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JOHNS HOPKINS  
BLOOMBERG  
SCHOOL of PUBLIC HEALTH

# International Nutrition

## FAMINE

Keith P. West, Jr. DrPH, MPH



Photo: Keith West

**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



# 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

- |                         |  |
|-------------------------|--|
| <b>Genesis 12:10</b>    | Famine grievous in the land                        |
| <b>Genesis 41:15-57</b> | Joseph interprets Pharoah's dream/ predicts famine |
| <b>Genesis 47:4-26</b>  | Joseph manages famine                              |

# Biblical Famine: Forerunner of Modern Concepts

- 7 fat and 7 lean kine
- Lean kine ate fat kine
- Officers appointed to collect 1/5th of crops in years of plenty
- Joseph SOLD stores to Egyptians
- Israelites sojourned from Canaan to Egypt
- Money failed; bread for livestock
- Seed distributed to sow on Pharaoh's new land
- Early Warning System: 7 yr of plenty & 7 yr of famine
- Food stock depletion
- Famine commission; taxes to build buffer stocks
- Food aid (Title 2...or Title 1!)
- Mass migration
- Failure of monetary economy
- Bartering away live assets
- Land transfers, indenturing

# Famines have Influenced Power Struggles throughout Human History

- Famine swelled ranks of **Crusades** (12<sup>th</sup> 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 20<sup>th</sup> 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

Destroyed  
food  
production  
capacity  
and markets  
in grain  
belt (esp  
the Ukraine)

**1930-33:** Massive food shortages

7 million died

# 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:

 **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



# The Great Leap Famine: References

- Yang DL. Calamity and Reform in China: State, rural society and Institutional Change since the Great Leap Famine. Stanford, CA: Stanford University Press, 1996.
- Becker J. Hungry Ghosts: Mao's Secret Famine - The First Full Account of the Tragedy that Claimed over 30 Millions Victims. New York: The Free Press/Simon & Schuster, Inc 1996.
- Newman LF (ed). Hunger in History: Food Shortage, Poverty and Deprivation. Oxford: Blackwell, 1992.

# 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: ↑ prices + ↓ wages

Target groups: fisherman, transport workers, agricultural labor

War economy: fears of invasion fueling stockpiling, hoarding, trade restrictions

# 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**





# Bangladesh: Pre-1974 Famine

1970 War, refugee migration

1971 Partial crop failure

1972 Continued crop failure  
More refugees

1973 Partial monsoon failure

1974 Flood

# Estimated Production of Rice in Bangladesh During 1967-1974

<u>Year</u>	<u>Total Domestic Production</u>
1967-1968	110.53
1968-1969	112.57
1969-1970	119.19
1970-1971	110.79
1971-1972	<b>98.87 (~15% decline)</b>
1972-1973	<b>100.20 (~15% decline)</b>
1973-1974 <sup>a</sup>	<b>118.01 (Famine year: normal food prodn)</b>

<sup>a</sup> Estimated. M. Rahman, Ecol of Food & Nutr 1978

# The Daily Market: Where the Economy Acts on Peoples Lives each Day



Photo: Keith West

**POST-HARVEST**

**PRE-HARVEST**

**Producing Areas**

**Producing Areas**



**Traders**



**Traders**



**Urban  
Markets**



**Urban  
Markets**

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.

