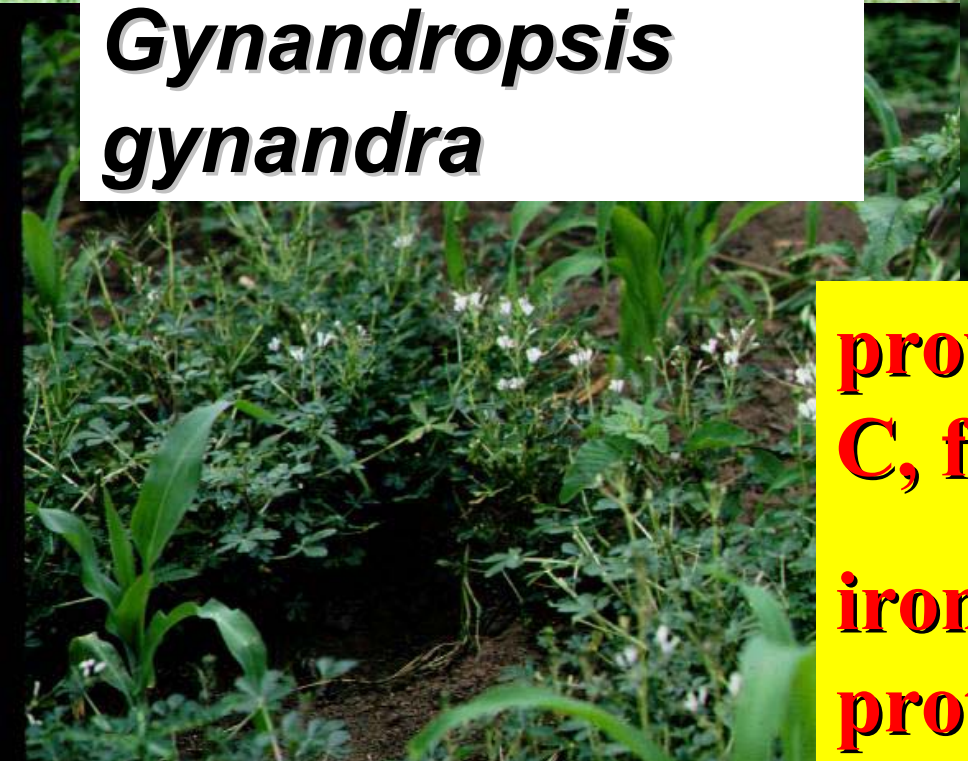
*Crotalaria brevidens*

*Solanum nigrum*



*Solanum nigrum*

*Gynandropsis gynandra*



**provitamin A, vitamin C, folate**

**iron, calcium, fibre, protein**

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- Antioxidants
- Glycemic control
- Hypolipidemic
- Antibiotic
- Immunostimulant
- Nervous system
- Detoxification
- Anti-inflammatory / anti-gout


