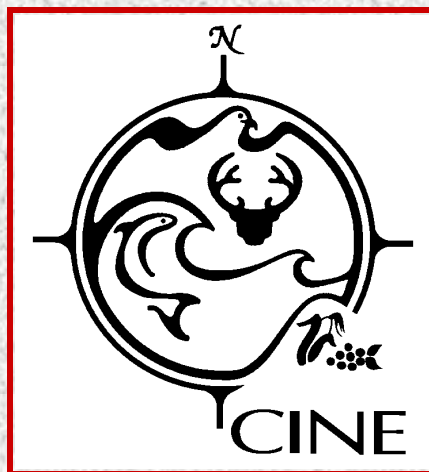


Session 5: GEA and Food Utilization

Professor Harriet Kuhnlein

Centre for Indigenous Peoples' Nutrition and Environment (CINE), and School of Dietetics and Human Nutrition, McGill University, Montreal, Canada

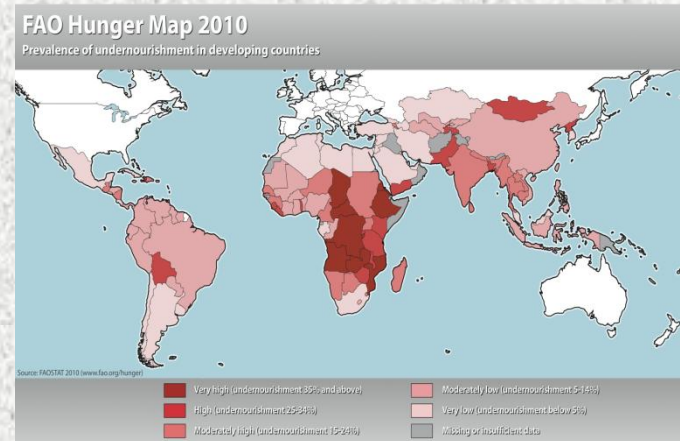


FAO/OECD Expert Meeting on Greening the Economy with Agriculture

Paris, 07 September, 2011

Nutrients, ecosystems and traditions

- Mongolia
 - landlocked
 - food insecure
- n-3 fatty acids
 - FAO/WHO = 2 g/day
- Mares' milk, local breed, genetic trait
- Biodiversity of grasslands



Cultivar Differences in Rice Nutrient Content

Nutrient	Range	Average	Variety with highest nutrient content	Variety with lowest nutrient content
Protein (n=1339)	5.55 – 14.58 g/100g	8.55	Indica CR1707 (Costa Rica)	Indica Rd 19 (Thailand)
Iron (n=95)	0.70 – 6.35 mg/100g	2.28	Long grained ^a red (China)	Undermilled Red ^a (Philippines)
Zinc (n=57)	0.79 – 5.89 mg/100g	3.34	Ganjay Roozy (IRRI)	Long grain ^a Fragrant (China)
Calcium (n=57)	1.0 – 65.0 mg/100g	26	ADT-21, red (India)	Brown Japonica ^a (Korea)
Thiamin (n=79)	0.117 – 1.74 mg/100g	0.475	Juchitan A-74 (Mexico)	Glutinous rice ^a special grade (China)
Riboflavin (n=80)	0.011 - .448 mg/100g	0.091	Tapol Dark Purple (Philippines)	Mun-pu red (Thailand)
Niacin (n=30)	1.97 – 9.22 mg/100g	5.32	Long grained ^a purple (China)	Glutinous round ^a grained (China)
Amylose (n=1182)	1.0-76.0 g /100g	22.36	Ingra 410 (Brazil)	Bpi-Ri-3 (Philippines)

^a These data come from Food Composition Tables, and do not strictly represent rice varieties

