Role of Food Processing and Post-harvest Management in Improving Food and Nutrition Security in Cities

Rosa S. Rolle, Ph.D
Senior Agro-Industries and Post-Harvest Officer
FAO RAP

Overview

- Urbanization and its impacts on food demand;
- Impact of urbanization on food and nutrition security;
- Challenges of meeting the food requirements of cities in the region
- Role of post-harvest management and processing
  - Enabling factors required
- Conclusion
Urban Population in the Asia-Pacific 1990 and 2010

UNESCAP Statistical Yearbook for Asia and the Pacific 2011

Urbanization Trends in Asia

Source: UNESCAP, 2011
Role of food processing and post-harvest management in improving food and nutrition security in cities

Urban Slum Population - Countries in Asia and the Pacific, 2005

Source: UNESCAP

Urbanization and Food Demand

Rosa S. Rolle, Ph.D
Senior Agro-Industries and Post-Harvest Officer
FAO RAP
1. Impacts of Urbanization

- Diversification of diets


2. Impacts of Urbanization

- Increased consumption of processed foods
  - Foods that have minimal time requirements for preparation
    - Cooking in the package
    - Ready-to-eat
    - Ready-to-cook
Increasing Consumption of Ready-To-Eat and Prepared Foods

How often do you purchase ready to eat meals rather than traditional meals made from scratch?

Top 10 - Frequently

Increased Demand for Pre-Packaged Foods in Cities

Foods Produced in the Formal Sector
Increased Demand for Pre-Prepared Foods in Cities

Foods sold in the Informal Sector

3. Impacts of Urbanization

- Increased demand for fresh and processed foods that are safe and of good quality in cities.
Role of food processing and post-harvest management in improving food and nutrition security in cities

How Is Urbanization Impacting on Food and Nutrition Security?

FOOD SECURITY

- Food security exists when all people at all times have physical and economic access to safe and nutritious food for a healthy and active life (FAO, 1996).

Dimensions of Food Security

- **Availability**
  - Supply of food from domestic production, import and food aid.

- **Access**
  - Adequate resources of people to obtain food;
  - Affordability of the food supply

- **Utilization**
  - Health situation of the people;
  - The culture and livelihood of societies;
  - Clean water, sanitation, health

- **Stability**
  - Variability in any of the above, and in coping capacity

Factors that Impact on **Access** to Food in Urban Areas

**Access** to food in urban areas:

- Is dependent on cash exchange
  - Most of the food needed by the household must be purchased;

- Is dependent on the market system and on processed food.

Wage employment and monetary income are, therefore, main prerequisites for achieving food and nutrition security in urban environments.
Quality of Diversified Diets for the Urban Poor?

- **Basic Food Products**
  - Basic Staple Foods
  - Little attention to Safety & Quality
  - Low Income

- **Convenience Products**
  - Products with Specific Attributes

- **Specialty Food Products**

**CONSUMER DEMAND TRENDS**

- **Exotic and Specialty Produce**
  - Innovation
  - Healthy Options
  - Up-market
  - Supermarkets

- **Mainstream Horticultural Produce**
  - Variety
  - Convenience
  - Safety and Quality
  - Basic
  - Wet Market

- **Price and Freshness**
Role of food processing and post-harvest management in improving food and nutrition security in cities

Key Challenges in Feeding Cities

- Responding to and meeting the needs of diversified diets in urban centers by the traditional food supply chains that predominate in cities across the region.

Characteristics of Traditional Supply Chains

- Production orientation
- Fragmented production units
- Multi-layered channels
- Un-differentiated products
- Minimal value added
- Predominance of wholesalers
- Production Push
- High levels of post-harvest loss

...Key Challenges in Feeding Cities

- High levels of post-harvest losses in food marketing channels
  - Increase food prices
  - Reduce food availability

Compression Damage

Trimming losses in cabbage due to insect/physical damage
Role of food processing and post-harvest management in improving food and nutrition security in cities

Post harvest Losses in Rice in South East Asia

<table>
<thead>
<tr>
<th>Activity</th>
<th>Estimated Range of Loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvest</td>
<td>1-3</td>
</tr>
<tr>
<td>Handling</td>
<td>2-7</td>
</tr>
<tr>
<td>Threshing</td>
<td>2-6</td>
</tr>
<tr>
<td>Drying</td>
<td>1-5</td>
</tr>
<tr>
<td>Storage</td>
<td>2-6</td>
</tr>
<tr>
<td>Transport</td>
<td>2-10</td>
</tr>
<tr>
<td>Total</td>
<td>10-27</td>
</tr>
</tbody>
</table>