# Anti-giardial activity

**Johns et al 1995.**

***Journal of Ethnopharmacology* 6:17-23.**

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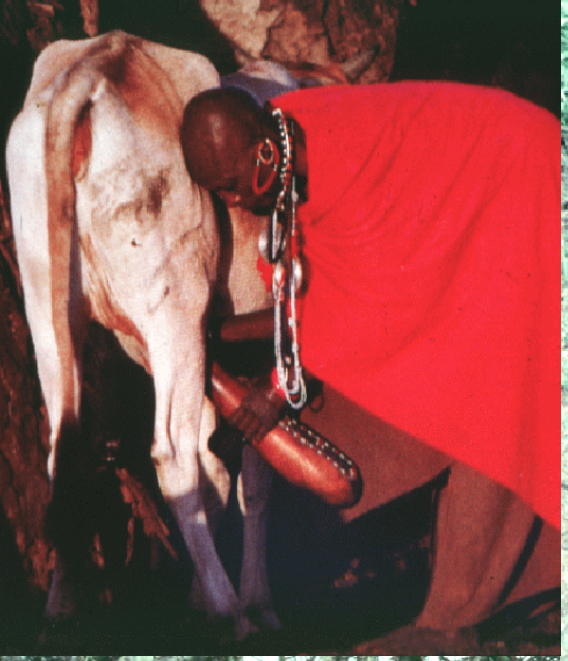
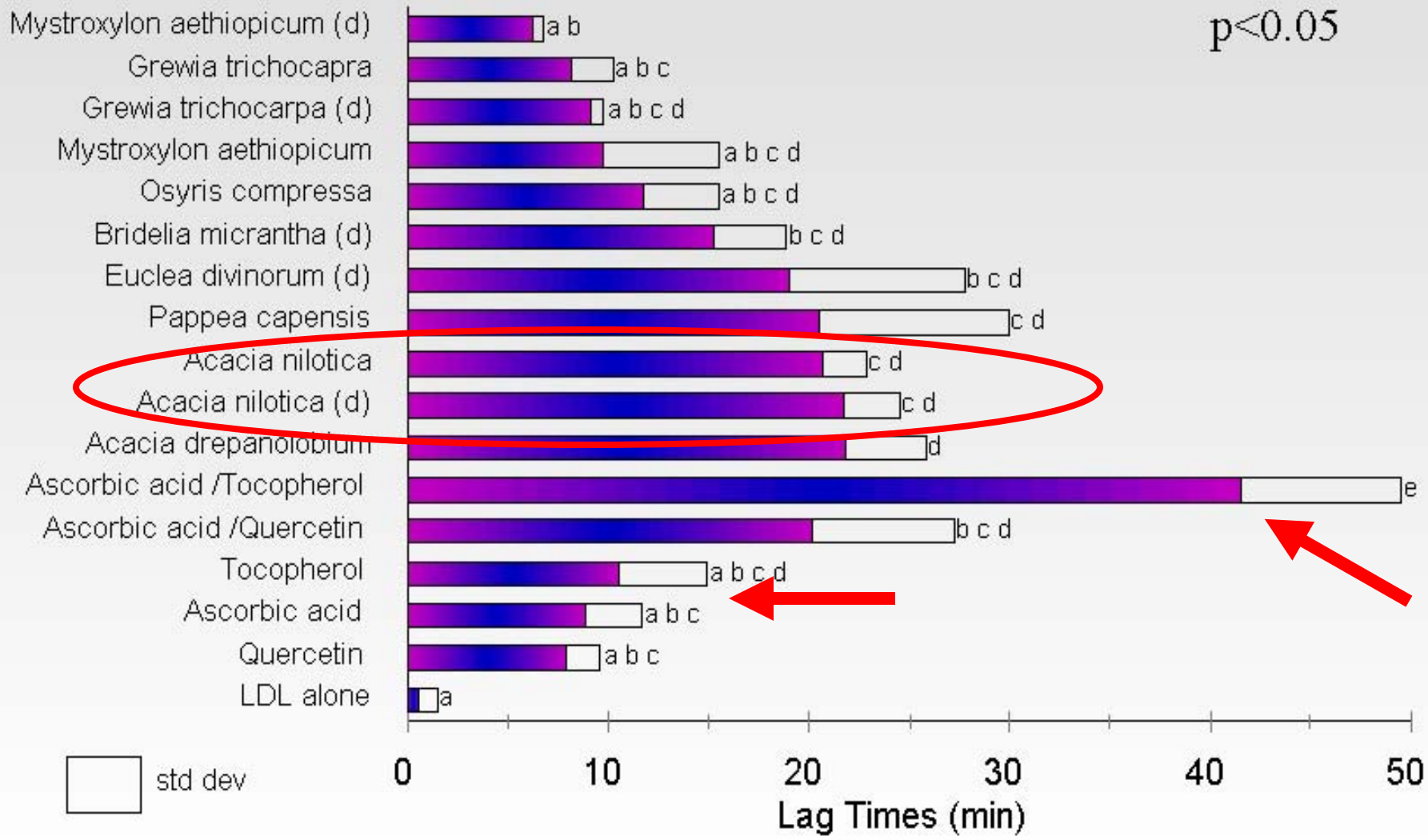





*Acacia nilotica* “olkiloriti”

