Agricultural Pathways to Improved Nutrition: Getting Policies Right!

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Global Nutritional Challenges

- Persistence of under weight births & Childhood stunting
- Rising inequality in food & nutrition access
- Increasing incidence of obesity
- Growing food safety concerns
The nature and magnitude of the nutritional challenge varies by the stage of structural transformation of a country.
Structural transformation: what is it?

Five inter-related processes define structural transformation:

• A declining share of agriculture in GDP and employment

• A rural to urban migration that stimulates the process of urbanization

• The rise of a modern industrial and service sector

• A demographic transition from high to low rates of births and deaths

• A nutrition transition from staple grains to diversified diets and processed foods
Structural Transformation is a Historical and Universal Phenomenon

Timmer (2009)
Structural Transformation, Human Development, and Agricultural Performance

- Low Productivity Agriculture
- Modernizing Agriculture
- Commercialized Agriculture

Share of Agriculture (% GDP) vs. GDP (US$ per Capita)

- High Human Development
- Medium Human Development
- Low Human Development
Structural Transformation and Nutrition

Wasting

Obesity

Stunting

Prevalence

log GDP per cap

SSA

Latin America

Asia

Non-pmtc fit

SSA

Latin America

Asia

Non-pmtc fit

SSA

Latin America

Asia

Non-pmtc fit

Webb P, and Block S PNAS 2012;109:12309-12314
So what does agriculture have to do with it?
Effect of policy support for agriculture versus non-agriculture on the prevalence of stunting
Window of Opportunity: The first 1,000 days of life...

~9 months in utero
~6 months breastfeeding
Early childhood

Message: to impact child nutrition and safeguard cognitive and physical development, targeting women and girls during childbearing years (ages 15-45) is essential.
Nutrition is multidimensional

HOUSEHOLD FOOD ACCESSS
(Quantity, quality and diversity of food)

Relative food prices and price policy
Sector-specific policies
Age, gender, education
Extent and type of agricultural commercialization
Access to inputs, technology, extension services, or credit

HOUSEHOLD INCOME
Determined by:
(132,227),(474,306)

INDIVIDUAL NUTRITION ACCESS & ABSORPTION

ALLOCATION OF FOOD
Determined by:
• Distribution and consumption of food within the household.
• Household size, age, gender, and health status (pregnant women, young children).

MICRONUTRIENT AND FOOD AVAILABILITY
Determined by:
• Spatial location of household (proximity to diverse food retailers).
• Agricultural diversification and livestock.
• Diversity in food production.
• Government interventions and safety-net programs.

NUTRIENT ABSORPTION AND UTILIZATION
Determined by:
• Access to clean drinking water.
• Toilet availability and sanitation.

INCREASED MATERNAL HEALTH & REDUCED CHILDHOOD STUNTING

Gender norms and behavior.
Individual calorie and micronutrient needs
Women’s empowerment
Unique health conditions
 Necessary food safety standards.

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For rural households, agriculture is central to food access

Agricultural policies are central for influencing:
- Rural household income (food affordability)
- Regional/local food supply (productivity and food diversity)
Complimentary policies for behavior change and environmental change are essential components:

- Behavior (education, women’s empowerment, etc.)
- Water, sanitation, and hygiene efforts

Agriculture is only part of the equation, complimentary policies are essential.
## Food system classification

<table>
<thead>
<tr>
<th>Food system classification</th>
<th>Characteristics</th>
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</thead>
<tbody>
<tr>
<td>Low productive systems</td>
<td>• Little to no Green Revolution gains&lt;br&gt;• Low per capita income&lt;br&gt;• Low agricultural productivity&lt;br&gt;• Low diet diversity&lt;br&gt;• High under nutrition &amp; micronutrient malnutrition</td>
</tr>
<tr>
<td>Modernizing Systems</td>
<td>• Green Revolution gains&lt;br&gt;• Low-medium per capita income&lt;br&gt;• Moderate agricultural productivity&lt;br&gt;• Moderate diet diversity&lt;br&gt;• Persistent micronutrient malnutrition</td>
</tr>
<tr>
<td>Commercial/ export systems</td>
<td>• Medium-high per capita income&lt;br&gt;• Higher opportunity for agricultural productivity&lt;br&gt;• High diet diversity&lt;br&gt;• coexistence of under nutrition and over nutrition</td>
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</table>
**Low Productive Agricultural Systems**