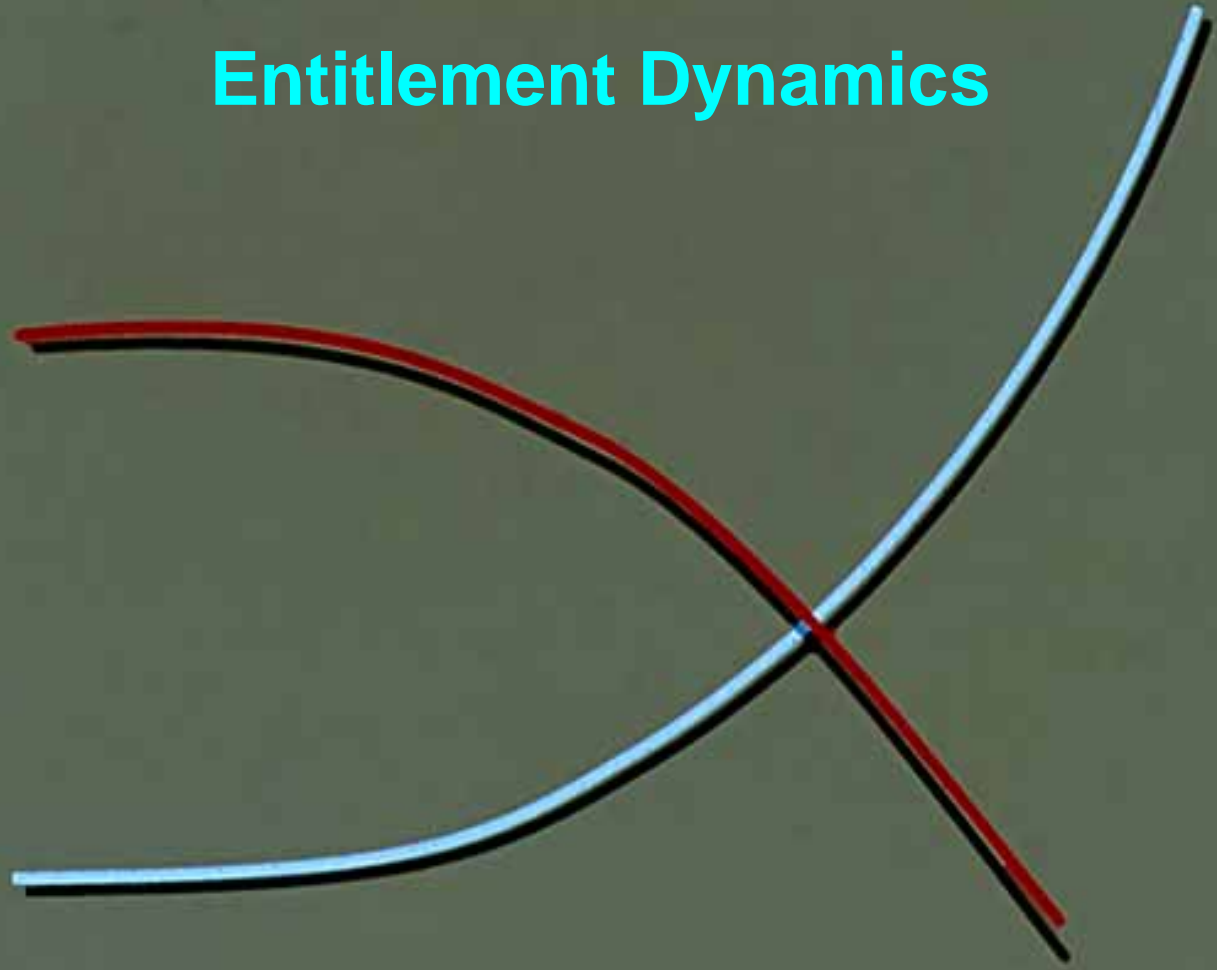
- A.K. Sen

# Entitlement Dynamics

Endowment of Poor

Percent Starving

Terms of Exchange  
(Cost of Living)



# 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

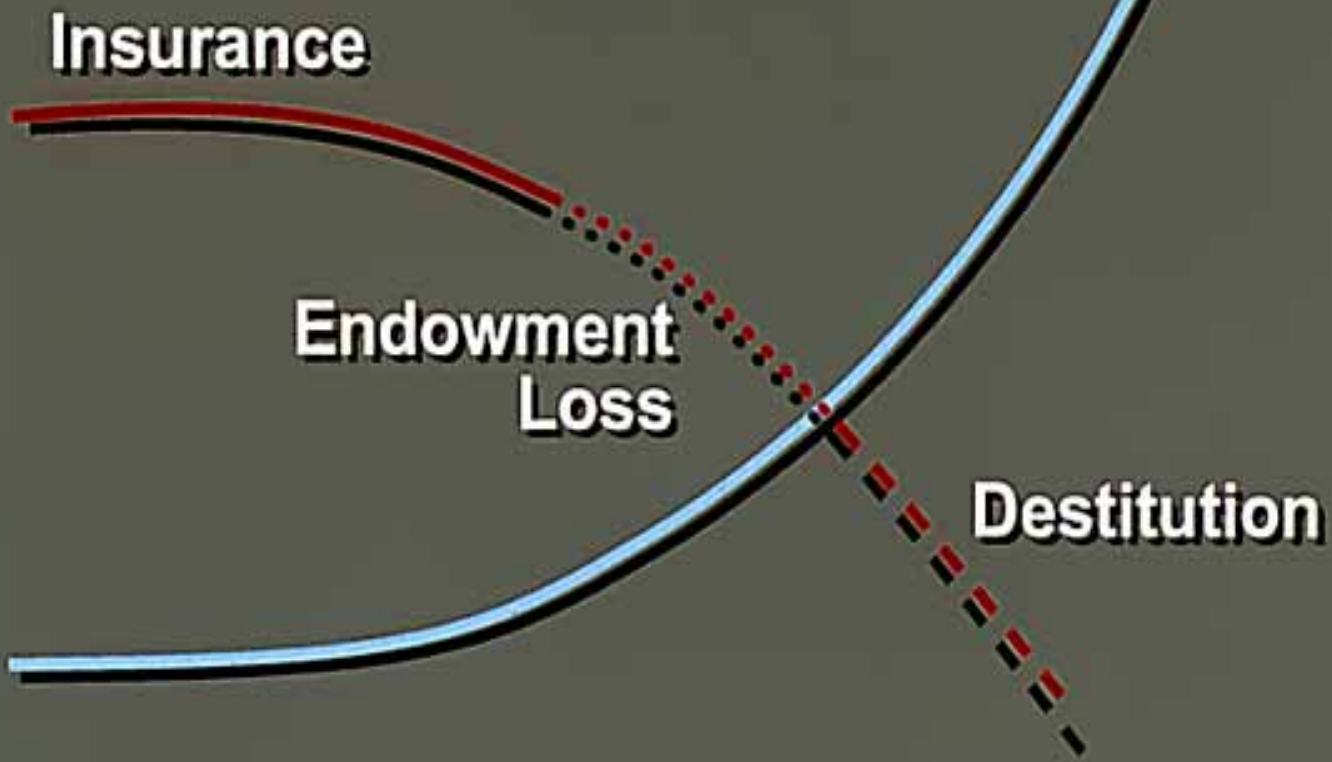
# Coping Strategies Phases: Buffers From Famine

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

# Entitlement Dynamics

Endowment of Poor

Percent Starving



Terms of Exchange  
(Cost of Living)

