Prospects and Challenges of Postharvest and Food Processing in Ethiopia

By

Ali Mohammed (BSc, MSc, PhD)

Department of Postharvest Management
Jimma University College of Agriculture and Veterinary Medicine

ali.mohammed@ju.edu.et or alimhmd@yahoo.om

January 16-20, 2017
Bahir Dar, Ethiopia
Contents of presentation

• Introduction
• Trends of crop production in Ethiopia
• Importance & potential of the Horticulture Subsector
• The Challenge: Huge Postharvest loss
• How can Postharvest & food processing contribute to better nutrition?
• Main Challenges of PH in the Ethiopia &
• Suggested interventions
• What has been Achieved so far?
• Reflection on the BDU-IUC project
Introduction

• The agriculture and rural development policy emphasises the combined effort of effective natural resources utilization and intensive use of technologies

• The several strategic and operational plans are enforced to improve the productivity level and quality of produce,

• Ethiopia had achieved a successive agricultural growth which had increased production and productivity of major grain crops,

• The production increase had stimulated the emerging agro-industries and export market,

• It had also created jobs for millions of citizens who live in rural and urban areas
Trends of crop production in Ethiopia

**Fig. 1:** Trends of private peasant holdings Cultivated Area of Land during main season from 2005/06 (E.C) to 2014/15 (2007 E.C)

- **Years of Crop Production:** 2005/06 (1998 E.C) - 2014/15 (2007 E.C)
- **Cultivated Area of Land in millions of Hectare:**
  - **Grain crops**
  - **Cash crops**
  - **Root Crops**
  - **Vegetables**
  - **Fruit Crops**

- The cultivated area trend shows an overall increase in grain crops and fruit crops, with slight fluctuations in the years 2009/10 to 2010/11. Cash and root crops remain relatively consistent, while vegetables show a slight decrease in the later years.
Fig. 2: Trends of private peasant holdings various Crop production during main season from 2005/06 (1998 E.C) to 2014/15 (2007 E.C)
Fig 6: The Status of Grain crops Cultivated Area of private peasant holdings across the regional states during main season from 2005/06 (1998 E.C) to 2014/15 (2007 E.C)
Importance & Potential of the Horticulture Sub-sector

In Ethiopia, Horticulture is a recent development but with a growing trend.

- Food self-sufficiency
- Nutrition
- Raw material for agro-industries
- Source of foreign currency
- Source of employment
- Environmental Management

In Ethiopia, the fruit and vegetable sub-sector has seen over 17% average growth over the last 10 years, and the government aims to increase production by an additional 47% from 2015-2020.
Developing a tomato concentrate processing plant in Ethiopia has been identified as a sector with significant investment opportunities. Here we feature a potential greenfield investment opportunity. Ethiopia is a promising market, particularly for investors with expertise in different scales, $1.5 million and $4 million, each with an expected IRR of 30-35%.
Ethiopia is a net importer of fruits, with imports growing at ~30% since 2010.

**Ethiopia’s fruit imports and exports (tons)**

- **Exports**
- **Imports**

<table>
<thead>
<tr>
<th>Year</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>2,044</td>
<td>14%</td>
<td>21%</td>
<td>17%</td>
</tr>
<tr>
<td>2010</td>
<td>3,467</td>
<td>47%</td>
<td>11%</td>
<td>28%</td>
</tr>
<tr>
<td>2011</td>
<td>4,525</td>
<td>15%</td>
<td>23%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Tropical fruit juices and mixtures are becoming increasingly popular.

**Ethiopia’s fruit juice imports by category (tons)**

- **Unsatisfied demand of tomato paste**
- **Existing local production of tomato paste**

Demand for juice is growing rapidly, and is projected to grow by 1.6x from 2012-20.

