

Impact of Climate Variability on Food Systems in South Asia

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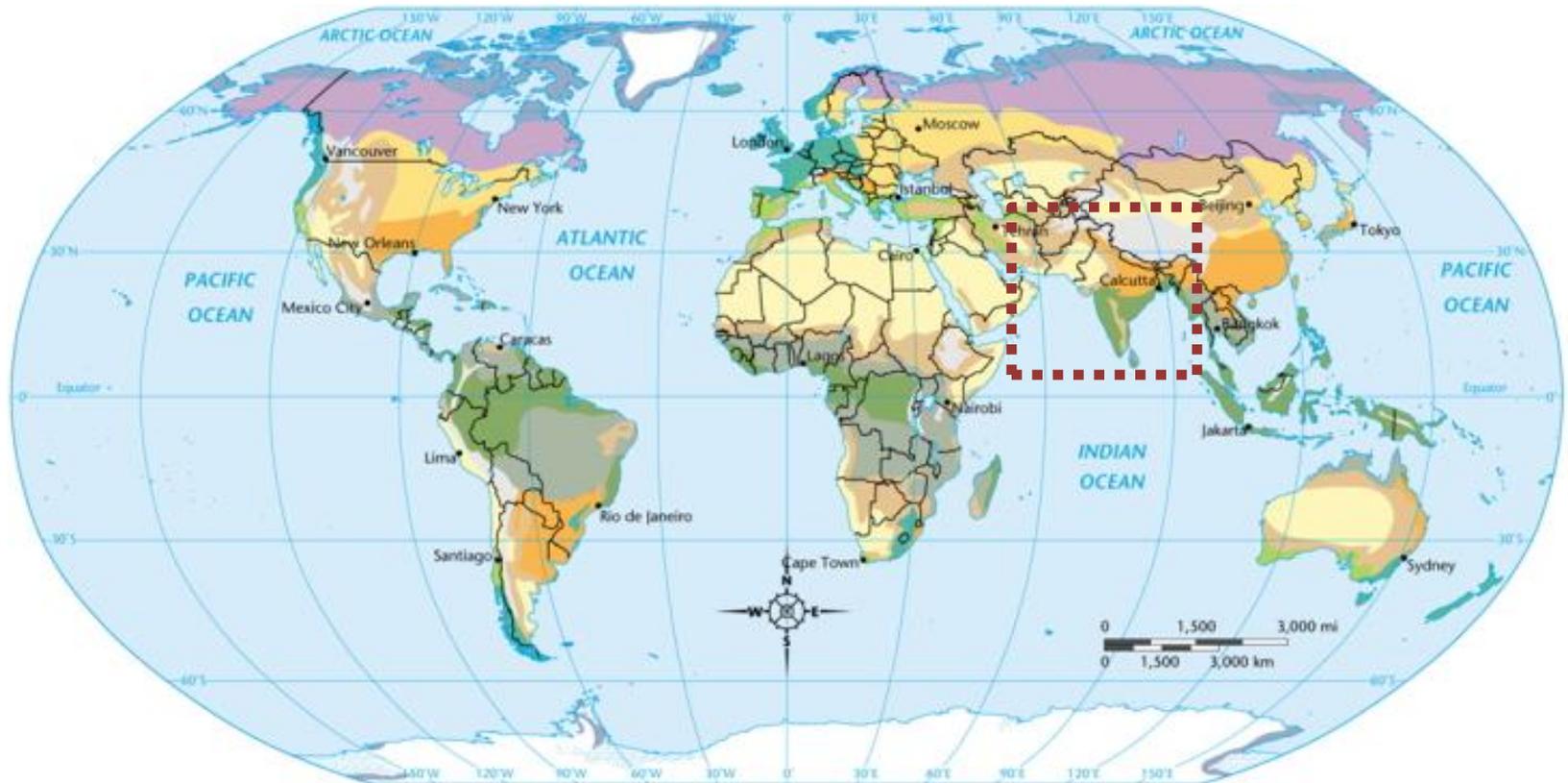
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Introduction

- [South Asia has about 35% of the world's undernourished people.](#)
- Making the region food secure will be a major development challenge:
 - [significant growth in population](#)
 - large scale conversion of cultivable land for non-agricultural purposes
 - [In spite of large scale irrigation development, agriculture production is still subject to climate vagaries](#)
- Food systems are not adaptive to current climate variability as crop failure and damages have been regularly reported due to recurring floods and droughts.