Much of Africa and other regions that missed out on the productivity, income, and food supply growth of the Green Revolution.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Productivity</th>
<th>Food value chains</th>
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<tr>
<td>• LITTLE TO NO GREEN REVOLUTION GAINS</td>
<td>• FOCUS ON NEGLECTED STAPLES AND TRADITIONAL CROPS: RESEARCH, EXTENSION AND INPUTS</td>
<td>• UPGRADE TRADITIONAL MARKETS</td>
</tr>
<tr>
<td>• LOW PER CAPITA INCOME</td>
<td>• TRADITIONAL AND NON-TRADITIONAL CROPS CULTIVATED BY WOMEN</td>
<td>• SMALL SCALE POST-HARVEST STORAGE AND PROCESSING</td>
</tr>
<tr>
<td>• LOW AGRICULTURAL PRODUCTIVITY</td>
<td>• BIOFORTIFICATION</td>
<td>• IMPROVING FOOD SAFETY AND QUALITY (focus on mycotoxins)</td>
</tr>
<tr>
<td>• HIGH MALNUTRITION</td>
<td>• PROMOTION OF KITCHEN GARDENS, BACKYARD LIVESTOCK</td>
<td>• ACCESS TO LAND AND PROPERTY RIGHTS</td>
</tr>
<tr>
<td>• LOW DIET DIVERSITY</td>
<td>• ACCESS TO LAND AND PROPERTY RIGHTS</td>
<td>• CONDITIONAL FOOD/CASH TRANSFER PROGRAMS</td>
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Modernizing Agricultural Systems

Much of Asia and Latin America that experienced the productivity gains of the Green Revolution suffer from sustained poverty, malnutrition, poor market linkages, and lack of dietary and production diversity.

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<tr>
<td>• GREEN REVOLUTION GAINS</td>
<td>• SUSTAINED CROP PRODUCTIVITY GROWTH AND DIVERSIFICATION TOWARDS MICRONUTRIENT RICH FOODS.</td>
<td>• CONNECTING SMALLHOLDER FARMERS TO GLOBAL / DOMESTIC RETAIL CHAINS.</td>
</tr>
<tr>
<td>• LOW-MEDIUM PER CAPITA INCOME</td>
<td>• LABOR SAVINGS TECHNOLOGIES FOR WOMEN</td>
<td>• EMPOWERMENT OF WOMEN IN CASH AND COMMERCIAL CROP SALES</td>
</tr>
<tr>
<td>• MODERATE AGRICULTURAL PRODUCTIVITY</td>
<td>• INPUT MARKETS, INFORMATION AND EXTENSION SYSTEMS.</td>
<td>• DEVELOPMENT OF COOPERATIVES</td>
</tr>
<tr>
<td>• MODERATE DIET DIVERSITY</td>
<td>• FINANCIAL SERVICES</td>
<td>• EXPAND OPPORTUNITIES FOR FOOD PROCESSING AND FORWARD LINKAGES IN FOOD SYSTEM TO CREATE EMPLOYMENT OFF FARM</td>
</tr>
<tr>
<td>• PERSISTENT MALNUTRITION</td>
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**Commercial/export-oriented systems**

High-growth export-driven countries in Latin America and Asia that have specializing farmers still need support transitioning to agriculture as a global/domestic business.

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<tr>
<td>• MEDIUM-HIGH PER CAPITA INCOME</td>
<td>• GREATER ATTENTION TO SUSTAINABILITY AND ENVIRONMENTAL PROTECTION</td>
<td>• INFRASTRUCTURE INVESTMENTS AND REGULATORY SYSTEMS FOR SMALLHOLDER INTEGRATION INTO FOOD VALUE CHAINS.</td>
</tr>
<tr>
<td>• STILL LARGE OPPORTUNITY FOR PRODUCTIVITY GAINS</td>
<td>• DIVERSITY INTO HIGH VALUE ADDED CROPS</td>
<td>• STRENGTHENING OF PUBLIC-PRIVATE PARTNERSHIPS TO ENCOURAGE GENERAL RURAL INVESTMENT,</td>
</tr>
<tr>
<td>• HIGH DIET DIVERSITY</td>
<td>• AGRIBUSINESS DEVELOPMENT</td>
<td>• FORTIFIED FOOD PRODUCTS</td>
</tr>
<tr>
<td>• NUTRITION INEQUALITY (UNDER-NUTRITION AND EMERGING EPIDEMIC OF CHRONIC DISEASE)</td>
<td>• FINANCIAL SERVICES</td>
<td>• IMPROVED REGULATORY ENVIRONMENT FOR FOOD SAFETY</td>
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<td>• INPUT MARKETS AND INFORMATION SYSTEMS</td>
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Role of Health and Nutrition in Agricultural Development

• For poorest populations in Africa and South Asia
  • Health and well-being in rural areas lag far behind urban areas
  • Productivity effects more serious where physical labor critical input

• Women are particularly vulnerable
  - Employment patterns:
    - women play a predominant role in the production of food crops; especially in Africa.
  - Biological vulnerabilities:
    - women have special vulnerabilities related to reproductive health and they are adversely affected by health and nutrition risks.
  - Life responsibilities:
    - women have a set of unique responsibilities in the home, particularly in terms of the care of children.
Complimentary policies

Behavior change:
• Education, extension

Harnessing the power of women’s groups.
• Nutrition messaging through women’s groups

Water, sanitation, hygiene
• Clean water technology development
• Sanitation technologies
Thank you!

Website: tci.cals.cornell.edu

Blog: blogs.cornell.edu/agricultureandnutrition/