Global Value Chains and Upgrading: Implications for Food and Nutrition Security

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Roma Tre University, GVCs for Food and Nutrition Security Workshop
Sept. 25, 2014
1. Global Value Chain (GVC) Approach: Upgrading & Governance
2. Wheat GVC and Food Security in the MENA Region
3. Country Cases in MENA
4. Global Corporations in Wheat Value Chains
The Center on Globalization, Governance & Competitiveness (CGGC) is dedicated to carrying out innovative and interdisciplinary research that has an impact on corporations, social institutions, and public policy.

Global Value Chains
NC in the Global Economy
Engineering & Entrepreneurship
Environment
Global Health
nanotechnology

CGGC News
The Development and Diffusion of Powder Coatings in the US and Europe
December 8, 2009 - A new report sponsored by EDF’s Corporate Partnerships Program on the development and diffusion of powder coatings has been released by CGGC. The report tracks the development of powder coatings into different product markets, the factors that lead to their adoption in the US and Europe, and the key economic, political, and environmental challenges that shape powder coatings as a critical technology worldwide.

The Offshore Services Industry: A New Opportunity for Latin America (La Industria de Servicios Offshoring: Una Oportunidad para America Latina)
October 21, 2009 - Gery Gereffi, Mario Castelli and Karina Fernandez-Scott presented the paper "La Industria de Servicios Offshoring: Una oportunidad para America Latina" in the annual REDIBERO meeting, with the title, "La Promoción del Comercio y la Inversión extranjera en Iberoamérica: ¿Podemos avanzar hacia la promoción regional?". Presentation (in Spanish) | ADEP Policy Brief |

Hybrid Trucks: Strategic Win for Economy and Environment
June 11, 2009 - A high-tech truck convoy pulled up to Capitol Hill to showcase the emergence of fuel-and-anti-emissions-saving hybrid technology for the nation’s biggest vehicles. The event, organized by clean transportation group CALSTART, unveiled a new CGGC study that highlights jobs created in truck manufacturing as well as other areas crucial to building the green economy: advanced energy storage, power electronics and control systems.

Manufacturing Climate Solutions
NEW chapters now available!
Public Transit Buses | Wind Power | Residential Reinsulation

CGGC value chain analysis finds U.S. job opportunities in manufacturing low-carbon technologies.

Work Opportunities
Associate in Research - Value Chain Analysis of U.S. Rail Vehicle Manufacturing, 11/1/09 More Info |
Associate in Research - Value Chain Analysis of U.S. Advanced Battery Development & Manufacturing, 11/1/10 More Info |

CGGC Project Websites
- NC in the Global Economy
- Global Value Chains
- Global Engineering & Entrepreneurship
- Nanotechnology in Society

Search by Country

Source: http://cggc.duke.edu/
The New Global Economy: Trends and Implications

• Trends
  – **GVCs** as 80% of world trade (UNCTAD, WIR 2013)
  – *Concentration* of production and consumption in relatively few large emerging economies
  – **Consolidation** within GVCs in fewer, larger suppliers
  – More South-South trade = *shifting end markets*

• Implications
  – **More opportunities** for connection and upgrading in large emerging economies
  – **Challenges** for small countries and firms on the periphery
  – Economic upgrading ≠ Social upgrading
GVC APPROACH: UPGRADING AND GOVERNANCE
The GVC Approach

**TOP DOWN** – the global economy with a focus on lead firms and inter-firm networks, using varied typologies of industrial “governance”

**BOTTOM UP** – a focus on countries and regions, which are analyzed in terms of various trajectories of economic and social “upgrading” or “downgrading”
Five types of global value chain governance

Source: Gereffi at al. [2005]
Dynamics in Global Value Chain Governance

<table>
<thead>
<tr>
<th>Governance Type</th>
<th>Complexity of transactions</th>
<th>Ability to codify transactions</th>
<th>Capabilities in the supply-base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Modular</td>
<td>① High ② High</td>
<td>③ High ④ Low ⑤ High ⑥ Low</td>
<td></td>
</tr>
<tr>
<td>Relational</td>
<td>High</td>
<td>③ Low</td>
<td>⑤ High ⑥ Low</td>
</tr>
<tr>
<td>Captive</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

① increasing complexity of transactions (harder to codify transactions; effective decrease in supplier competence)
② decreasing complexity of transactions (easier to codify transactions; effective increase in supplier competence)
③ better codification of transactions (open or de facto standards, computerization)
④ de-codification of transactions (technological change, new products, new processes)
⑤ increasing supplier competence (decreased complexity, better codification, learning)
⑥ decreasing supplier competence (increased complexity, new technologies, new entrants)
GVCs in fresh vegetables sector (from Africa to UK)

Source: Dolan and Humphrey [2004]
ECONOMIC UPGRADING

• Strategies used by countries, regions, and firms to maintain or improve their positions in the global economy

• Upgrading refers to the acquisition of technological capabilities and market linkages that enable firms to improve their competitiveness and move into higher-value activities.