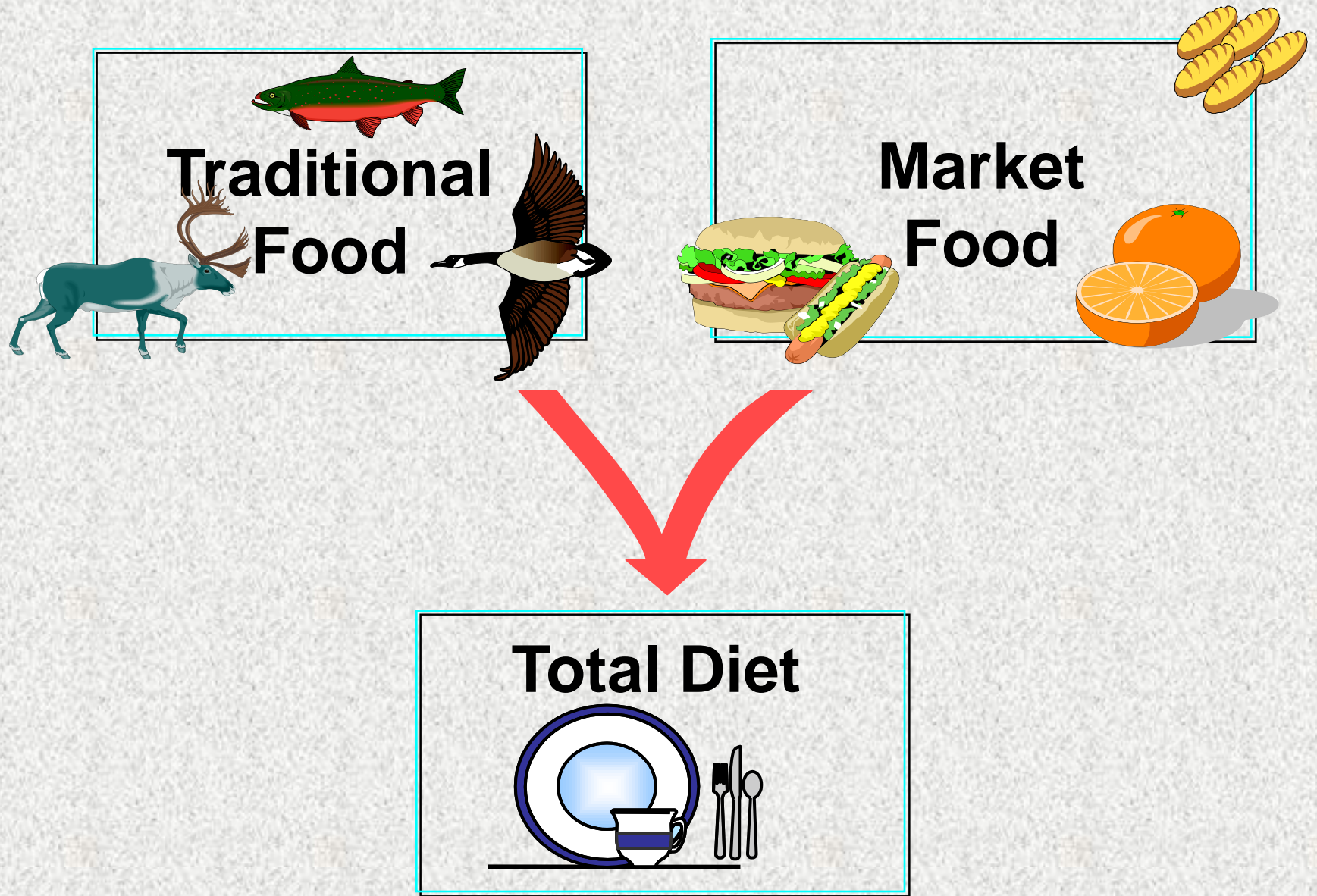
Kennedy and Burlingame, 2003

Traditional use and availability of aquatic biodiversity in rice-based ecosystems

	Cambodia	China	Laos
Fish	70	52	27
Crustaceans	6	2	5
Molluscs	1	4	8
Amphibians	2	4	10
Insects	2	3	16
Reptiles	8	-	7
Aquatic Plants	13	19	20
Total	102	84	93

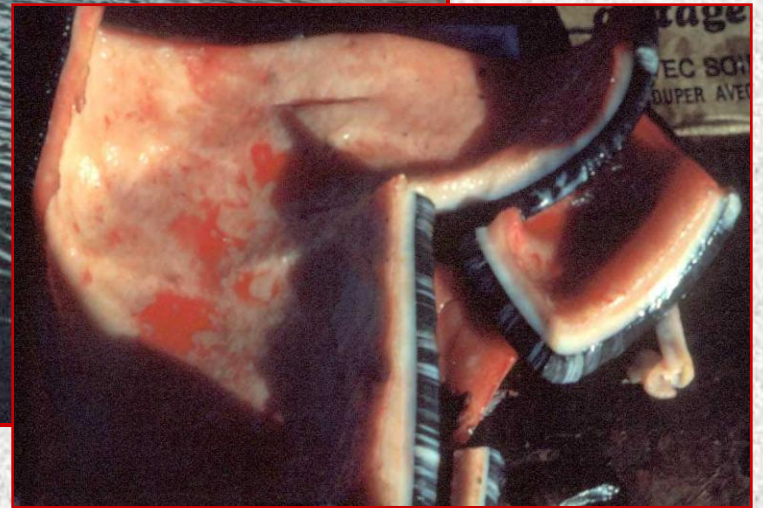
Source: Balzer, Balzer, Pon, 2002; Luo, Xaypladeth

