International Nutrition

FAMINE

Keith P. West, Jr. DrPH, MPH
There are so many hungry people that God cannot appear to them except in the form of bread.

- Gandhi
Pathophysiology of Starvation

- Muscle wasting
- Appetite diminishes
- Growth slows/stops
- Weight lost
- Behavior changes: listless, apathetic, confused

Photo: Keith West
Definitions of Famine
(Food supply based: inadequate)

- Widespread food shortage leading to significant rise in regional death rates (Blix et al, 1971)
- Sudden, sharp reduction in food supply resulting in widespread hunger (Brown & Eckholm, 1974)
- A community syndrome (Curry, 1978)
Definitions of Famine
(Food consumption-based)

Sudden collapse in level of food consumption of large numbers of people (Scrimshaw, 1987)

Lack of food over large geographical areas sufficiently long and severe to cause widespread disease and death from starvation (Chamber’s Encyclopedia)
Famine Definition
(Mortality based)

- Unusually high mortality with unusually severe threat to food intake of some segments of a population

M. Ravillion, 1997
Famine Definition
(Food consumption based)

- A set of conditions that occurs when large numbers of people in a region cannot obtain sufficient food, resulting in widespread, acute malnutrition

Fred Cuny†, 1999
By the year 2000...eliminate

- Famine and related deaths
- Starvation
- Man-made disaster-induced deficiencies
- Iodine deficiency
- Vitamin A deficiency

- ICN, Rome, 1992
### Early Biblical Famine Accounts

<table>
<thead>
<tr>
<th>Scripture</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genesis 12:10</td>
<td>Famine grievous in the land</td>
</tr>
<tr>
<td>Genesis 41:15-57</td>
<td>Joseph interprets Pharoah’s dream/predicts famine</td>
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<tr>
<td>Genesis 47:4-26</td>
<td>Joseph manages famine</td>
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<tr>
<td><strong>Biblical Famine: Forerunner of Modern Concepts</strong></td>
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<td>-----------------------------------------------</td>
<td></td>
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<tr>
<td>• 7 fat and 7 lean kine</td>
<td></td>
</tr>
<tr>
<td>• Lean kine ate fat kine</td>
<td></td>
</tr>
<tr>
<td>• Officers appointed to collect 1/5th of crops in years of plenty</td>
<td></td>
</tr>
<tr>
<td>• Joseph SOLD stores to Egyptians</td>
<td></td>
</tr>
<tr>
<td>• Israelites sojourned from Canaan to Egypt</td>
<td></td>
</tr>
<tr>
<td>• Money failed; bread for livestock</td>
<td></td>
</tr>
<tr>
<td>• Seed distributed to sow on Pharoah's new land</td>
<td></td>
</tr>
<tr>
<td>• Early Warning System: 7 yr of plenty &amp; 7 yr of famine</td>
<td></td>
</tr>
<tr>
<td>• Food stock depletion</td>
<td></td>
</tr>
<tr>
<td>• Famine commission; taxes to build buffer stocks</td>
<td></td>
</tr>
<tr>
<td>• Food aid (Title 2…or Title 1!)</td>
<td></td>
</tr>
<tr>
<td>• Mass migration</td>
<td></td>
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<tr>
<td>• Failure of monetary economy</td>
<td></td>
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<tr>
<td>• Bartering away live assets</td>
<td></td>
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<tr>
<td>• Land transfers, indenturing</td>
<td></td>
</tr>
</tbody>
</table>
Famines have Influenced Power Struggles throughout Human History

Famine swelled ranks of **Crusades** (12\textsuperscript{th} C)
• Peasants stormed **Bastille** following spikes in bread prices (Fr Revolution) (1789)
• Famines preceded **Bolshevik** Revolution
• “**Great Leap**” Famine preceded the Cultural Revolution in China (1958-59)
• **Ethiopian** famine preceded the overthrow of Haile Selasi (1974)
• Famine (possibly) brought **N Korea** regime to fully understand potential consequences
Famine seems to be the last, the most dreadful resource of nature ... premature death must visit the human race.