# 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

Photo: K West



# 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

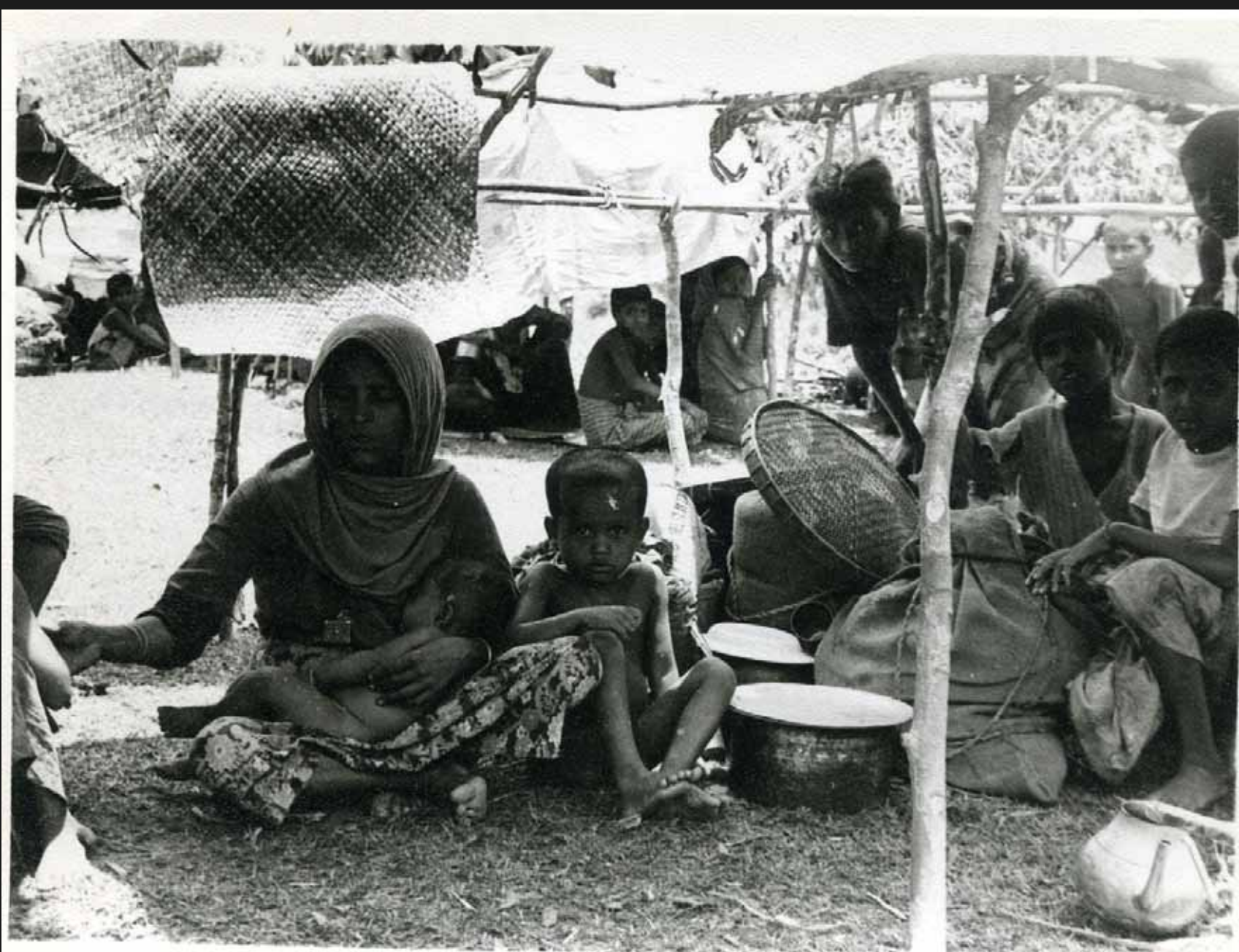


Photo: Keith West

# 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

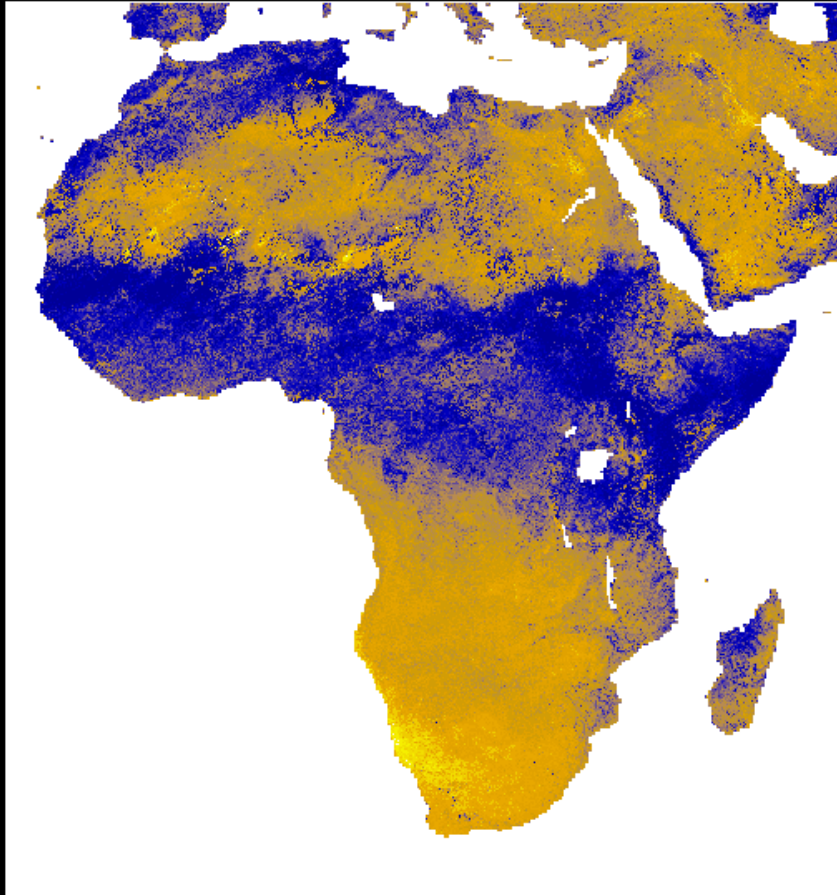
**Late 1991:** Conflict-induced mortality