Source: ATA (2016)
Table: Summary of fruit & vegetable consumption patterns

<table>
<thead>
<tr>
<th></th>
<th>Ethiopia</th>
<th>Burundi</th>
<th>Malawi</th>
<th>Mozambique</th>
<th>Tanzania</th>
<th>India</th>
<th>China</th>
<th>Guinea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vegetable consumption</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% consuming</td>
<td>93%</td>
<td>72%</td>
<td>94%</td>
<td>88%</td>
<td>90%</td>
<td>95%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity (kg/person/yr)</td>
<td>20</td>
<td>30</td>
<td>56</td>
<td>88.2</td>
<td>68.2</td>
<td>53.8</td>
<td>51</td>
<td>31.2</td>
</tr>
<tr>
<td>Value (US$/person/yr)</td>
<td>3.3</td>
<td>2.0</td>
<td>6.6</td>
<td>10.7</td>
<td>21.3</td>
<td>9.3</td>
<td>29.1</td>
<td>15.1</td>
</tr>
<tr>
<td>Price (US$/kg)</td>
<td>0.27</td>
<td>0.23</td>
<td>0.13</td>
<td>0.27</td>
<td>0.23</td>
<td>0.17</td>
<td>0.57</td>
<td>0.48</td>
</tr>
<tr>
<td>% of food budget</td>
<td>9.4%</td>
<td>9.4%</td>
<td>11.6%</td>
<td>7.9%</td>
<td>8.1%</td>
<td>9.2%</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>% of total budget</td>
<td>5.6%</td>
<td>6.7%</td>
<td>9.3%</td>
<td>5.6%</td>
<td>4.6%</td>
<td>5.7%</td>
<td>3.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Fruit consumption</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% consuming</td>
<td>20%</td>
<td>50%</td>
<td>45%</td>
<td>23%</td>
<td>72%</td>
<td>57%</td>
<td>46%</td>
<td>22%</td>
</tr>
<tr>
<td>Quantity (kg/person/yr)</td>
<td>1.3</td>
<td>15.8</td>
<td>11.9</td>
<td>13.4</td>
<td>22.2</td>
<td>15.3</td>
<td>25.8</td>
<td>23.6</td>
</tr>
<tr>
<td>Value (US$/person/yr)</td>
<td>0.4</td>
<td>3.1</td>
<td>2.8</td>
<td>1.6</td>
<td>3.4</td>
<td>4.6</td>
<td>5.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Price (US$/kg)</td>
<td>0.31</td>
<td>0.2</td>
<td>0.24</td>
<td>0.12</td>
<td>0.15</td>
<td>0.3</td>
<td>0.23</td>
<td>0.08</td>
</tr>
<tr>
<td>% of food budget</td>
<td>0.4%</td>
<td>1.8%</td>
<td>1.9%</td>
<td>1.3%</td>
<td>2.5%</td>
<td>4.2%</td>
<td>1.9%</td>
<td>1.3%</td>
</tr>
<tr>
<td>% of total budget</td>
<td>0.3%</td>
<td>1.3%</td>
<td>1.2%</td>
<td>0.8%</td>
<td>1.7%</td>
<td>3.4%</td>
<td>0.7%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Source: Woldsadiq, 2007

We have to work hard towards improving our food habit for more than 96 million people & 2.56% growth rate.
Annual Ethiopian export earnings from fruit and vegetable Million USD

Source: EHDA, 2012

Source: (ATA, 2016)
GoE aims to increase production by 47% between 2015 and 2020 based on its Growth and Transformation Plan II (GTP II).

**Hawassa-Arbaminch Corridor**
- 6,000 hectares commercial development
- 20,000 hectares out-growers holding
- Modern warehouse under construction
- Distance to:
  - Djibouti: 903km
  - Port Djibouti: 1008km

**Bahirdar, Abay Valley & South Gondar Corridor**
- 10,000 hectares commercial development
- 40,000 hectares out-growers holding
- International airport and modern warehouse
- Distance to:
  - Djibouti: 687Km
  - Port Djibouti: 792Km
  - Sudan: 348Km
  - Port Sudan: 1282Km

**Adiss Ababa & Oromia Corridor**
- 10,000 hectares commercial development
- 30,000 hectares out-growers holding
- International airport and modern warehouse facility
- Distance to:
  - Djibouti: 662km
  - Port Djibouti: 767km