Climate variability in South Asia



Tropical

- Tropical wet
- Tropical wet and dry

Dry

- Semiarid
- Arid

Moderate

- Mediterranean
- Humid subtropical
- Marine west coast

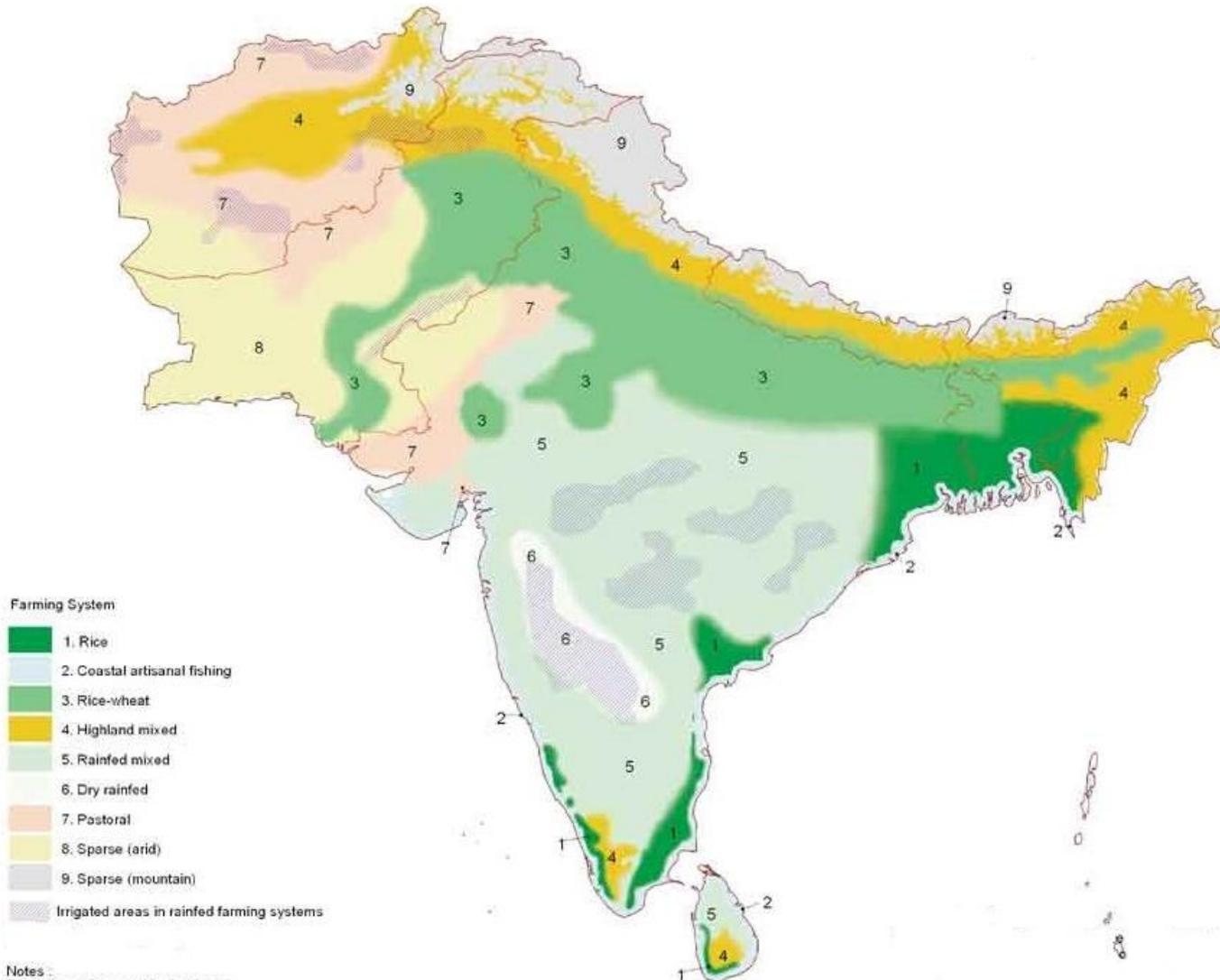
Continental

- Humid continental
- Subarctic

Polar

- Tundra
- Ice cap
- Highlands
- Non-permanent ice

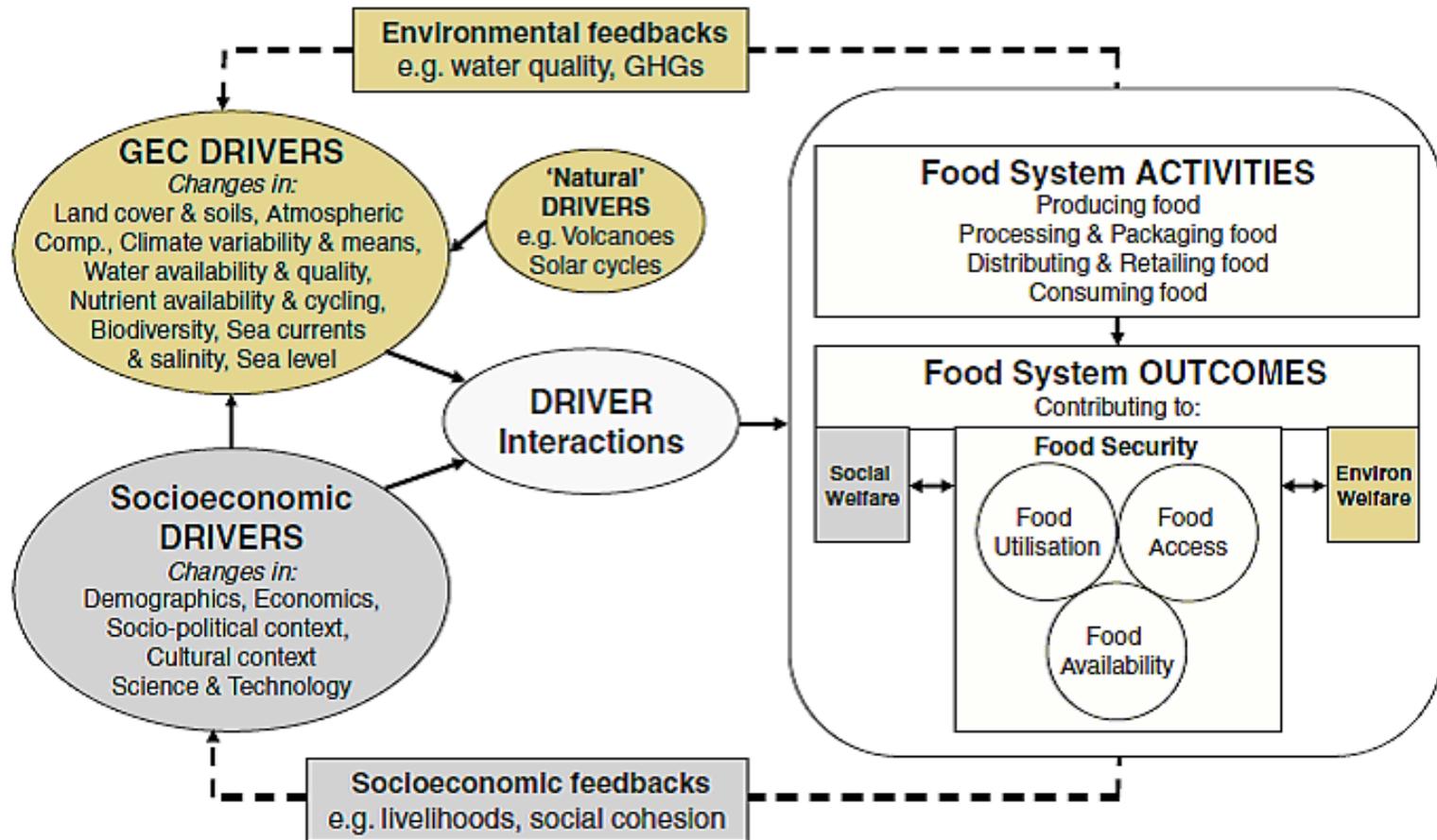
Farming systems in South Asia



Food insecurity in South Asia

- During 2011-13, average dietary energy supply in South Asia was 108 per cent.
- However, malnourishment persisted due to extreme poverty and spatial variability in food availability and access.
- Also, diet remains highly imbalanced with heavy dependence on cereals and roots and tubers.
- It is projected that by 2020, food demand will almost be 1.5 to 2 times.
- Many South Asian countries will be short of rice and wheat by 2020.

Food system approach: Interaction between food security and climate variability



Impact of climate variability on food security

- On food production
 - [Droughts](#)
 - [Floods](#)
 - [Decline in total factor productivity gains](#)
- [On food distribution](#)
- [On access to food](#)
- [On food utilisation](#)