**Early 1992:** Famine and infectious diseases



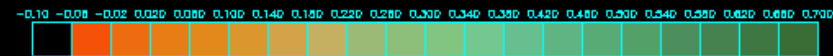
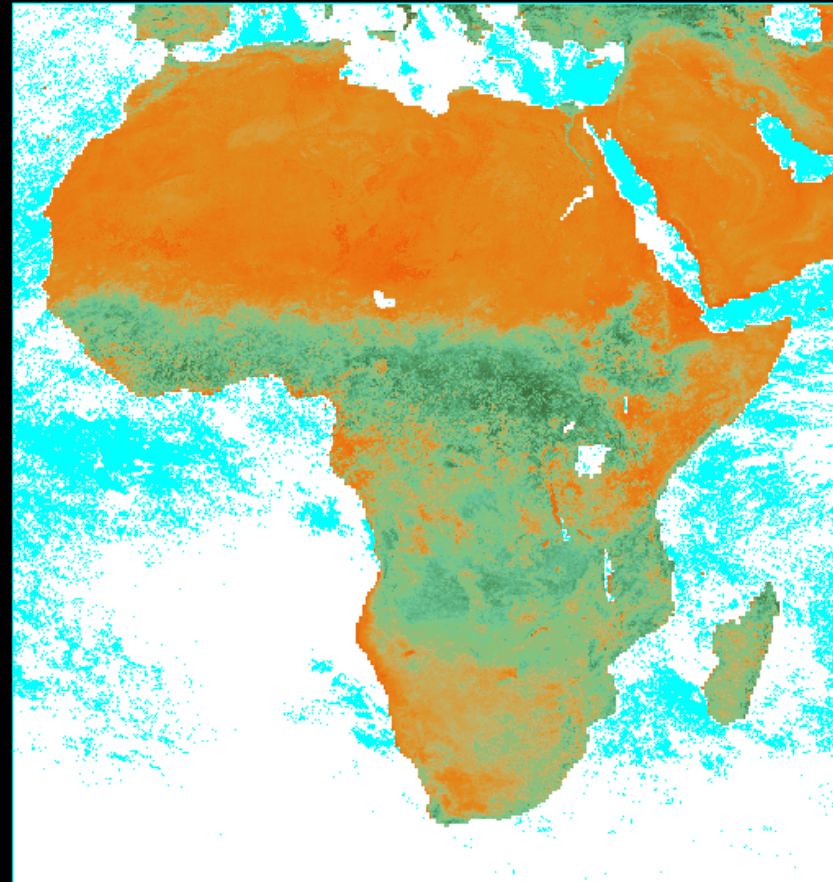
# Chronic climatic conditions can predispose regions to famine

GVI PWI Africa: JUN 26 2005



Areas of chronic low rainfall in Africa

GVI NDVI Africa: JUN 26 2005



Vegetation Index in Africa



# Famine (Complex Emergencies) in Africa

## 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)**



Courtesy of CIA World Factbook.

# North Korea Famine: Complex Causes

Historically famine-proned region

**1989** Collapse of Soviet Union

**1994** Kim Il Sung dies

**1995** Extensive flooding/crop damage

145/200 counties; 1.7 MMT grain lost/ 5.9 MMT grain affected

**1996** Floods destroy ~12% of crops

**1997** Drought/tidal waves

# Acute vs Non-acute Nutritional Status

## Katona-Apte & Mokdad, 1998

	<b>Cases (110)</b>	<b>Control (108)</b>	<b>RPR</b>
<b>WHZ, mean</b>	<b>-2.4</b>	<b>-0.8</b>	
<b>Fa dead</b>	<b>15%</b>	<b>2%</b>	<b>7.5</b>
<b>Mo dead</b>	<b>3%</b>	<b>1%</b>	<b>8.0</b>
<b>Either dead</b>	<b>22%</b>	<b>3%</b>	<b>7.3</b>
<b>Hospitalized p 3 mo</b>	<b>80%</b>	<b>12%</b>	<b>6.7</b>