Two Portions of Diet





Inuit, Nunavut



Climate Change



Northwest Territories and Yukon First Nations

Examples of Excellent, *UNEXPECTED* Sources of Micronutrients in Traditional Arctic Food

(per 100 g EP)

Whale skin (<i>Monodon monoceros</i>)	- 31.5 mg vitamin C
(<i>Delphinopterus leucas</i>)	- 36.0 mg vitamin C
Seal liver (<i>Phoca hispida</i>)	- 23.8 mg vitamin C
Goose lung (<i>Branta canadensis</i>)	- 46.3 mg iron
Whale dried meat (<i>Monodon monoceros</i>)	- 70 mg iron
Whale blubber (<i>Monodon monoceros</i>)	- 1700 ug retinol
Loche liver (<i>Lota lota</i>)	- 317 ug vitamin D

**Inuit whale muktuk or
mattak – whale skin
and blubber**



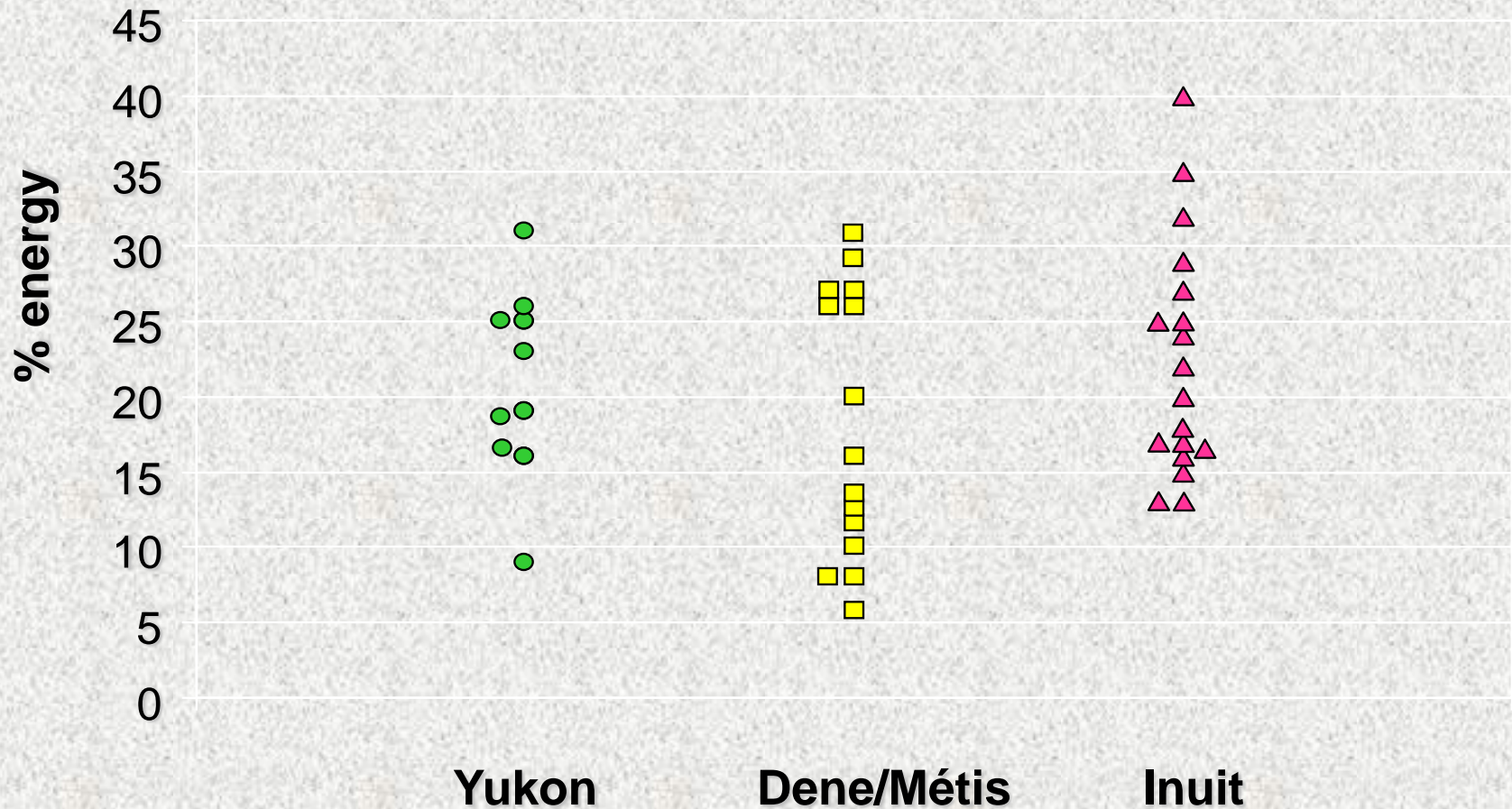


Dried narwhal meat – Baffin Island, Canada

Diversity of Food Species in 3 Cultural Areas of the Canadian Arctic

	Dene/Métis	Yukon	Inuit
Sea mammals	0	0	14
Land animals	17	16	14
Birds	16	26	70
Fish/Seafood	20	20	48
Plants	48	40	48
Total	101	102	194

Percent Energy from Traditional Food from Yukon, Dene/Métis and Inuit Communities



Nutrient Intake on Days With or Without Traditional Food (TF) (least square means \pm SEM)

		With TF	N	Without TF	N
Total energy (Kcal)	Yukon	2052 \pm 45 *	413	1947 \pm 52	389
	Dene/Métis	2261 \pm 39 *	662	2085 \pm 55	350