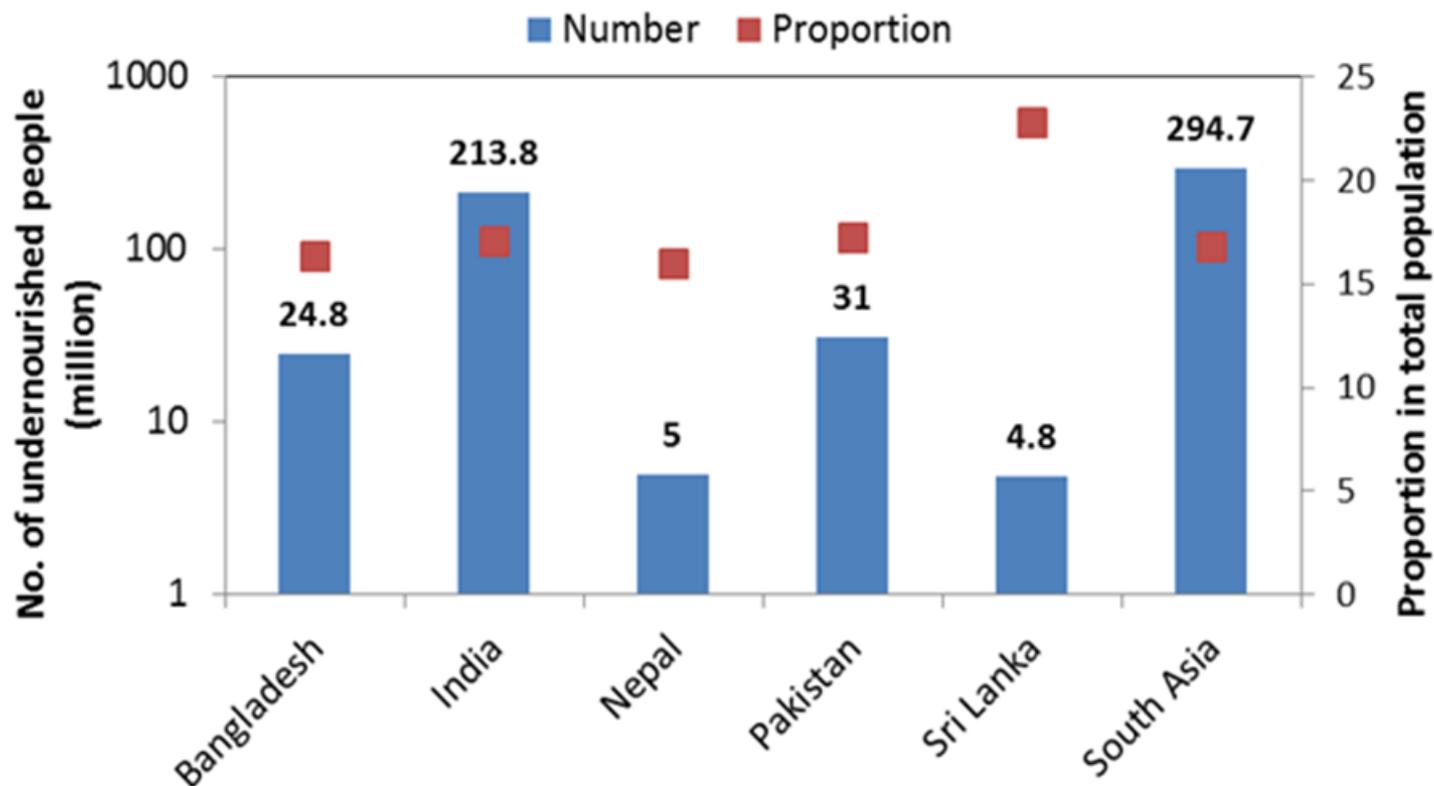
Conclusion

- South Asia with its diverse agro-ecology is home to about 25% of the world's population, but also has the unique distinction of having the highest proportion of world's undernourished people.
- Agricultural production in the region is under stress due to climate extremes; land use changes; constantly growing population; and high proportion of BPL HHs.
- Food and livelihood security is under threat as the region is expected to experience more frequent droughts in north-western parts and floods in eastern parts.