RPR = relative prevalence ratio

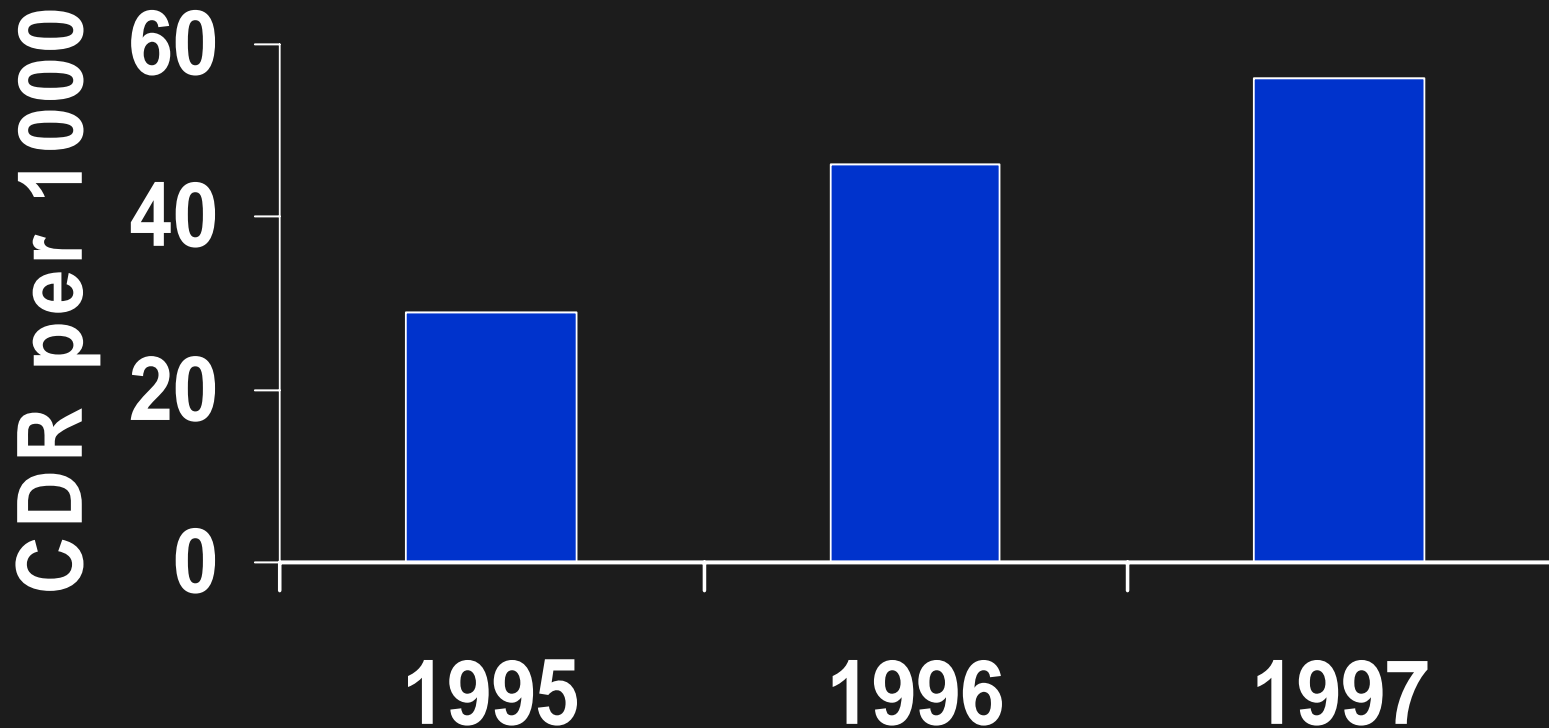
# North Korean Migrant Survey

## 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



Robinson, et al., 1999

# North Korea Famine Responses

- 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



# WFP/FAO/UNICEF Survey, August, 1997

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**