	Inuit	2170 \pm 35 *	1092	1857 \pm 41	783
As % Energy Carbohydrate	Yukon	37 \pm 0.6		42 \pm 0.7 *	
	Dene/Métis	36 \pm 1		42 \pm 1 *	
	Inuit	37 \pm 0.5		49 \pm 0.6 *	
Protein	Yukon	32 \pm 0.5 *		19 \pm 0.5	
	Dene/Métis	31 \pm 0.4 *		20 \pm 0.6	
	Inuit	33 \pm 0.4 *		17 \pm 0.5	
Fat	Yukon	30 \pm 0.6		40 \pm 0.5 *	
	Dene/Métis	31 \pm 1		37 \pm 1 *	
	Inuit	32 \pm 0.5		38 \pm 0.6 *	

* significant $p < 0.05$ (adjusted for season, site, gender, age)

Kuhnlein et al, J Nutr 134, 2004

**Nutrients Significantly Higher on Days WITH Traditional Food -
Consistently for Yukon, Dene/Métis and Inuit**

Protein

Vitamin D

Vitamin E

Riboflavin

Vitamin B6

Iron

Zinc

Copper

Magnesium

Manganese

Phosphorus


Potassium

Selenium

Nutrients Significantly Higher on Days WITHOUT Traditional Food

Fat, Saturated Fat, Sucrose, Sodium





For Inuit only: Vitamin C, Folate



• HARRIET V. KUHNLEIN • BILL ERASMUS • DINA SPIGELSKI

Indigenous Peoples' food systems:

the many dimensions of culture, diversity and environment for nutrition and health



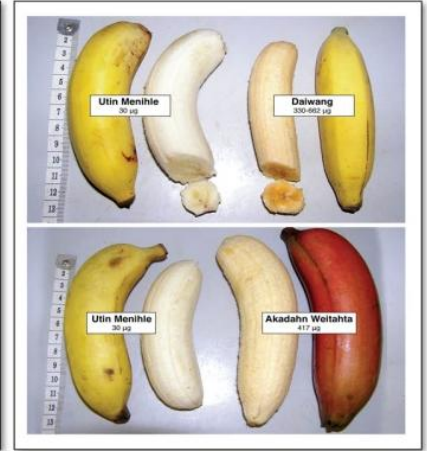
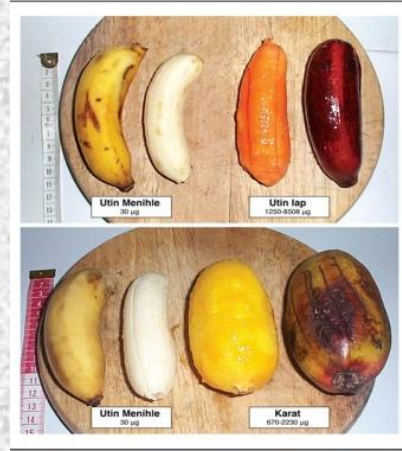


Case Study Community and Academic Partners Meeting in The Rockefeller Foundation's Bellagio Center, Italy, 2008

