

Food Crops for Health: Human Health Benefits of Traditional Native American Crops

By

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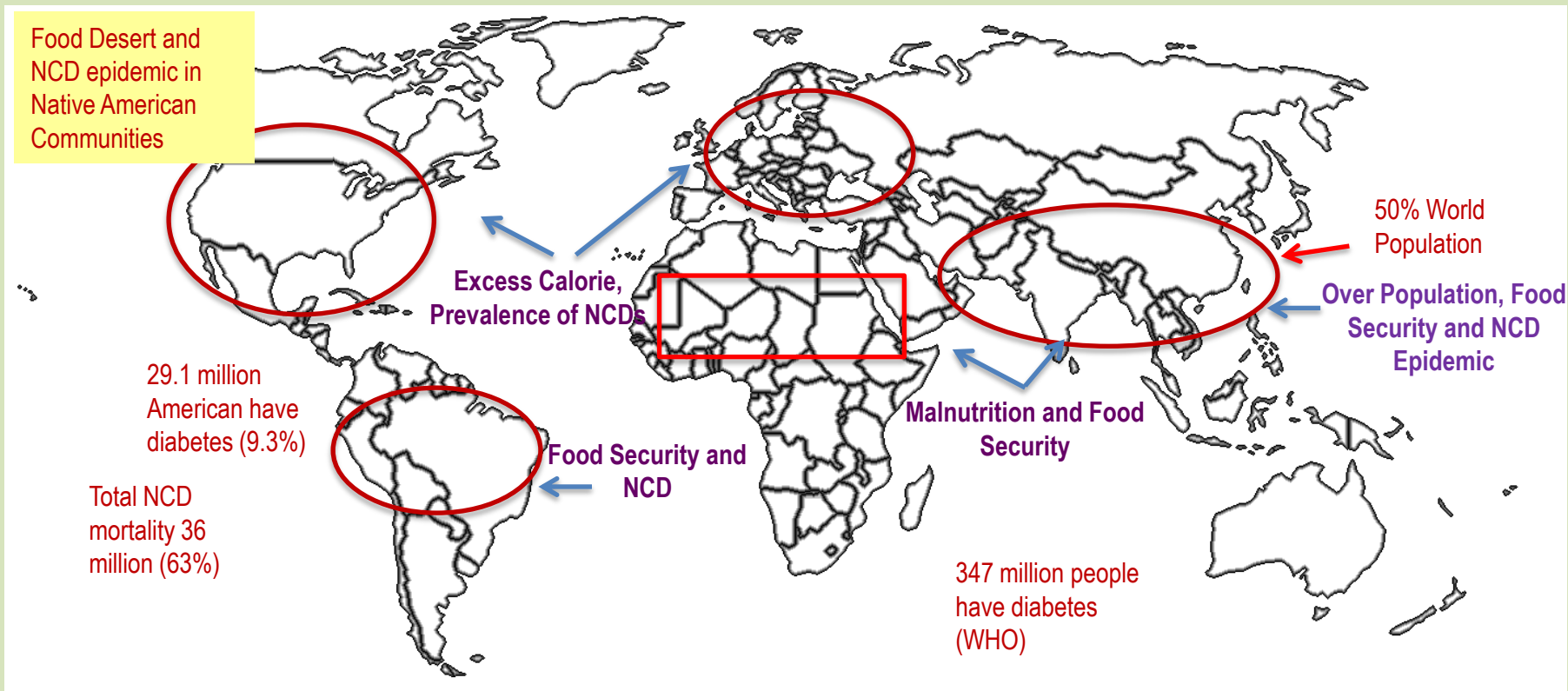
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Epidemic of Diabetes in Indigenous Communities

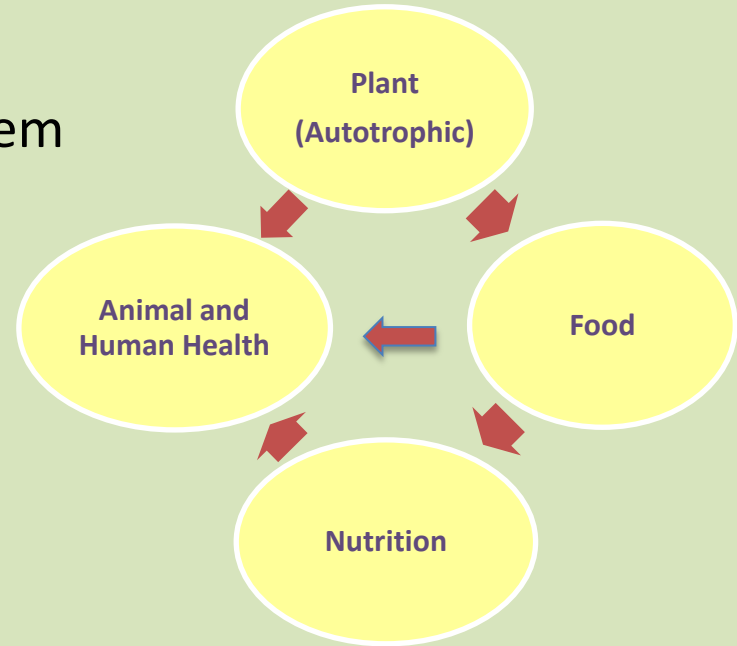
- Nearly 400 million estimated indigenous population (5%) of the world face significant health disparities compared to their non-indigenous counterparts.
- More than 50% of indigenous adults over age group of 35 are suffering with type 2 diabetes (IDF, 2012).
- 2.2 times higher probability of American Indians and Alaska Natives to have diabetes compared to their non-Hispanic counterparts (American Diabetes Federation).