• Diverse mixes of government policies, institutions, corporate strategies, technologies, and worker skills are associated with upgrading success

• In general, a country upgrades when a critical mass of firms located within its borders achieves upgrading.
Social Upgrading: improving the livelihood of value chain actors and access for those who are excluded from the chain.

Environmental Upgrading: Process to improve environmental impacts of the chain through changes in the production system and management to reduce emissions and waste.
TRIPLE BOTTOM LINE: Diversified, Inclusive and Green Growth

Development Outcomes:
- Job creation
- Exports
- Income generation
- Added value
- Better use of resources
- Backward linkages

Economic Upgrading:
- Economic Upgrading
- Job creation
- Exports
- Income generation
- Added value
- Better use of resources
- Backward linkages

Social Upgrading:
- Inclusion of vulnerable groups
- Job creation
- Improve working conditions
- Higher wages
- Skills acquisition

Environmental Upgrading:
- Soil preservation and improvement
- Water conservation
- Wildlife conservation
- Pollution and waste reduction

Sustainable Growth
GVC Upgrading: Empirical Indicators

- Product Upgrading ➔ Unit price of goods
- Process Upgrading ➔ Productivity measures
- Functional Upgrading ➔ Backward/forward links
- Chain Upgrading ➔ Economic diversification
- Social Upgrading ➔ Wage rates, working conditions
- Environmental Upgrading ➔ Carbon footprint

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FUNCTIONAL UPGRAADING IN GVCS: Adding Capabilities – Mexican Blue Jeans

<table>
<thead>
<tr>
<th>U.S.-TORREON APPAREL COMMODITY CHAIN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1993</strong></td>
</tr>
<tr>
<td>UNITED STATES</td>
</tr>
<tr>
<td>Textiles</td>
</tr>
<tr>
<td>Trims and Labels</td>
</tr>
<tr>
<td>Cutting</td>
</tr>
<tr>
<td>Assembly</td>
</tr>
<tr>
<td>Laundry and Finishing</td>
</tr>
<tr>
<td>Distribution</td>
</tr>
<tr>
<td>Marketing</td>
</tr>
<tr>
<td>Retail</td>
</tr>
<tr>
<td>TORREON</td>
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<tr>
<td>Textiles</td>
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<tr>
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<tr>
<td>Cutting</td>
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<tr>
<td>Distribution</td>
</tr>
<tr>
<td>Marketing</td>
</tr>
<tr>
<td>Retail</td>
</tr>
</tbody>
</table>

| **1996**                             |
| UNITED STATES                        |
| Textiles                             |
| Trims and Labels                     |
| Cutting                              |
| Assembly                             |
| Laundry and Finishing                |
| Distribution                         |
| Marketing                            |
| Retail                               |
| TORREON                              |
| Textiles                             |
| Trims and Labels                     |
| Cutting                              |
| Assembly                             |
| Laundry and Finishing                |
| Distribution                         |
| Marketing                            |
| Retail                               |

| **2000**                             |
| UNITED STATES                        |
| Textiles                             |
| Trims and Labels                     |
| Cutting                              |
| Assembly                             |
| Laundry and Finishing                |
| Distribution                         |
| Marketing                            |
| Retail                               |
| TORREON                              |
| Textiles                             |
| Trims and Labels                     |
| Cutting                              |
| Assembly                             |
| Laundry and Finishing                |
| Distribution                         |
| Marketing                            |
| Retail                               |
Dynamic Value Added -- “Smile” Curve

The Smile Curve in GVCs: Variations
WHEAT GVC AND FOOD SECURITY
IN THE MIDDLE EAST AND NORTH AFRICA
Food Security in MENA Research Project

• Three-year project supported by US Dept. of Defense MINERVA Initiative for university-led research (http://minerva.dtic.mil/funded.html)

• Rank food security of MENA countries

• Apply GVC approach to identify vulnerabilities and leverage points in key food commodities in MENA countries

• Identify risks in the chain and strategic options to improve food security
1. A detailed **mapping of the actors** in specific value chains in particular countries or regions

2. An assessment of a **country’s position** in the GVC

3. The identification of **constraints and opportunities** for value chain development leading to strategies to drive sustainable industry growth
Methodology

- Value chain mapping
- Identification of global actors and institutions
- Country-level case studies: Egypt, Iran, Saudi Arabia, Syria and United Arab Emirates
- Comparative analysis of wheat GVCs and food security strategies in five countries
- **GOAL:** Use GVC framework to analyze MENA vulnerabilities & design more resilient food security strategies at the regional level
Global Agri-Food Companies