# Inhibition of LDL oxidation by Maasai soup additives

## Conjugated dienes




Lindhorst and Johns

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*Commiphora mukul*

"guggul" Indian Bdellium

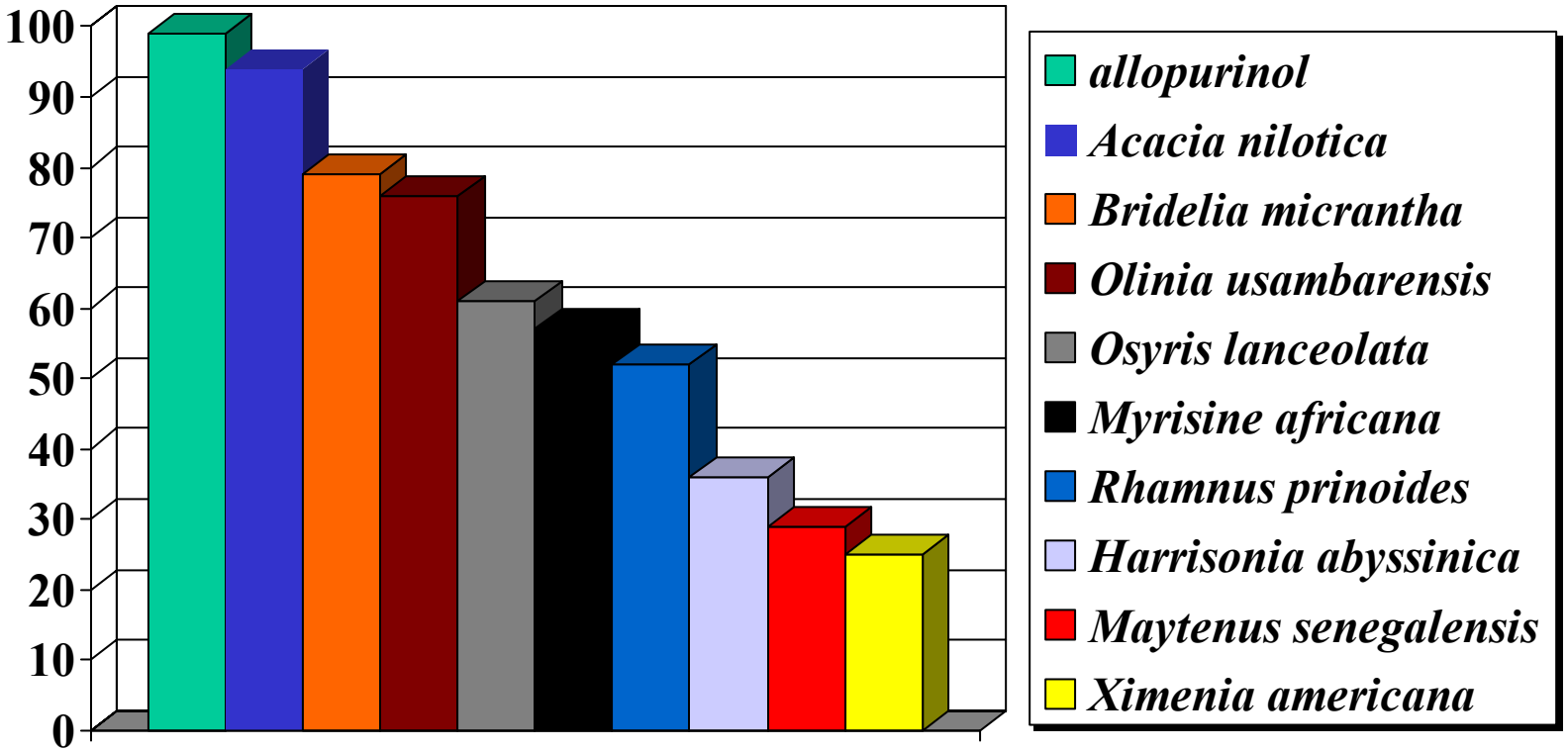
Johns *et al*. 2000. *Current Anthropology* 41:453-459.