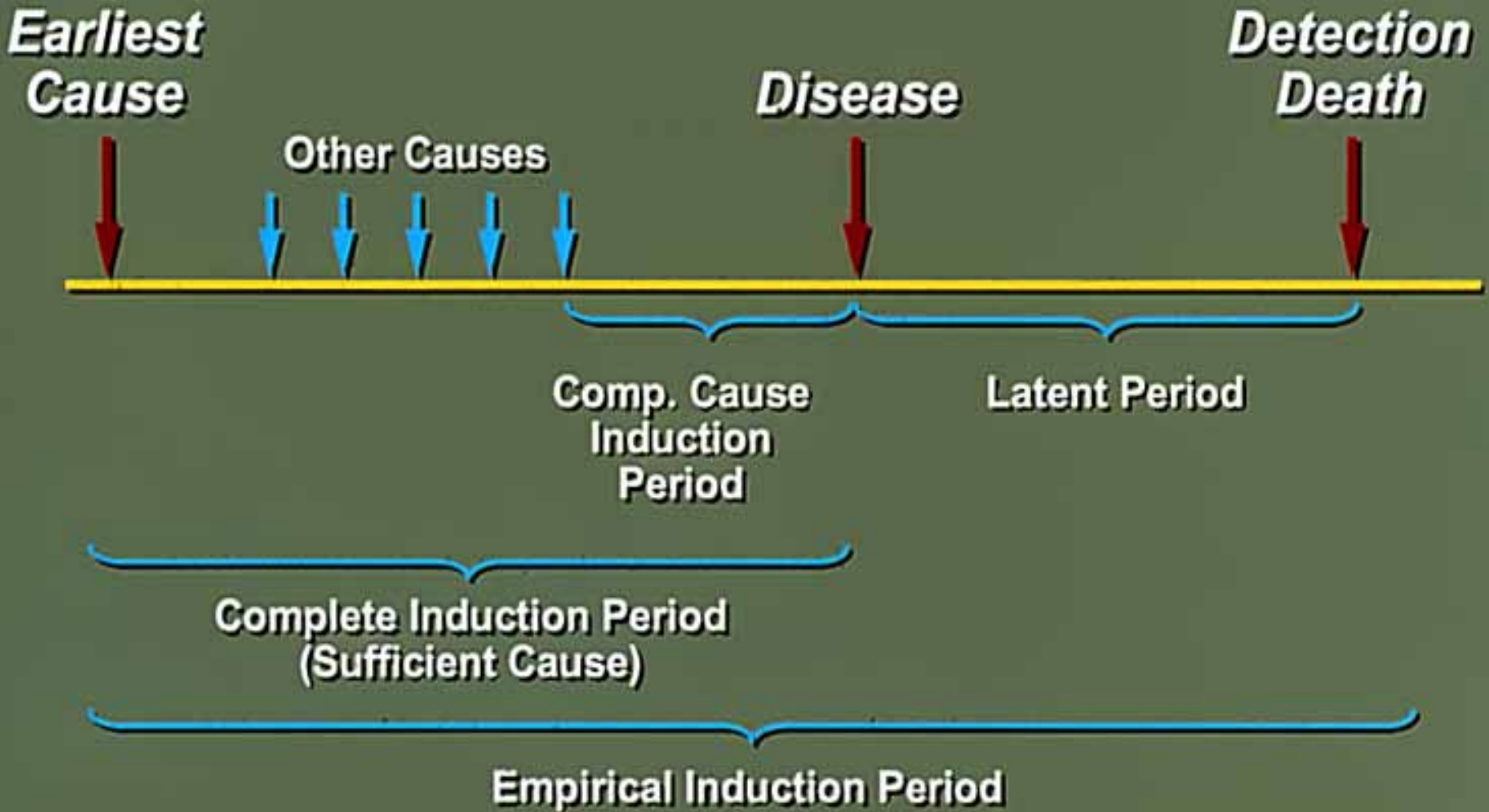
# **“Classic” Chain of Causation**

**Food Shortage → Starvation → Famine**

# Modern Concept of Causation

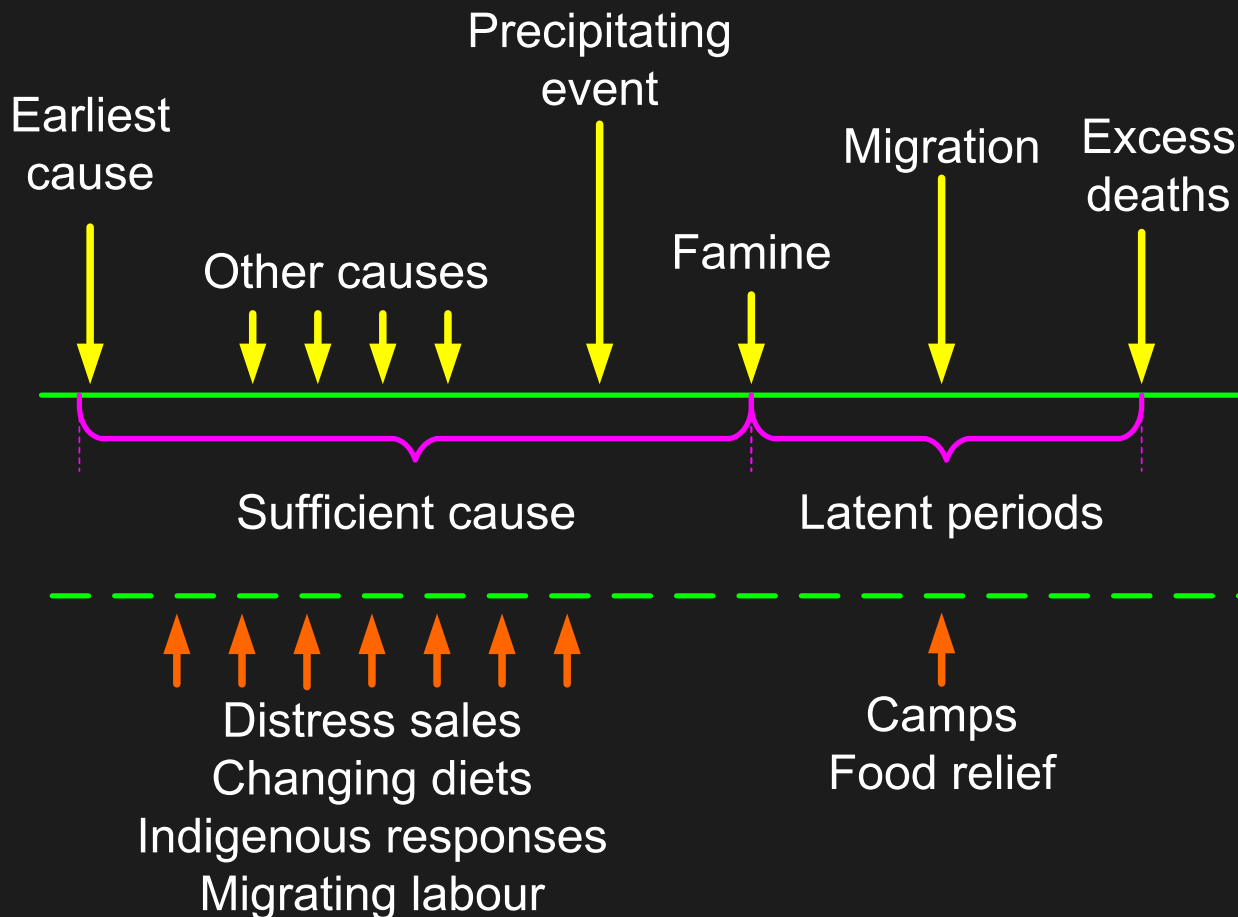


Concept of Disease Causation:  
Similar concept can be applied to causation of famine...