**Mekele, Raya & Alamata Corridor**
- 4,000 hectares commercial development
- 40,000 hectares out-growers holding
- International airport & modern warehouse facility
- Distance to:
  - Djibouti: 521km
  - Port Djibouti: 626km

**Awash, Diredawa & Harar Corridor**
- 20,000 hectares commercial development
- 20,000 hectares out-growers holding
- Airport facility and modern warehouse
- Distance to:
  - Djibouti: 309Km
  - Port Djibouti: 414Km
<table>
<thead>
<tr>
<th>Description</th>
<th>Location - South West Amhara</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops</td>
<td>Sorghum and sesame, fruits and vegetables, dairy, meat and other animal products</td>
</tr>
<tr>
<td>Growing area available</td>
<td>398,095 hectares</td>
</tr>
<tr>
<td>Total area of IAIP</td>
<td>154.99 hectares</td>
</tr>
</tbody>
</table>

IAIP Total area 154.99 ha
University training programmes:
- Mechanical and electric engineering
- Design and construction
- Food and consumer goods technology
- Economics and management
- Service and hospitality
- Agricultural science
- Natural resource management
- Business administration and management

<table>
<thead>
<tr>
<th>Graduates from Ethiopian institutions</th>
<th>Average payment USD/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVET</td>
<td>125,738</td>
</tr>
<tr>
<td>Graduate</td>
<td>8,021</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>86,210</td>
</tr>
</tbody>
</table>

Source: Statistical Report on the 2014 urban employment unemployment survey
Interestingly, Ethiopia is blessed with all congenial conditions to produce bumper yield of diverse crops:

- **Human resources**
- **Arable land**
- **Massive water source** (even called the water tower of Africa)
- **Diverse and Congenial Climate** (conducive for production of Tropical, subtropical and temperate environments)

In respect of production and export potential for horticultural crops, Ethiopia is on a good platform.
Infrastructure

• The Bole International airport
• Newly developed international airports

Accessible export platform to international market

• Ethiopia is ideally positioned for the export packaged fruits and vegetables, providing preferential access to over 400 million people in 19 member countries
  – the Common market for Eastern and Central Africa (COMESA),
  – USA under the AGROA agreement, and
  – EU under the every-thing-but-arms treaty
17 | MARKET OPPORTUNITIES

- Local population of 96.5 million (2014)
  - Population growth 2.5%
- Duty free access to U.S. market under African Growth and Opportunity Act (AGOA)
- Ethiopia concluded bilateral investment treaties (BITs) and double taxation treaties (DTTs) with a number of countries:
  - BIT: Algeria, Austria, Belgium, Luxembourg, China, Denmark, Egypt, Equatorial Guinea, Finland, France, Germany, India, Iran, Israel, Italy, Kuwait, Libya, Malaysia, Netherlands, Nigeria, Russian Federation, South Africa, Spain, Sudan, Sweden, Switzerland, Tunisia, Turkey, United Kingdom, and Yemen.
  - DTT: China, Czech Republic, Iran, Israel, South Africa, Tunisia, Turkey, and United Kingdom.
- Everything but Arms Agreement (EBA) with the European Union
- Ethiopia is part of the Cotonou agreement between the European Union and the African, Caribbean and Pacific Group of States (ACP countries); and the
  - Common Market for Eastern and Southern Africa (COMESA)
    - Free trade area
    - 19 African countries
    - Population of 470 million
- Investment guarantees
  - Ethiopia is a member of the Multilateral Investment Guarantee Agency, a World Bank affiliate, and a signatory to the Convention on the Settlement of Investment Disputes Between States and Nationals of Other States.
Reduction of Post Harvest Loss—The Neglected Dimension in Increasing Food and Nutrition Security!
Fig 1. The critical link between production and consumption—Postharvest
• “The world produces enough food to feed everyone”, yet at the same time an estimated one in eight people, or some 870m, suffer from chronic undernourishment (The Economist, 2014).

• How come people have no enough food to eat when the world produces enough?