% ENERGY FROM TRADITIONAL LOCAL FOOD AND NUMBER OF TRADITIONAL SPECIES/VARIETIES

Culture	% Diet Energy	N of species/ varieties
Awajún, Peru	93	223
Bhil, India	59	95
Dalit, India	43	329
Gwich'in, Canada	33	50
Igbo, Nigeria	96	220
Ingano, Colombia	47	160
Inuit, Canada	41	79
Karen, Thailand	85	387
Maasai, Kenya	6	35
Nuxalk, Canada	30	67
Pohnpei, Micronesia	27	381

Bananas and vitamin A: FSM



<5 µg carotenes

>8500 µg carotenes

Ecosystem Threats to Indigenous Peoples' Food Systems Biodiversity, Nutrition and Health

- Displacement of traditional food with poor quality purchased food and increasing chronic disease**
- Loss of wildlife animals and plants: numbers of species and within species; loss of agricultural varieties**
- Environmental insults and contaminants, habitat destruction**
- Encroachment of outsiders on land and resources, cash cropping and bioprospecting/piracy; trespassing restrictions**
- Climate change – global warming impacting food species**
- Urbanization and employment- restricted access to food**
- Changing food acceptability (old food and new food)**



Nuxalk Preparing Ooligan Grease- Concerns for Declining Stocks of *Thaleichthys pacificus* in Canada



AFROFOODS

CALL FOR ACTION FROM THE DOOR OF RETURN FOR FOOD RENAISSANCE IN AFRICA

Dakar - 10th December 2009.
Human Rights Day

- Note that the degradation of ecosystems and the loss of food biodiversity is contributing greatly to the increases in poverty and malnutrition in Africa;
- Recognize that returning to local crops and traditional food systems is a prerequisite for conservation and sustainable use of biodiversity for food and nutrition;
- Acknowledge that local foods are the basis for African sustainable diets.



The Door of No Return
House of the Slaves
Gorée Island

Q 1 Which are the most urgent dietary transitions that need to take place towards low-footprint food systems and which investments are required to trigger those changes?



MOST URGENT - GLOBALLY

- Reduce malnutrition
 - Reduce undernutrition (human rights)**
 - Reduce obesity (costs of health care)****
- Reduce energy intensity
 - Less meat, more local harvests****
- Improve dietary diversity and dietary quality**
- Less processed, long-distance foods**

INVEST IN:

- Research on local biodiversity identifications and nutrient properties**
- Education and media for consumers and policy makers**
- Improving tax structures of energy intense foods at the source- then reduce threats to biodiversity**



Q 2 Export of nutrients to towns and through exports results in nutrient surpluses everywhere: which are the major challenges in cutting nutrient and food waste by 50% globally?



CHALLENGES TO CUTTING NUTRIENT AND FOOD WASTE

- Promote local food systems with good food
- Reduce portion sizes (restaurants)
- Recycle/compost plate waste from institutions
- Reduce loss of fish bycatch; improve technology
- Improve technology to process fish
- Improve local technology to decrease losses from harvest
- Education of consumers and policy makers
- Improve physical activity
- Export/import quotas on energy per capita; tax on excess



Q 3 How can the present globalized food system and trend towards localized food systems be mutually enforcing? How can the food system ensure sustainable consumption and production?



MAKE GLOBALIZED AND LOCALIZED MUTUALLY REINFORCING

- Build local food processing and sales; labelling for C footprint**
- Biodegradable food packaging**
- Use local food biodiversity-promote ecosystem protection with tax credits to processors and producers**
- Reward local initiatives that improve child health**
- Require a percentage of large food industry profits go to local food promotion and reward successes**

ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION

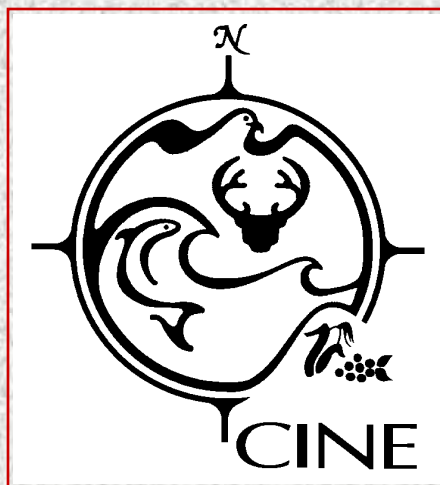
- Taxes to fund education of consumers to use sustainable foods**
- Use locally adapted food species and varieties/cultivars**
- Promote local cuisine with local products; more gardens**
- Education and media; raise awareness for local foods**
- Raise prices of meat in high income areas to provide reduced prices in low-income areas**



Definition of Sustainable Diets

Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.

Thank You!



WWW.MCGILL.CA/CINE

www.indigenousnutrition.org