• Inputs (seeds, fertilizers, pesticides, herbicides): Monsanto, Syngenta, Ciba-Geigy

• **ABCD commodity traders** – move about 90% of the world’s grain: ADM (US - public); Bunge (US - public); Cargill (US - family firm); Louis Dreyfus (France - family firm)

• Food Processors: Unilever, Nestle, Kraft

• Supermarkets: Walmart, Carrefour, Tesco
Food Security in MENA

- Food security is a major challenge in MENA
- MENA is the largest wheat-importing region
- Climatic and land constraints and population growth fueled dependence on imports
- 2007-08 food crisis and civil unrest created value chain disruptions
- Higher food prices impact unrest
## MENA Country Typology and Level of Food Insecurity

<table>
<thead>
<tr>
<th>Resource-Poor Labor Abundant</th>
<th>Resource-Rich Labor Abundant</th>
<th>Resource-Rich Labor Importing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comoros</td>
<td>Yemen</td>
<td>Libya</td>
</tr>
<tr>
<td>Djibouti</td>
<td>Syria</td>
<td>Bahrain</td>
</tr>
<tr>
<td>Mauritania</td>
<td>Algeria</td>
<td>Kuwait</td>
</tr>
<tr>
<td>Somalia</td>
<td>Sudan</td>
<td>Oman</td>
</tr>
<tr>
<td>West Bank and Gaza</td>
<td>Iran</td>
<td>Qatar</td>
</tr>
<tr>
<td>Egypt</td>
<td>Iraq</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>Jordan</td>
<td></td>
<td>United Arab Emirates</td>
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<tr>
<td>Lebanon</td>
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<tr>
<td>Morocco</td>
<td></td>
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<tr>
<td>Tunisia</td>
<td></td>
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<tr>
<td>Israel*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Food Security is measured as total exports divided by food imports and food production per capita. Low Risk is defined as having one or both measure above global average. Moderate risk is defined as having one or both below global average. Acute risk is defined as one or both measures less than 50% the global average.

1 Syria’s food insecurity is acute due to the current civil war

2 Data not available

Source: CGGC based on data from world Bank Development Indicators and Breisinger et al, 2010
Wheat Global Value Chain

Inputs
- R&D
- Land
- Water
- Seeds
- Fertilizer
- Pesticide
- Machines
- Labor

Production
- Soft, Hard, Durum wheat
- Large farms
- Smallholders

Processing and Logistics
- Elevators
  - Cleaning
  - Drying
  - Blending
  - Storage
- Logistics
- Mills
  - Flour Milling
  - Packaging
- Feed Milling

Marketing
- Bakeries
- Supermarkets & Grocers
- Food manufacturers
- Wholesale
- Livestock production

Domestic
International

Trade
Trading companies
Offshore production

Supporting activities and institutions
- Government Regulations
- Trade Policies
- Futures Trading
- Financial Intermediaries
- Food aid
- Infrastructure
MENA Region Wheat Value Chain

**Inputs**
- R&D
- Land
- Water
- Seeds
- Fertilizer
- Pesticide
- Machines
- Labor

**Production**
- Soft, Hard, Durum wheat
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- Financial Intermediaries
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- Infrastructure

**Domestic**
- Trading companies
- Offshore production

**International**

Red: Acute disruption points in wheat GVC
COUNTRY CASES IN MENA’S WHEAT VALUE CHAIN
Where does MENA get its wheat, and how sticky is the relationship?

Different regions within MENA rely on different countries as their leading source of imported wheat. Depending on the country, these relationships have persisted since 2007.

- **Morocco**: has imported 9.3% of MENA’s wheat since 2007.
- **Algeria**: has imported 16.6% of MENA’s wheat since 2007.
- **Mauritania**: has imported 16.6% of MENA’s wheat since 2007.
- **Egypt**: has imported 25.9% of MENA’s wheat since 2007.
- **Syria**: has no stickiness.
- **Libya**: has imported 25.9% of MENA’s wheat since 2007.
- **Saudi Arabia**: has no stickiness.
- **Iran**: has no stickiness.
- **Iraq**: has no stickiness.