Food loss and waste, which occur throughout the globe’s countless food supply chains.
Postharvest losses of all types of foods are high

- This is true Globally and for Sub-Saharan Africa, East Africa, Ethiopia
- FAO sponsored case studies (2010 through 2015)

**Weight** = Food Loss is 1.3billion tons

**Nutrition** = 1.5 Quadrillion kcal

**Monetary** = 1 trillion Dollar
The link appears very short however it is more than what many people think!
## Table. Loss in terms of yield and Monetary value incurred due to postharvest loss in three cereals and a legume in 2013/14

<table>
<thead>
<tr>
<th>Crop</th>
<th>Production (Qt), CSA (2013/14)</th>
<th>% Share</th>
<th>Yield Reduced, (Qt)</th>
<th>25% Loss (FAO)</th>
<th>Ave. Price (Birr/qt)</th>
<th>Total Loss (Birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>64,915,402.92</td>
<td>25.80</td>
<td>16,228,850.7</td>
<td>800</td>
<td>12,983,080,560</td>
<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td>38,288,701.03</td>
<td>15.20</td>
<td>9,572,175.25</td>
<td>1000</td>
<td>9,572,175,250</td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td>39,251,941.35</td>
<td>15.60</td>
<td>9,812,985.3</td>
<td>1200</td>
<td>11,775,582,360</td>
<td></td>
</tr>
<tr>
<td>H. beans (white)</td>
<td>1,987,777.65</td>
<td>0.79</td>
<td>496,944.4</td>
<td>1200</td>
<td>596,333,280</td>
<td></td>
</tr>
<tr>
<td>H. beans (red)</td>
<td>2,586,338.48</td>
<td>1.03</td>
<td>646,584.6</td>
<td>1000</td>
<td>646,584,600</td>
<td></td>
</tr>
<tr>
<td><strong>Total Loss, ETB</strong></td>
<td><strong>147,030,161</strong></td>
<td></td>
<td><strong>36,757,540.25</strong></td>
<td></td>
<td><strong>35,573,756,050</strong></td>
<td></td>
</tr>
</tbody>
</table>
Table. Production and postharvest loss of selected fruits and vegetables in Ethiopia (2015/2016)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Total Production (Qt)</th>
<th>PPHL (%)</th>
<th>Amount Lost (Qt)</th>
<th>Unit Price (Birr/Qt)</th>
<th>Monetary Value (Birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato</td>
<td>36,576,382.69</td>
<td>37.15*</td>
<td>13,588,126.17</td>
<td>1,000.77</td>
<td>13,598,589,026.49</td>
</tr>
<tr>
<td>Tomato</td>
<td>12,581,433.98</td>
<td>45.32*</td>
<td>5,701,905.88</td>
<td>1,300.17</td>
<td>7,413,446,967.66</td>
</tr>
<tr>
<td>Mango</td>
<td>1,003,514.90</td>
<td>43.53*</td>
<td>436,830.04</td>
<td>2,700.39</td>
<td>1,179,611,460.83</td>
</tr>
<tr>
<td>Avocado</td>
<td>538,245.79</td>
<td>40.00</td>
<td>215,298.32</td>
<td>2,000.00</td>
<td>430,596,632.00</td>
</tr>
<tr>
<td>Banana</td>
<td>4,401,344.16</td>
<td>45.78**</td>
<td>2,014,935.36</td>
<td>2,100.64</td>
<td>4,232,653,807.17</td>
</tr>
<tr>
<td>Total</td>
<td>55,100,921.52</td>
<td></td>
<td>21,957,095.76</td>
<td></td>
<td>26,854,897,894.14</td>
</tr>
</tbody>
</table>

Calculated from CSA Ethiopia (2016)

* Mohammed Kasso and Afework Bekele (2016)
** Zenebe et al. (2015)
Qt = 100kg
Estimated Postharvest Losses (%) of Fruits & Vegetables in Ethiopia based on Interviews (Tadesse, 1991)

