WATER IN THE FOOD AND VALUE CHAIN
INCREASING THE BENEFICIAL USE OF WATER

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ISSUES

• Food supply historically high

• Drivers and implications

• Carryover stocks of water or food?

• Supply and value chain
Take home message

Food and water security cannot be achieved with a sole focus on production and supply

Reduce losses and waste in the food/value chain is sensible & doable

Reduce risk for farmers
Between 2007 – 2008, world food supply increased by 7% (a new record)
Parallel with this, the number of undernourished increased by 100+ million

Source: Mats Lannerstad, Linköping
Additional storage peaked in the 70s

Source: Mats Lannerstad
Variability of rainfall in Beira - one hundred years

Source: JeanMarc Faures, FAO
There is no Such Thing as an Average
(Bhavani basin and dam/reservoir, India)

"Dams as Modern Temples of India" (Jawaharlal Nehru)

Source: Mats Lannerstad, Linköping University
Ground water – if you have the means
Rainfed agriculture; green water augmentation & management

Highly unpredictable & variable precipitation; Rapid return flow

Land use that permits infiltration of rainwater; soil moisture = green water resource

Is soil moisture enough to overcome effects of dry spells?

Options for food security

- Storing water
- Storing food
- Procuring food

What about the "one-acre farmer"?
- Food crops?
- Other?
A view on the world water situation:

“...we have enjoyed a series of water ‘bubbles’ to support economic growth over the past 50 years or so..... We are now on the verge of water bankruptcy in many places with no way of paying the debt back”.

World Economic Forum, January 2009
### Population, GDP and water requirements

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (billion)</th>
<th>GDP (billion $, 2005 ppp)*</th>
<th>Water withdrawals (km³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800: (T. R. Malthus)</td>
<td>&lt; 1</td>
<td>913 (1820)</td>
<td></td>
</tr>
<tr>
<td>1900:</td>
<td>1.65</td>
<td>700</td>
<td></td>
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<tr>
<td>1950: just after WWW</td>
<td>2.5</td>
<td>7,006</td>
<td></td>
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<tr>
<td>2050:</td>
<td>9.2 – 9.5</td>
<td>193,318**</td>
<td>?</td>
</tr>
</tbody>
</table>

Garry Becker: 1980 – 2007: World Real Gross Domestic Product grew by **3.4% annually on average**

* Hillebrand, E. 2009. “Poverty Growth, and Inequality over the next 50 years” Expert meeting on how to feed the World in 2050, FAO

** Trend Growth projection
Meat and milk demand/supply & GDP growth, 1961-2000

World average: < 40 kg (2003)

Source: Charlotte de Fraiture, IWMI
Another 2-3 billion in a generation
- with dreams
- want/demand/right to sense development
What Food for What Food/Nutrition Security?

- **Food production**: The amount in the field
- **Food supply**: The amount available on the market; production minus losses before market, conversion
- **Food demand**: The amount bought/procured by households, public institutions and other social entities
- **Food consumption**: the intake of food, i.e. the amount of food eaten

Losses, spoilage, conversions and wastage along the food chain
Losses & waste at a high cost

Monetary
US – estimated US $100 billion annually
UK – calculated £ 10 billion annually of household waste (retail value)

Water - all food produced consumes water

Green house gas emission – from production throughout the supply chain, incl disposal

Income and security
Food prices, new demands and climate change

World Food Summit, Rome, June 2008:
"Boost production to ease the food crisis, says UN chief
Food production needs to rise by 50 per cent by 2030 to meet rising demand,"
Ban Ki-Moon

Climate change may reduce potential yields in SSA and SA by 30% by 2030 (Lobell et al. 2008 in Science)

Temperature increase may reduce yields of corn, soya beans and cotton by 30 – 46% in the US in a century (Schlenker & Roberts, PNAS, 2009)

"One Country’s Table Scraps, Another Country’s Meal”, NYT, May 18, 2008

112 pounds of food wastage per month for a family of four
Given:
- Scarcity/bubbles/bankruptcy/stochastic character/...
- Competition for water and land for non-food supply
- Very high energy input agriculture is not replicable
- High rates of losses and waste of food
- Environmental implications of food production....
- Overeating >> undernourishment

What is a sensible strategy for water and food security?

“Enough is enough – tonight, the bonus bubble burst”

(Swedish Prime Minister Fredrik Reinfeldt on behalf of 27 EU Heads of State, September 16, 2009)
WIDENING GAP:
FOOD SUPPLY - FOOD INTAKE REQUIREMENTS


Source: Mats Lannerstad, Linköping

Norm for national food supply: 2,700 – 2,800 kcal

Daily per cap kcal intake requirement to "lead an active & healthy life"
Food Security ...
“...exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” Rome Declaration (FAO, 1996)

- How much is “sufficient”?
  2,000 – 2,200 kcal/person, day on average

- What to do when preferences deviate from “sufficient”?
Value of water and value of food

A dollar could buy

- 1,200 kcal of potato chips
- 875 kcal of soda
- 250 kcal of vegetables
- 170 kcal of fresh fruit

More expensive to keep thin and to go for a healthy diet
Another perception and policy a generation or two ago

WRAP study (UK): HHs throw away 1/3 of the food they have bought, 60% of which is “perfectly fit for consumption”

Swedish school children throw away more of the food they like
Who will push the new agenda to deal with bubbles?

Scientists?
Politicians/policy makers?
The person in the street?
The corporate sector?
The young/next generation?
Media?

Keeping in mind:
- Doers
- Investors
- executing complex and unpopular decisions
- mobilise support & compliance
Where is the road ahead?

Increased efficiency of the rains
Better seeds, fertilizers & tools
Harvest and post harvest techn.

Food processing, value added
“Contract” farming
Reduce losses and waste
Consumption “adjustments”

Where is the road ahead?