Rev. T. Malthus, 1798
The Great Irish Famine
From 1846-48.

Attributed to failure of potato crop due to a fungus

~1.5 million died
~1.5 million migrated

Class famine (market failure): Farming peasantry most affected
Ireland: 1846-47

Potato blight
No money among peasants
No effective demand for food
No peasant markets
No food for peasantry

Plus Food exports
Laissez Faire policy
Several Major Famines in the 20th Century

- China: 1959-60
- Russia: 1918-21
- Ukraine: 1931-34
- India: 1943
- Bangladesh: 1974
- Ethiopia: 1974; 1984-85
- Somalia: 1992-93
- Sudan: 1984-85; 1998
- East Timor: 1978
- North Korea: 1997-98
Famine in Post Czarist Russia 1918-1921

- Lenin empowers Commissariat of Food to extract grains from peasants
- Peasant uprisings
- Communists wage class warfare
- Grain production fell to 1/2 of 1914
- Massive international relief in 1921
Stalin’s Reign of Terror

1928: Stalin initiated collectivization

1929: Peasant land merged into “factory-farms”
      Peasants organized into “brigades”
      Rich peasants (kulaks) killed
      Grain stocks seized
      Peasants rebelled, destroyed livestock/grains

1930-33: Massive food shortages
         7 million died

Destroyed food production capacity and markets in grain belt (esp the Ukraine)
Ukraine Famine: 1931-34

- Stalin used famine to crush Ukraine Nationalism/Cossack rebellion
- Militia guarded grain stores
- Grains shipped out of Ukraine
- Ukraine covered with corpses
- Widespread reports of cannibalism
- 5 (of 7) m who died in Russia in 1933-4 from famine died in Ukraine
- Covered up for decades
Famine in China

108 BC to 1911 AD:

麂 1828 major famines

J. Becker, 1996
Northwest China: Famine of 1927

- 60 million affected; 3-6 million perished
- Horrid descriptions of famished in rural areas

But also there were...

- Rich men, grain hoarders, money-lenders, landlords with armed guards to defend them
- Cities with plenty of grain and food

China Int’l Famine Relief Commission
Western China: Famine of 1929

- Famine started with severe drought
- Destitution caused by “millions of armed men”, crushing exactions from landlords, enforced taxation and poor government

Int’l Famine Relief Commission
American Red Cross
“Great Leap” Famine in China 1959-1961

- Worst famine in human history; until recently, least well-known
- Estimated 30 million deaths
- Followed a decade of investment in heavy industry vs agriculture, state monopolization, land reform, collectivization and commune formation, heavy rural grain taxation, market restrictions

DL Yang, Calamity & Reform in China 1996
The Great Leap Famine: References

Indian Famines

Vulnerable groups

• Agricultural laborers
• Rural artisans
Bengal Famine of 1943

Cause: “Shortage of rice supply for consumption”

- Famine Inquiry Commission
Bengal Famine of 1943

Rice Supply

~5% lower than previous 5 years
13% higher than 1941
9% higher per capita than 1941

Amartya Sen, 1978
Bengal Famine of 1943

Class Famine

Rural event: \( \uparrow \) prices + \( \downarrow \) wages
Target groups: fisherman, transport workers, agricultural labor
War economy: fears of invasion fueling stockpiling, hoarding, trade restrictions

A. Sen, 1978
Famine in Bangladesh: 1974

- Need to know “abnormal” conditions from “normal” stresses

Courtesy of CIA World Factbook
Azmirigang Thana, Sylhet, Bangladesh:
In December: Normal Dry Season

Photo: Keith West
Azmirigang Thana, Sylhet, Bangladesh: 
In August: Normal Wet Season