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guava</td>
<td>49.2</td>
</tr>
<tr>
<td>Pineapple</td>
<td>28.2</td>
</tr>
<tr>
<td>Mango</td>
<td>26.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Total Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>September</td>
<td>29.06</td>
</tr>
<tr>
<td>2012</td>
<td>October</td>
<td>28.19</td>
</tr>
<tr>
<td>2012</td>
<td>November</td>
<td>39.44</td>
</tr>
<tr>
<td>2012</td>
<td>December</td>
<td>41.99</td>
</tr>
<tr>
<td>January</td>
<td></td>
<td>35.74</td>
</tr>
<tr>
<td>February</td>
<td></td>
<td>31.32</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td>25.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>33.07</strong></td>
</tr>
</tbody>
</table>

*Figure 1. Loss tomato fruits along the value chain in Eastern Shewa Zone, Ethiopia*
Table 3  Type and estimated post-harvest losses and quality deterioration of the dominantly cultivated horticultural crops.

<table>
<thead>
<tr>
<th>Horticulture</th>
<th>Types of major loss</th>
<th>Estimated loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>Abrasion, bruise, rupture, softening, shrivel, sore, bleach, squash, crash, over ripen</td>
<td>45.32</td>
</tr>
<tr>
<td>Mango</td>
<td>Wound, scratch, rotting, bleach, squash, puncture</td>
<td>43.53</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Scratch, flaccid, decay, bleach, spot, compression, wound, wilting, crush, sprouting</td>
<td>37.15</td>
</tr>
<tr>
<td>Orange</td>
<td>Abrasion, discolor, sour, decomposition, shrinkage, rough and thick peal</td>
<td>35.58</td>
</tr>
<tr>
<td>Mandarin</td>
<td>Abrasion, discolor, sour, decomposition, shrinkage, rough and thick peal</td>
<td>34.25</td>
</tr>
<tr>
<td>Papaya</td>
<td>Scratch, flaccid, decay, bleach, spot, compression, lesion, crash</td>
<td>30.31</td>
</tr>
<tr>
<td>Khat</td>
<td>Wilting, leaf shot burn, weight loss, leaf puncture</td>
<td>27.34</td>
</tr>
<tr>
<td>Onion</td>
<td>Decay, wilt, shrink, flaccid, sprouting</td>
<td>25.21</td>
</tr>
<tr>
<td>Guava</td>
<td>Skin scratch, bruising, rotting, softening, discolor</td>
<td>23.10</td>
</tr>
<tr>
<td>Green pepper</td>
<td>Flaccid, decay, wilting, color change</td>
<td>22.54</td>
</tr>
<tr>
<td>Banana</td>
<td>Decay, softening, bruising, chilling, peal split and breakage, skin graze</td>
<td>19.87</td>
</tr>
<tr>
<td>Coffee</td>
<td>Shrivel, bleach, shrunk seed</td>
<td>15.75</td>
</tr>
</tbody>
</table>
The figures could be dubious if methods are not comprehensive

• Commodity assessment System (La Gra, 1991)
• RLAT
• Load Tracking (FAO,
Table 1: Production and yield of major food crops in the year 2014/15 (CSA, 2015)

<table>
<thead>
<tr>
<th>Crop Categories</th>
<th>Production (q)</th>
<th>Share of Crop Category (%)</th>
<th>Yield (q/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>236,076,624</td>
<td>69.8</td>
<td>23.2</td>
</tr>
<tr>
<td>Pulses</td>
<td>26,718,345</td>
<td>7.9</td>
<td>15.5</td>
</tr>
<tr>
<td>Oilseed</td>
<td>7,600,993</td>
<td>2.2</td>
<td>11.8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>5,954,004</td>
<td>1.8</td>
<td>62.1</td>
</tr>
<tr>
<td>Root Crops</td>
<td>54,615,540</td>
<td>16.2</td>
<td>175.1</td>
</tr>
<tr>
<td>Fruit Crops</td>
<td>7,066,486</td>
<td>2.1</td>
<td>171.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>338,031,992</strong></td>
<td><strong>100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Loss and additional area required for major food crops in the year 2014/15 (extrapolated from CSA, 2015)