Food Security and Epidemic of NCDs



Plant-based Food & Human Nutrition

- Food security is not based on calorie intake, but from the concept of balanced diet, enriched with micronutrients and phytochemicals.
- Interconnected and dynamic system
- Evolution & changes in Dietary Patterns & lifestyle
- Epigenetics & Metabolism of Food & Diseases



Previous Studies and the Foundation

1) Health Benefits of Traditional Corn, Beans, and Pumpkin: *In Vitro* Studies for Hyperglycemia and Hypertension Management

Y.-I. Kwon, E. Apostolidis, Y.-C. Kim, and K. Shetty

JOURNAL OF MEDICINAL FOOD 10 (2) 2007, 266–275

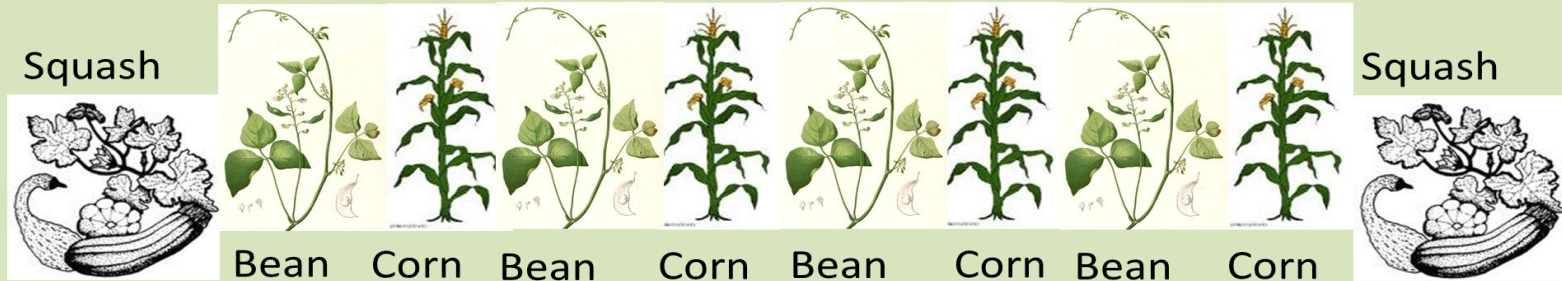
2) Evaluation of Indigenous Grains from the Peruvian Andean Region for Antidiabetes and Antihypertension Potential Using *In Vitro* Methods

Lena Galvez Ranilla, Emmanouil Apostolidis, Maria Ines Genovese, Franco Maria Lajolo, and Kalidas Shetty

J Med Food 12 (4) 2009, 704–713

Benefits of Traditional Food Crops

- Traditional cultivars shown better resistance against biotic and abiotic stresses
- Higher concentration of secondary metabolites with bioactive functionality
- Ecological and environmental sustainability



Anti-diabetic Potential of Selected Traditional Crop Foods

Crops	Total Phenolic Content (mg/g)	Total Antioxidant Activity (% inhibition)	Alpha-amylase Inhibition (%)	Alpha-glucosidase Inhibition (%)
Purple Corn	8.0	77%	0%	51%
Quinoa	2.3	86%	0%	30%
Andean Legume	4.0	40%	0%	20%
Round orange pumpkin	0.17	33%	60%	50%
Jack Bean	1.2	22%	50%	20%
Dark red corn	0.5	38%	32%	35%

Strategies for Human Health Applications

Screening of food crops and cultivars for higher bioactive profiles in traditional food crops



Evaluation of bioactive functionality of screened food through *in vitro* assays for NCD management



Clinical and Epidemiological studies to prove the concept



Marketing, Outreach, and Education to develop the awareness for traditional healthy food

Future Challenges and Directions

- Distribution and accessibility of fresh, and healthy food.
- Food crop diversity with better ecological understanding.
- Knowledge on indigenous and traditional food system (cultivation, preparation, ingredients)
- Understanding food synergies and whole food profile.
- Solution with whole-system approach.
- Community based initiatives, education, awareness
- **Prevention is better than cure....**



Climbing Bean