# RESIN OF *COMMIPHORA AFRICANA*

## E- Guggulsterone content

| | |
|---|---|
| RESIN | 0.03 % |
| CHEWED RESIN | 0.006% |
| RELEASED BY MASTICATION: | 80%<br>0.24mg/g |

# Xanthine oxidase inhibition- Maasai milk & soup additives




Guertin and Johns, 2001

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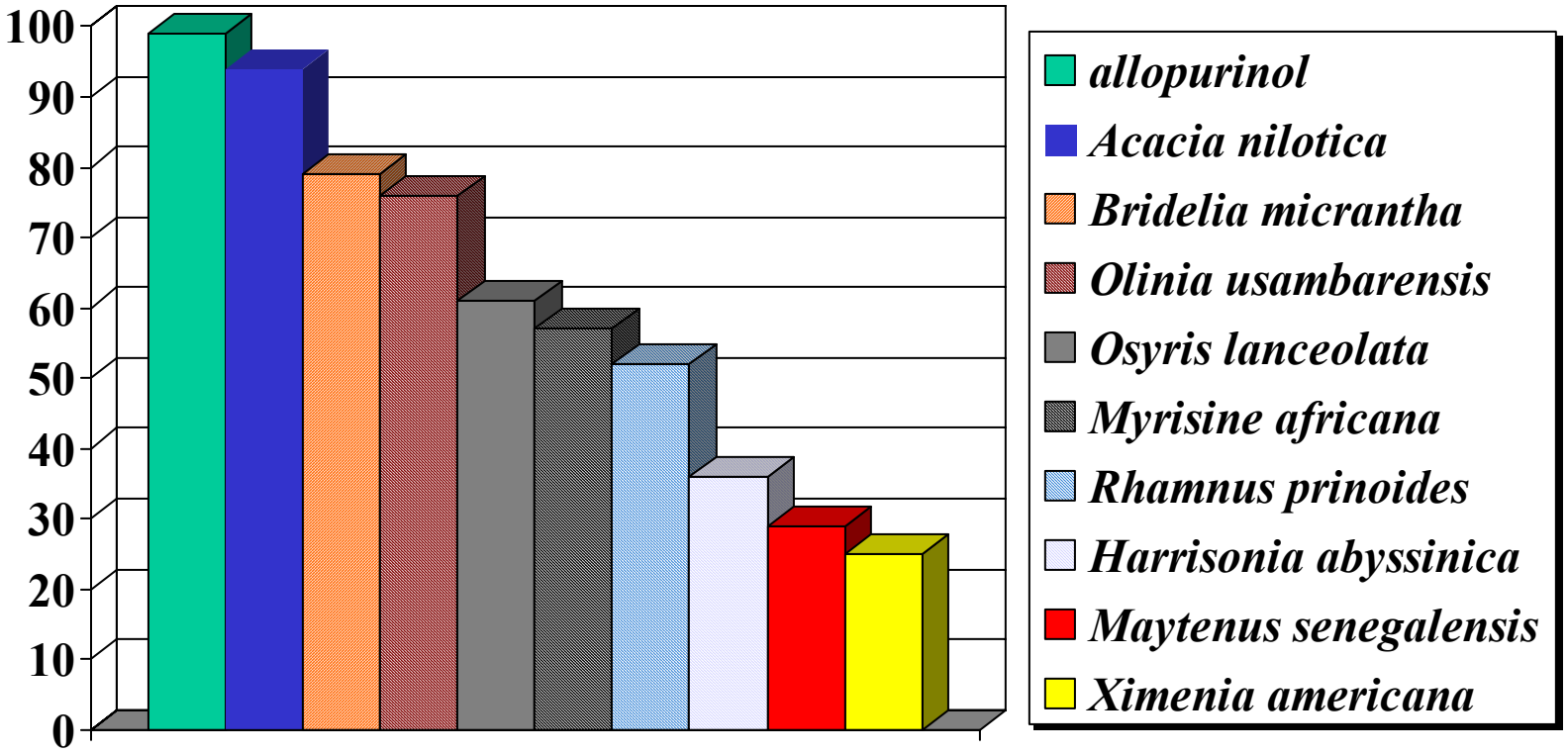


Guertin and Johns, 2001

# Xanthine oxidase inhibition- Maasai milk & soup additives

| | % Inhibition (S.D.) |
|---|---|
| Remedies for joint disease (n=5) | 60.6 (13.6) |

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| | % Inhibition (S.D.) |
|---|---|
| Remedies for joint disease (n=5) | 60.6 (13.6) |
| Other indications (n=18) | 38.2 (28.9) |

Student's t-test p = 0.03

# CONCLUSIONS

- Biodiversity ⇒ Dietary Diversity ⇒ Health
- Global change impacts traditional ecology
- Health rationale for managing biodiversity
- Health not simply absence of disease
- Rural / Urban linkages are key