<table>
<thead>
<tr>
<th>Crop Categories</th>
<th>Lost Production (q)</th>
<th>Share of loss by Crop Category (%)</th>
<th>Total Additional Area Required (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>59,019,156</td>
<td>78.0</td>
<td>2,535,810</td>
</tr>
<tr>
<td>Pulses</td>
<td>6,679,629</td>
<td>12.0</td>
<td>389,652</td>
</tr>
<tr>
<td>Oilseed</td>
<td>1,900,248</td>
<td>6.6</td>
<td>213,874</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1,484,845</td>
<td>1.1</td>
<td>34,793</td>
</tr>
<tr>
<td>Root Crops</td>
<td>13,572,507</td>
<td>1.6</td>
<td>53,214</td>
</tr>
<tr>
<td>Fruit Crops</td>
<td>1,765,523</td>
<td>0.7</td>
<td>22,310</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>84,421,908</strong></td>
<td><strong>100.0</strong></td>
<td><strong>3,249,652</strong></td>
</tr>
<tr>
<td>Crop Categories</td>
<td>Monetary Value of Lost Production (Birr)</td>
<td>Number of People to be fed with the lost Food</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Cereals</td>
<td>36,346,512,936</td>
<td>44,766,635,978</td>
<td>101,842,105</td>
</tr>
<tr>
<td>Pulses</td>
<td>6,773,548,741</td>
<td>6,789,401,360</td>
<td>3,679,663</td>
</tr>
<tr>
<td>Oilseed</td>
<td>3,605,173,042</td>
<td>3,640,503,507</td>
<td>5,007,028</td>
</tr>
<tr>
<td>Vegetables</td>
<td>3,357,524,586</td>
<td>3,357,524,586</td>
<td>261,460</td>
</tr>
<tr>
<td>Root Crops</td>
<td>7,493,931,449</td>
<td>7,493,931,449</td>
<td>7,042,508</td>
</tr>
<tr>
<td>Fruit Crops</td>
<td>972,815,570</td>
<td>972,815,570</td>
<td>734,595</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>58,549,506,324</strong></td>
<td><strong>67,020,812,450</strong></td>
<td><strong>118,567,359</strong></td>
</tr>
</tbody>
</table>
Losses and other uses = 2.04 million tons of grain

vs

Cereal import = 1.16 Million tons (FAO, 2012)

Therefore, the imported grain could have been avoided had there been appropriate postharvest management system.
Figure 1: Spoiled onion, displayed for sale with discount (A) and discarded (B)

Figure 2: Tomatoes in wooden crates. D: Mixture of ripe and unripe tomatoes; E: Wounded and bruised; F: Rejected tomatoes
How safe is the food?

How was the food produced?

Who can confirm these all?

How good is the quality of the food?

Who should worry about food quality & safety?
Farmers in many places in Ethiopia sell grains with mold for 50% less the normal price normal price.

Wholesalers suggested to have paid 11.5 birr for a kilo of onion which is being sold for up to 5 birr when rotten and becomes less appealing. i.e. 56% less.

Figure 7: Mean frequency, relative density and incidence of fungal genera recovered from storage facilities in selected Districts of Jimma zone (2011/2012)
Problems related to postharvest loss are often underestimated

- Food loss is the cause for a number of things
  - Forest clearance,
  - GHG emission
  - Increased food prices,
  - Loss of wet lands,
  - Loss of biodiversity
  - Climate change
What can be done?

- How fast is our population growing?

- How much more food do we need to produce for the growing population?

- How much more land do we need to produce the required food?

- Is there any other means of increasing available food to ensure food security?
How can Postharvest & food processing contribute to better nutrition?