**SOURCE**: FAO, total tonnage of wheat exported.
## Food Security Strategy 2000 and 2013

<table>
<thead>
<tr>
<th>Food Security</th>
<th>Syria</th>
<th>Egypt</th>
<th>Saudi Arabia</th>
<th>UAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat Imports</td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
</tr>
<tr>
<td>Domestic Production</td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
</tr>
<tr>
<td>Offshore Production</td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
<td><img src="#" alt="2000 to 2013" /></td>
</tr>
</tbody>
</table>

- **2000** = Orange
- **2013** = Green
- **High** = Gray
- **Moderate** = Light Gray
- **Low** = White
2000s: Egypt Pre-Social Unrest Wheat Value Chain

Production
Small & Medium Farms
8 million tons

Processing
Storage
6 months

Imports 10 million tons

Mills

Consumption
Bakeries
- < $.01/ loaf (govt. subsidized price)
- No enforcement of rationing at 7 loaves

Importing 4 - 5 million tons

Currency Reserves
$36 billion

2013: Egyptian Social Unrest Wheat Value Chain

Production
Small & Medium Farms
9.5 million tons

Processing
Storage
<3 months

Mills

Consumption
Bakeries
- Bread rationing at 3 loaves
- 5.5% price increase in wheat flour
- 2.3% price increase in bread
- Available bread $0.7/loaf

Importing 4 - 5 million tons

Currency Reserves
$18.9 billion

Red: Acute disruption points in wheat GVC
2000s: Syria Pre-Conflict Wheat Value Chain

Production
- Small & Medium Farms
  - 4 million tons

Processing
- Collection Centers: 140
- Mills: 8,000 – 9,000 tons of flour/day
- Storage: 3.5 - 4 million tons
- Imported 0.37 million tons

Consumption
- Bakeries
  - Mostly damaged
- Price is 20% below production cost
- 0.23 USD for 1.5 kgs of subsidized bread
- 1.4 USD for 1.5 kgs of bread
- Acute bread shortage

Red: Acute disruption points in wheat GVC

International Bank Accounts
- Currently frozen

2013: Syrian Conflict Wheat Value Chain

Production
- Small & Medium Farms
  - 2 - 2.4 million tons

Processing
- Collection Centers: 40
- Mills: 4,800 - 5,400 tons of flour/day
- Storage: 2.9 million tons
- Imported: 1 million tons
- Unmet need: 2 million tons

Consumption
- Bakeries
  - Mostly damaged
- 1.4 USD for 1.5 kgs of bread
- Acute bread shortage

International Bank Accounts
- Currently frozen
GLOBAL CORPORATIONS IN WHEAT VALUE CHAINS
Interaction of Global and Local Food Value Chains

Global value chain

- Agri-Business (ADM)
- Food Manufacturers (Kraft, Nestlé)
- Fast-food Franchises (McDonald’s, KFC)
- Retailers (supermarkets, discount foods, Wal-Mart)

Local value chain

- Local Farmers
- Local Food Producers
- TNC Franchises (fast-food chains)
- Local Franchises (fast-food & traditional)
- Local Retailers (supermarkets, convenience stores, street vendors)

Food Consumption Patterns

-------------------------- Trade flows
Agribusiness in the Wheat GVC

• Link production to consumption
• Consolidate production
• Manage uncertainties
• Invest in R&D and logistics
• Ensure traceability and safety
## Major Grain Traders in MENA

<table>
<thead>
<tr>
<th>Company</th>
<th>Headquarters</th>
<th>Type</th>
<th># of employees</th>
<th>Sales Revenues USD (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archer Daniels Midland (ADM)</td>
<td>United States</td>
<td>Public</td>
<td>29,300</td>
<td>61.7</td>
</tr>
<tr>
<td>Bunge Limited</td>
<td>United States</td>
<td>Public</td>
<td>~30,000</td>
<td>45.7</td>
</tr>
<tr>
<td>Cargill</td>
<td>United States</td>
<td>Private</td>
<td>131,000</td>
<td>107.9</td>
</tr>
<tr>
<td>Louis Dreyfus</td>
<td>France</td>
<td>Private</td>
<td>34,000</td>
<td>~35.0</td>
</tr>
<tr>
<td>Glencore Xstrata</td>
<td>Switzerland</td>
<td>Public</td>
<td>n/a</td>
<td>10.4 (Agri-only)</td>
</tr>
</tbody>
</table>

Source: Dy 2011
Initial Takeaways from MENA Study

• GVC lead firms influence wheat trade
• Increased dependency on imports pushes higher dependence on the multinational grain traders
• Food security strategies vary among MENA countries
• Supply disruptions dramatically affect bread prices
• Strong role of government in MENA (wheat imports, grain elevators and mills, subsidized bread prices)
• Resilient food security regimes require diversified options involving government-private sector collaboration
Broader GVC Issues for Food Security

• What can GVC governance structures contribute to the analysis of stable regions and states?

• How should economic and social upgrading be defined operationally in terms of food security and nutrition?

• What can global corporations do to address food security challenges amidst actual or potential social unrest in developing regions like MENA?

• Does offshore production in developing countries have a legitimate role to play in reducing food insecurity problems in MENA and globally?

• What guidelines can be provided to state actors in their legitimate desires to promote national food security?
THANK YOU!
QUESTIONS?

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