Source: FAO

Factors that Contribute to Losses in Grains

- Inadequacy of drying and threshing facilities
- Improper and inadequate transportation and handling
- Poor design of storage infrastructure
- Poor storage management
- Poor milling techniques
- Low level of farmer awareness
- Insect pests and rodents throughout the post-harvest chain.
Role of food processing and post-harvest management in improving food and nutrition security in cities

Post-harvest Losses in Fruits and Vegetables in Selected Asian Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Fruit (%)</th>
<th>Vegetables (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>25 - 40</td>
<td>20-30</td>
</tr>
<tr>
<td>Malaysia</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Thailand</td>
<td>14</td>
<td>17 - 35</td>
</tr>
<tr>
<td>Philippines</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>Indonesia</td>
<td>15 - 40</td>
<td>15 - 40</td>
</tr>
</tbody>
</table>

Source: Bautista (2001)

Quantitative Loss At Various Points of the Supply Chain in Thailand

<table>
<thead>
<tr>
<th>Crop</th>
<th>Farm to Wholesale</th>
<th>Wholesale to Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wt. Loss (%)</td>
<td>Defects (%)</td>
</tr>
<tr>
<td>Cucumber</td>
<td>2.55</td>
<td>3.77</td>
</tr>
<tr>
<td>Sweet Pepper</td>
<td>4.88</td>
<td>5.13</td>
</tr>
<tr>
<td>Lettuce</td>
<td>2.87</td>
<td>2.58</td>
</tr>
<tr>
<td>Tomato</td>
<td>3.33</td>
<td>6.89</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>1.57</td>
<td>3.32</td>
</tr>
</tbody>
</table>

Source: Amuttiratnana and Passornsiri (1992)
Causes of Losses in Fruits and Vegetables

- **Technical causes:**
  - Damage due to poor handling and packaging
  - Temperature abuse
  - Water loss owing to poor relative humidity management

- **Organizational causes:**
  - Multi-layering of supply chains

Key Roles of PH Management

- Increase efficiency in supply chains to feed urban populations
- Reduce losses
**Schematic development of FSCs in relation to post-harvest infrastructure.**

- Developing countries: rudimentary post-harvest infrastructure
- Transitional countries: limited infrastructure (e.g., packing houses, storage facilities)
- Industrialized countries: advanced infrastructure (e.g., cold chains)

Enabling Factors

- Improved transport and logistics systems
- Roads
- Markets
- Infrastructure for storage and marketing
- Improved organization of small farmers
- Human resource development to:
  - Upgrade technical and organizational skills for post-harvest loss reduction
  - Improve efficiency

---


©2010 by The Royal Society
Technical Roles of Processing

- Enhance nutritional quality
- Increase shelf-life
- Improves transportability
- Meet consumer needs for convenience
- Reduce post-harvest losses
- Improve food safety and quality
- Add value

Contribution of Processing to Improving Food and Nutrition Security in Cities

<table>
<thead>
<tr>
<th>Benefits of Processing</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Added value</td>
<td>- (\uparrow) income and access</td>
</tr>
<tr>
<td>- Reduced post-harvest losses</td>
<td>- (\uparrow) food availability</td>
</tr>
<tr>
<td>- Income generation</td>
<td>- (\uparrow) access to food</td>
</tr>
<tr>
<td>- Employment creation</td>
<td>- (\uparrow) access to food</td>
</tr>
<tr>
<td>- Improved safety, nutritional quality and taste</td>
<td>- (\uparrow) access to safe and nutritious food</td>
</tr>
</tbody>
</table>
Enabling Factors for Improvements in Processing

- Access to consistent supplies of good quality raw materials
- Access to technologies of an appropriate scale
- Access to credit
- Human Resource Development
  - Meeting requirements for food safety and quality

Conclusion

- Assurance of food security and nutrition in cities hinges greatly on developing efficiency in post-harvest handling, processing, storage, packaging, preservation, and distribution of food that is affordable.
Role of food processing and post-harvest management in improving food and nutrition security in cities

Rosa S. Rolle, Ph.D
Senior Agro-Industries and Post-Harvest Officer
FAO RAP