PH and food processing can contribute to better nutrition through:

- **increased availability** of nutritious foods at a reasonable price (on the farm, for sale in local markets)
- **extending the season** when nutritious foods are available (via storage, processing)
- **increasing purchasing power** (improve access to nutritious foods for low income rural populations)
- **Enriching foods** through processing and value addition
- **enhanced quality and safety of foods**
- **removal of Anti-nutritional factors**
Main Challenges of PH in the Ethiopia

• Lack of awareness and skill (mostly focused on pre-harvest)
• Till recent time, limited attention given to PHL (Policy)
• Limited or no institutional capacity in support of postharvest activities
• Uncoordinated and Fragmented efforts in research, education and extension
• Limited infrastructure for production & postharvest
• Poorly developed value chain
• Use of less efficient processing technologies

• Problem of logistics

• Traditional way of doing things (Harvesting, transportation, storage, etc.)

• Lack of availability of improved technologies (Availability, affordability, awareness)

• High incidence of pre & post-harvest diseases

• Little or no value addition
• “reducing post-harvest losses requires fewer resources and applies less pressure to the environment in maintaining the quantity and quality of food than through increased production to offset post-harvest losses” (FAO 1981).
What are the recommended interventions?

- Create awareness
- Strong commitment
- National PHM Policy/strategy
- Improve institutional capacity
- Enhancing infrastructure
- Improve the value chain and marketing system
- Develop national manual for post harvest package
- Demonstrating PH technologies and improved practices on FTCs and model farmers
- Inventory on indigenous and best practices
- Improve the access to suitable, safe & affordable PH technology and inputs Technologies Promote Agro-processing and Value addition
- Generate and/or Adapt technologies that are environmentally friendly, least cost and socially acceptable.
- Training personnel in postharvest and food processing at different levels
What has been Achieved so far?

- National, Regional and International efforts
- Training in PHM & related fields started in Ethiopia (BSc, MSc & PhD)
- National Postharvest Management Platform
- Ethiopian Society of Postharvest Management (ESPHM)
- Postharvest Management Policy/stratgey is already drafted
- Postharvest Extension Package is being prepared
- There are on-going efforts to develop/adopt technologies that are economical, socially and environmentally acceptable
Reflection on the BDU-IUC project -

Postharvest and Food Processing in Northwest Ethiopia
At Global Level - Sustainable Development Goals

SDGs target hunger, poverty, sustainable production & consumption

SDG 2: End Hunger
SDG 12: Responsible consumption and production

• Targets include SDG 12.3 Reducing food losses by 50% by 2030

Globally only 5% of the research fund for PHM
• At the African Union Summit (in June 2014), African heads of state and government adopted the Malabo Declaration on ‘Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods’.

• Among the goals is goal 3b) which targets to halve the current levels of Post-Harvest Losses, by the year 2025. Emphasized are the needs for – a multifaceted approach that involves all stakeholders in the food supply chain. – application of appropriate technologies and practices; – education and training of food supply chain actors; – an enabling policy environment that rewards or incentivizes FLW reduction champions.
• The proposed work is in alignment with
  – GTP-II agricultural sector Objectives—as pillars in the Agricultural Transformation Agenda
    • increased and market oriented crop production and productivity;
    • increased livestock production and productivity;
    • reduced degradation and improved productivity of natural resources; and
    • enhanced food security.
• Markets and Agri-business

As such, a more systematic approach for building institutional and human capacity of key agricultural systems is envisioned in the Transformation Agenda during GTP II.
- National postharvest management policy & strategy
  - capacity building, processing, processing and value chain, postharvest loss assessment, technology generation/adoption, awareness creation

- National Crop Post-harvest Research Strategy (2016-2030)
  - Capacity building, processing, processing and value chain, postharvest loss assessment, technology generation/adoption, extension

- Ethiopian Society of Postharvest Management (ESPHM)
  - The long-term plan of the departments and the faculty is to become centres of excellence in research and education on crop production, postharvest management, food processing, and value chain development by having well educated and committed staff and state-of-the-art research laboratories and facilities.

- The Strategy of BDU
  - Teaching, research and extension/community service
The Way Forward

Need for smooth integration

Sustainable Development

Sustainable Food & Nutrition Security

Producers, Handlers, traders, Processors, Consumers

Agricultural Research

Agricultural Education

In s.e.g. NGOs & Privates

Extension

5/9/2018

Ali Mohammed (PhD)
Thank you