Photo: Keith West
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>War, refugee migration</td>
</tr>
<tr>
<td>1971</td>
<td>Partial crop failure</td>
</tr>
</tbody>
</table>
| 1972 | Continued crop failure  
<pre><code>  | More refugees |
</code></pre>
<p>| 1973 | Partial monsoon failure |
| 1974 | Flood |</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>Total Domestic Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967-1968</td>
<td>110.53</td>
</tr>
<tr>
<td>1968-1969</td>
<td>112.57</td>
</tr>
<tr>
<td>1969-1970</td>
<td>119.19</td>
</tr>
<tr>
<td>1970-1971</td>
<td>110.79</td>
</tr>
<tr>
<td>1971-1972</td>
<td>98.87 (~15% decline)</td>
</tr>
<tr>
<td>1972-1973</td>
<td>100.20 (~15% decline)</td>
</tr>
<tr>
<td>1973-1974(^a)</td>
<td>118.01 (Famine year: normal food prodn)</td>
</tr>
</tbody>
</table>

\(^a\) Estimated. M. Rahman, Ecol of Food & Nutr 1978
The Daily Market: Where the Economy Acts on Peoples Lives each Day

Photo: Keith West
Starvation is a matter of not having enough food to eat, not a matter of there being enough food to eat.

- A.K. Sen
Entitlement – The legal means to command food and other commodities (to survive)
Entitlement has two components:

- **Endowment**
  (resources to exchange; internal)

- **Exchange Opportunities**
  (cost of living; external)
Endowment

- Labor (ability to perform work)
- Cash or credit
- Assets (to exchange for food)
Food Exchange Entitlements

Opportunities the market offers to a person to exchange other commodities (money, labor, barter, etc.) for food.

- A.K. Sen
Entitlement Dynamics

- Endowment of Poor
- Terms of Exchange (Cost of Living)
- Percent Starving
Households cope with changes in food production, prices, wages and employment by:

- Changing cropping patterns
- Intensifying off-farm work
- Remitting food aid for income
- Drawing on savings
- Selling assets
- Borrowing money
- Migrating for work
- Cutting back meals
- Reducing non-food spending
Coping Strategies Phases: Buffers From Famine

- **Risk Insurance** – minimize risk/manage shortfalls
- **Endowment Loss** – depleting key assets to survive this crisis
- **Destitution** – migrating to survive
Entitlement Dynamics

- Insurance
- Endowment Loss
- Destitution

Terms of Exchange (Cost of Living)

Endowment of Poor

Percent Starving
Risk Insurance Phase

- Increase buffer stocks (good years)
- Alter cropping system
- Restructure herds for drought resistance
- Diversify income sources
- Labor migration
Risk Insurance
(with asset depletion)

- Loans via indigenous/social networks
- Sale of small livestock
- Sale of household assets
- Include “famine foods” in diet
- Accept lower wages
“Nyeka” root from bed of Shire River is consumed in southern Malawi during severe dry seasons.
Endowment Loss Phase

- Sale of productive HH assets
- Sale of large livestock
- Sale/mortgaging of land
- Indenturedness
- Dietary restriction
Land transactions at the Land Transfer Office, Sundarganj, Northwestern Bangladesh

Photo: Keith West
Destitution Phase

- Distress migration: to camps, urban centers
- Death of most vulnerable
Destitute Burmese refugees in Bangladesh, 1978

Photo: Keith West
Armed Conflict: A Cause of Famine

- Disrupts agricultural production
  - Kampuchea (1979)
  - Mozambique (1980s)
  - Southern Sudan (1990s)
  - Somalia (1990's)
- Hinders food distribution/economic recovery
- Exacerbates famine conditions
Somalia: Conflict → Food Insecurity 1990

1. Fighting destroyed harvests
2. Militia looted assets needed to plant and sow
3. Bandits closed trade routes
4. Bandit attacks discouraged food growing
5. Fighting paralyzed relief efforts

S. Hansch, et al., 1994
Somalia: Excess Deaths Due to Complex Causes

Late 1991: Conflict-induced mortality

Early 1992: Famine and infectious diseases
Chronic climatic conditions can predispose regions to famine. Areas of chronic low rainfall in Africa are illustrated in the map on the left, while the map on the right shows the Vegetation Index in Africa. Maps courtesy of NOAA, http://www.noaa.gov.
Preconditioned by …

