Food Chains, Agrobiodiversity Conservation, and the Kitchen: a Political Ecological Approach

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Overview

- The structure of the global modern food system and the domestic sphere
- Characteristics of ‘traditional’ rural subsistence (RS) food systems
- The RS food chain: Links between agrobiodiversity, food storage, processing, preparation, and culinary traditions in the domestic sphere
- Gender and post-harvest pressures leading to decreasing use and maintenance of agrobiodiversity
The elephant in the biodiversity-food security nexus: the changing structures of ‘modern’ globalizing food systems
Farms, land in farms, and average acres per farm, 1850–2012

Million farms/hundred acres/billion acres

Farms (million)

Average farm size (hundred acres)

Land in farms (billion acres)


Where Americans Eat, 1889-2009

Source: Dr. Stephan Guyenet. Fast Food, Weight Gain and Insulin Resistance. Whole Health Source.
## Market concentration is rising in global agricultural input industries

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>Four-firm concentration ratio</th>
<th>Eight-firm concentration ratio</th>
<th>Share of global market (percent)</th>
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<tbody>
<tr>
<td><strong>Crop seed and biotechnology</strong></td>
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<td><strong>Animal health</strong></td>
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<td>1994</td>
<td>32.4</td>
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<td>2000</td>
<td>41.8</td>
<td>67.4</td>
<td></td>
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<tr>
<td></td>
<td>2009</td>
<td>50.6</td>
<td>72.0</td>
<td></td>
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<td><strong>Animal genetics</strong></td>
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<td>1994</td>
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<td></td>
<td>2000</td>
<td>na</td>
<td>na</td>
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<td></td>
<td>2006/07</td>
<td>55.9</td>
<td>72.8</td>
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</table>

*na = data not available.*

The concentration ratio measures the share of global market sales earned by the largest four or eight companies in the sector.

*Source: USDA, Economic Research Service estimates from Fuglie et al. (2011).*
Average # of TV ads viewed in 2012

Source: Nielsen (2012)
USA and Europe: Time spent in food preparation per day 1975-2000

- France
- Netherlands
- Norway
- USA
- UK

"We'll have lots to eat this winter, won't we Mother?"

Grow your own
Can your own

MOTHER EARTH NEWS
WISER LIVING SERIES

HOW TO GROW AND PRESERVE
YOUR OWN FOOD

TOP TIPS FOR GREAT FALL GARDENS

PLUS:
• Easy Crops to Can or Freeze, P. 16
• Extend Your Growing Season
• Instant No-Dig Garden Beds
• Simple Ways to Store Crops, P. 54
• DIY: Hoop House & Food Dehydrator
• Best Vegetable Seed Companies

FREE ORGANIC FERTILIZERS P. 42

The Lost Art of Scratch Cooking
by Curtis Parker

RECIPIES FROM THE KITCHEN OF
NATHA ADKINS PARKER
“Agricultural output markets in developing countries have changed fundamentally and rapidly since 1950…[reflecting] a shift from a traditional to a modern phase….At the end of the period we see consolidation downstream in the agrifood system (in the processing and retail segments), including the rapid rise of large-scale processors, supermarkets, and food service chains.”

“Naturally, this transformation from the traditional to the modern phase does not occur at a uniform rate across regions, or countries, or zones, or between rural and urban areas. The transformation can be observed as a diffusion process, of new organizations, institutions, and technologies in the food system – which occurs first and fastest in urban areas of the richer developing countries. These then ripple out into their own rural towns and into other developing countries.” [own emphases]
Where there is no doctor supermarket...
Rural Subsistence Food Systems

- Large number of wild and domestic species
- Local culinary traditions
- Storage is local small-scale, often domestic
- Transport is local, often non-motorized
- Processing is small-scale, mainly domestic
- Distribution is local, often non-monetary (e.g. gift-giving)
- Not oriented mainly toward income generation, but to social and subsistence goals
Culture and nature co-evolve
Culinary traditions are founded upon locally available species.
Agrobiodiversity and nutrition
Food based on much more than agriculture
Agrobiodiversity maintenance comes from use (e.g. Zimmerer 2003)

- Much more than environment
- More than agronomy
- 70% of thousands of potato and maize varieties are used for post-harvest characteristics (e.g. freeze drying, boiling, soup, beer making)
- Women select, store, process, and prepare, and know many more taxa
400+ Malawi bean varieties
(Ferguson, 1990; Sperling & Berkowitz 1994)

- 75% of selection criteria related to post-harvest, 50% to taste, cooking quality, and health, e.g.
  - Pods and leaves for ‘hunger’ periods
  - Cooking time
  - Storability
Selection criteria for one maize variety, Yucatan

<table>
<thead>
<tr>
<th>Selection Criteria</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong plants</td>
<td>M</td>
</tr>
<tr>
<td>Drought resistance</td>
<td>M</td>
</tr>
<tr>
<td>High yielding</td>
<td>M</td>
</tr>
<tr>
<td>Can be stored in the field</td>
<td>M</td>
</tr>
<tr>
<td>Inherited seed</td>
<td>M</td>
</tr>
<tr>
<td>Easy and fast to degrain</td>
<td>F</td>
</tr>
<tr>
<td>Easy to grind</td>
<td>F</td>
</tr>
<tr>
<td>Fast cooking time</td>
<td>F</td>
</tr>
<tr>
<td>Easy to shape into tortillas</td>
<td>F</td>
</tr>
<tr>
<td>Consistent dough</td>
<td>F</td>
</tr>
<tr>
<td>Does not become ‘soupy’</td>
<td>F</td>
</tr>
</tbody>
</table>
Processing chain for one maize variety
(Lope-Alzina, Ibid. 2008)