*K. Rothman, 1980*

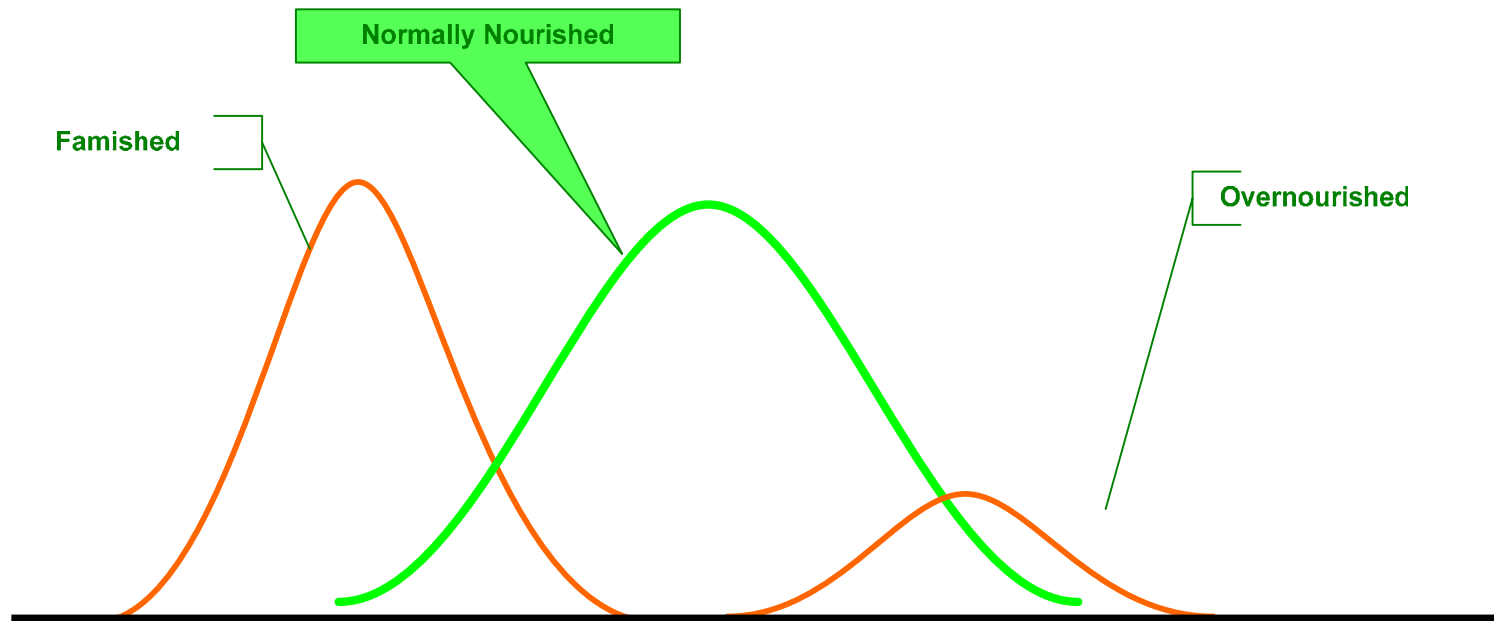
Individual or component causes leading to a sufficient cause that precipitates famine, and the responses to famine