- Subsistence agriculture
- Poor transport infrastructure
- Weak popular participation
- Armed conflict
- Economic disruptions
- Drought

Von Braun, IFPRI, 1991
North Korea (DPRK)

24 million population (1996) 60% urban
123 sq km, 20% arable
Centralized socialist system
Life expectancy ~74 yr
Adult literacy 100%
GNP $970 per capita (1996)
## North Korea Famine: Complex Causes

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Collapse of Soviet Union</td>
</tr>
<tr>
<td>1994</td>
<td>Kim Il Sung dies</td>
</tr>
<tr>
<td>1995</td>
<td>Extensive flooding/crop damage</td>
</tr>
<tr>
<td></td>
<td>145/200 counties; 1.7 MMT grain lost/ 5.9 MMT grain affected</td>
</tr>
<tr>
<td>1996</td>
<td>Floods destroy ~12% of crops</td>
</tr>
<tr>
<td>1997</td>
<td>Drought/tidal waves</td>
</tr>
<tr>
<td></td>
<td>Cases (110)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>WHZ, mean</td>
<td>-2.4</td>
</tr>
<tr>
<td>Fa dead</td>
<td>15%</td>
</tr>
<tr>
<td>Mo dead</td>
<td>3%</td>
</tr>
<tr>
<td>Either dead</td>
<td>22%</td>
</tr>
<tr>
<td>Hospitalized p 3 mo</td>
<td>80%</td>
</tr>
</tbody>
</table>

RPR = relative prevalence ratio

Acute vs Non-acute Nutritional Status
Katona-Apte & Mokdad, 1998
North Korean Migrant Survey
March, 1998

- Yanbian Prefecture, China
- 1.5 sites/NGO assisted
- Migrant and non-migrant HHs
- HH composition, food, mortality

C. Robinson, et al., Lancet, 1999
North Korea Migrant Survey
Mortality in Households

CDR per 1000


Robinson, et al., 1999
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1995 | Bilateral appeals for food aid  
- Japan, Egypt, S. Korea  
- Cutbacks in Chinese aid |
| 1997 | WFP $95 m appeal for  
200,000 MT food |
| 1998 | UNICEF/WFP/EU surveys  
show moderate malnutrition |
n = 3965 <7 y/o children
40 kindergartens/nurseries in 18 countries (selected)
weight, height measured
110 cases acute MN/108 controls

Katona-Apte & Mokdad, 1998
"Classic" Chain of Causation

Food Shortage → Starvation → Famine
Modern Concept of Causation

Food Shortage \( \rightarrow \) Initiating/Intervening Factors

(?)

\begin{itemize}
  \item Food availability decline (FAD)
  \item Market Dynamics
  \item Gov’t/ Int’l Response
  \item War
\end{itemize}

Normal \rightarrow Pre-famine \rightarrow Famine
Concept of Disease Causation:
Similar concept can be applied to causation of famine...

K. Rothman, 1980
Individual or component causes leading to a sufficient cause that precipitates famine, and the responses to famine.
Some Component Causes of Famine

- Crop Failure (eg, due to weather, flood)
- Market Failure (ie, ineffective demand)
- Failed Central Economy
- Conflict-Anarchy
- Lack of free press
Population Distributions of Nutritional Status During Times of Famine
Shifting of a population toward starvation with increasingly severe prefamine and famine conditions.

Diagram:
- Normal
- Prefamine
- Famine

Axes:
- Population
- Starvation threshold
Transitional Populations at Higher Risk of Famine

Risk of Famine

Subsistence  Mixed  Market

FOOD ECONOMY
Famine Relief

A Policy Failure
Policy Issues

- Civil conflict resolution
- Drought (flood) management
- Dry season farming and development
- Animal husbandry
- Pest control
Policy Issues

• Tax relief
• Pastoral protection
• Early warning system
• Food support mechanisms
• Good governance/Democracy
• Freedom of speech/press
Famine prevention policies should support indigenous capacity to withstand (cope with) a variety of stresses.