Sow → Young ears → Boil → Corn-on-the-cob

Tend plants → Grind → Mill fresh dough → Boil → Hand shape → Toast

Harvest → Select ears/seed from plants → Store in fields with lime → Boil with lime → Mill flour → Hand shape → Toast

Mature ears → Store in container in home-garden → Raw for animal feed → Ferment → Hand shape → Toast

Select ears/seed from plants → Store in gardens with lime → Boil → Hand shape

Store in a sack → Seed for planting/sale

Dry for months → Hard shell isswaaj

Sweet atole nuevo/’sa’ → Isswaaj

Sour atole nuevo/’sa’ → Dried

Dilute in water → Tortillas → Burned

Tamales, sauces, bread, etc.*

Dilute in water → Keyem/pozol (daily drink)

Ferment → Animal feed

Boil with lime → Mill flour

Sakab (sacred drink)

Boil → Grind

Hand shape

Toas

Boil

Sweet atole nuevo/’sa’

Hard shell isswaaj

Sour atole nuevo/’sa’
Storage, processing and preserving

- Make plant materials edible
- Improve nutrient values, digestibility
- Eliminate toxins, pathogens and improves quality
- Prolong availability
- Meet local culinary requirements
- Technology and labour available condition use
Storage
# Women’s Reasons for Fermenting Complementary Foods, Nigeria

(Nnanyelugo et al. 2003)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Awka</th>
<th>Onitsha</th>
<th>Enugu</th>
<th>Nsukka</th>
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<tbody>
<tr>
<td>Improves taste</td>
<td>11.20</td>
<td>1.12</td>
<td>22.49</td>
<td>11.04</td>
</tr>
<tr>
<td>Mother’s advice</td>
<td>0.00</td>
<td>1.12</td>
<td>0.96</td>
<td>0.00</td>
</tr>
<tr>
<td>Health visitor’s advice</td>
<td>0.80</td>
<td>0.00</td>
<td>0.48</td>
<td>0.00</td>
</tr>
<tr>
<td>Helps child grow</td>
<td>1.60</td>
<td>50.28</td>
<td>0.48</td>
<td>26.21</td>
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<tr>
<td>Food is soft</td>
<td>19.20</td>
<td>0.00</td>
<td>0.00</td>
<td>0.69</td>
</tr>
<tr>
<td>Improves digestibility</td>
<td>2.40</td>
<td>0.06</td>
<td>1.91</td>
<td>1.38</td>
</tr>
<tr>
<td>Child eats more</td>
<td>1.08</td>
<td>10.05</td>
<td>3.35</td>
<td>7.59</td>
</tr>
<tr>
<td>Enhances flavor</td>
<td>8.80</td>
<td>0.56</td>
<td>11.97</td>
<td>6.90</td>
</tr>
<tr>
<td>Enhances color</td>
<td>0.00</td>
<td>0.00</td>
<td>5.26</td>
<td>5.54</td>
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<tr>
<td>Removes toxins</td>
<td>17.60</td>
<td>3.91</td>
<td>27.27</td>
<td>6.21</td>
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<tr>
<td>Improves nutrient content</td>
<td>2.40</td>
<td>15.65</td>
<td>0.48</td>
<td>14.49</td>
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</table>
Preparation
Ethnoecological knowledge and skills in storage, processing, preserving, and preparation

- Properties of species and species’ parts
- Pests and pathogens and their management
- Materials, and material and chemical processes
- Construction of structures and implements
- Nutritional requirements and food preferences of different groups
- Cultural norms and values about distribution, rituals, etc.

Takes at least a third of a lifetime to accrue

Must be transmitted systematically
Swaziland’s decline in agrobiodiversity and food security (Malaza 2003)

- Decline in consumption of traditional crops (cow peas, jugo beans, sorghum, millet, sesame, pumpkins, wild leafy vegetables)
- Women lack time to collect wild foods; preparation is time-consuming
- Lack of improved technology for sorghum processing, processing is time-consuming
- Low status of traditional vegetables
- Urban female wage employment: lack of availability, processing constraints, lack of knowledge, loss of taste for traditional foods
Avg. labour = 4 hours per family per day
Women and genetic erosion in the post-harvest sphere

- Increasing influence of the global agroindustrial food system:
  - Declining status of traditional foods, reliance on exotic species
  - Cheap foodstuffs compete with local species
  - Formal seed systems & government policy erode local seed access

- Need for cash, off-farm work and outmigration – loss of labour, knowledge

- Formal education, declining status of traditional knowledge

- Time constraints

- Decreasing status of women’s knowledge, work, and everything domestic and traditional
Some conclusions

- Food security and nutrition in most subsistence-oriented societies depend principally on local agrobiodiversity.
- Most agrobiodiversity is maintained in such small subsistence societies.
- Agrobiodiversity will be sustained *only* if demand continues.
- Demand depends *even more* on the post-harvest chain than on agronomic and environmental conditions.
Women influence agrobiodiversity directly through production (farm, homegarden), and indirectly through post-harvest demand.

Pressures on women’s time are leading to declines in agrobiodiversity.

Changing diets and the status of traditional foods are leading to declines in agrobiodiversity.

In conceptualising agrobiodiversity conservation, there is insufficient focus on the domestic sphere, food processing, preparation, women, and women’s constraints.
Should these women conserve for the rest? Or should driving forces be addressed?