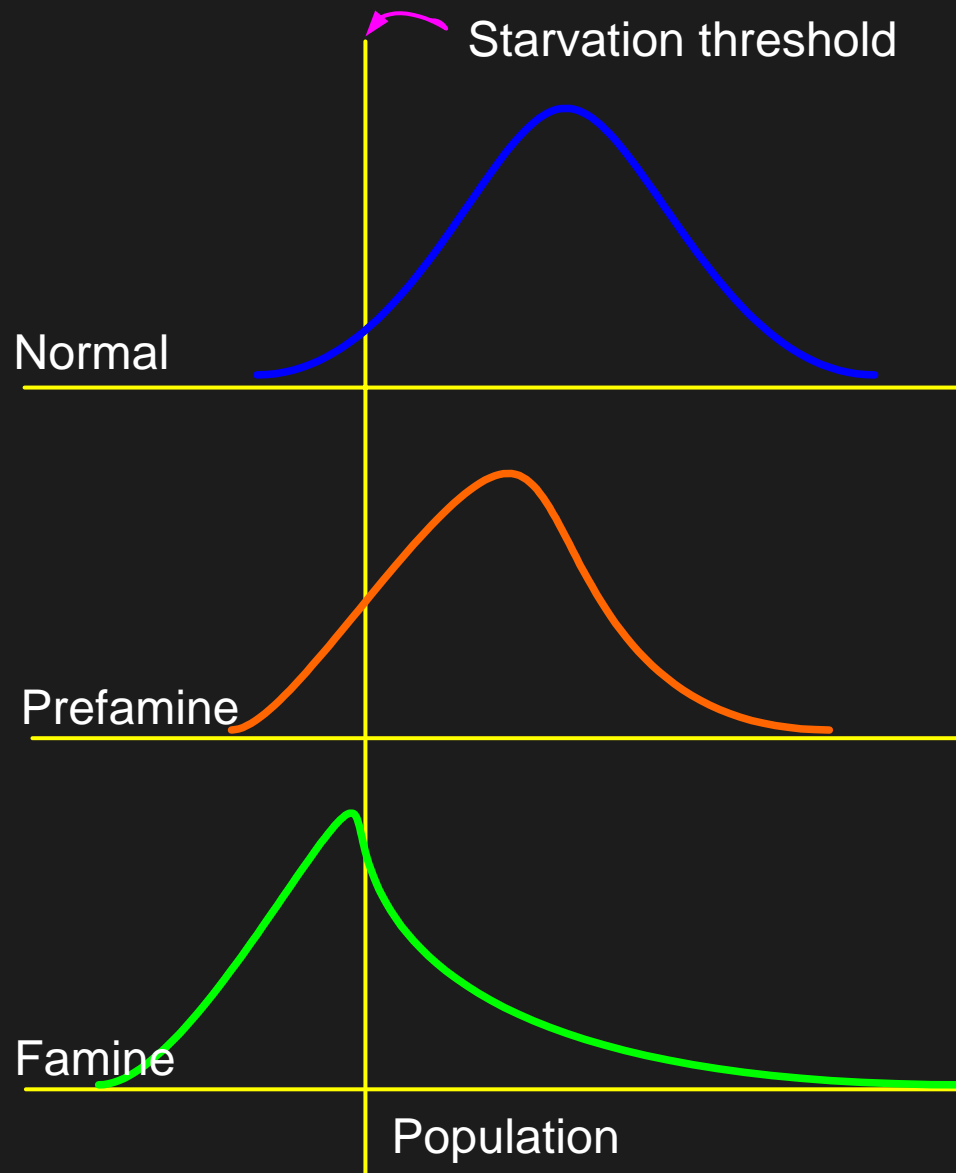
# Some Component Causes of Famine

- 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*

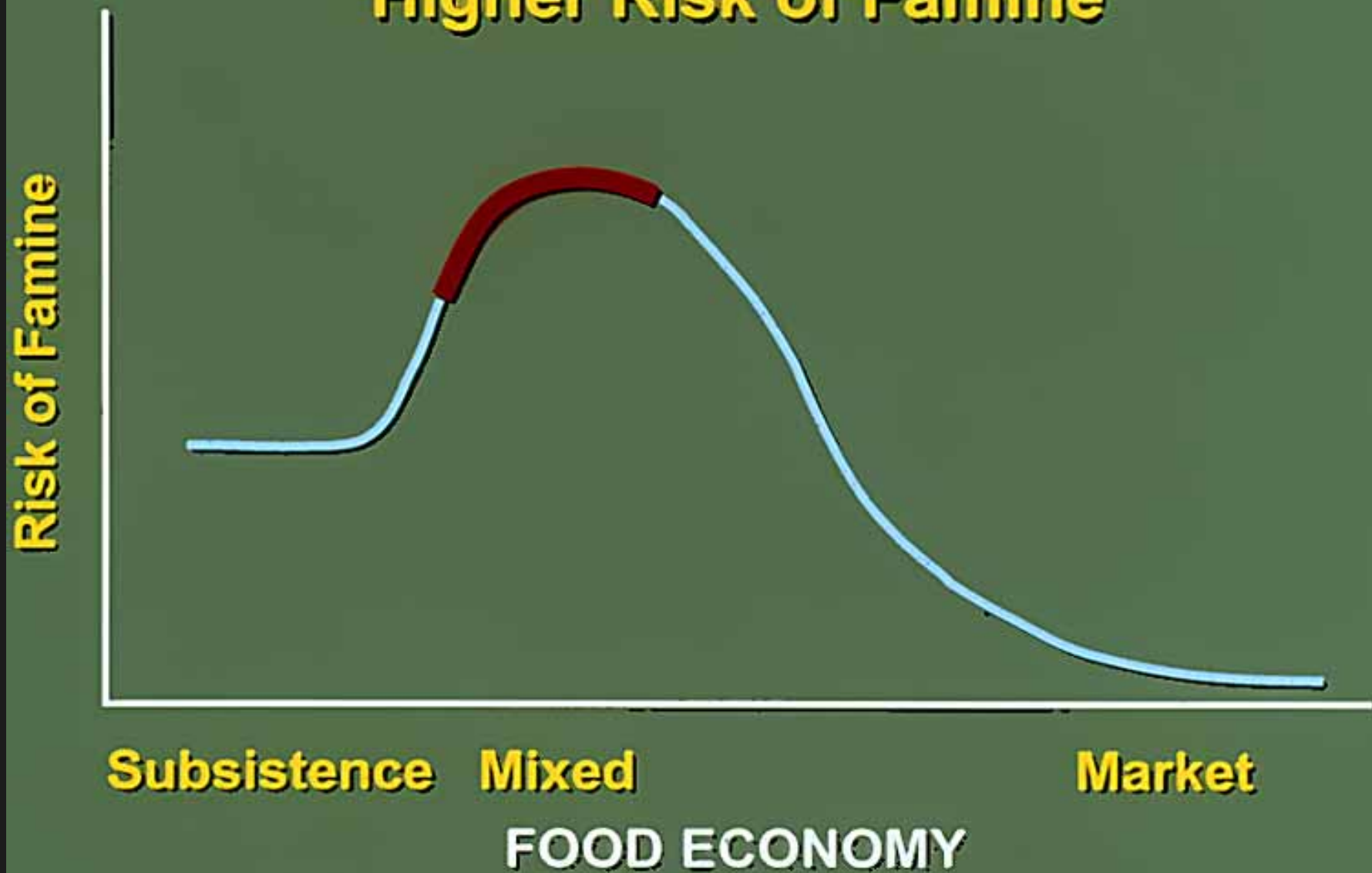


# Shifting of a population toward starvation with increasingly severe pre famine and famine conditions





# Transitional Populations at Higher Risk of Famine



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.