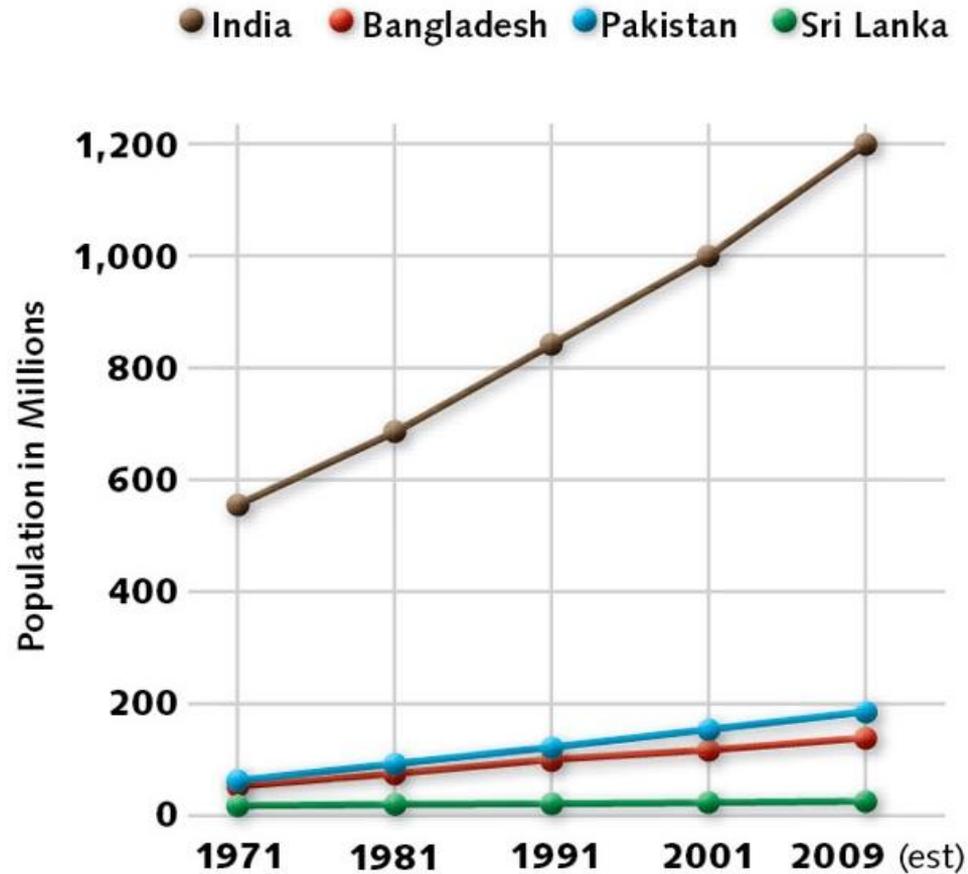
Conclusion

- Major adverse impacts of the increasing climate variability will be felt on the rice-wheat food production systems (mainly in IGP) which accommodate majority of population which depend on agriculture.
- Considering that the demand for food grain is expected to outstrip production by 2020, the region needs promotion of food systems that can meet growing demand and adapt to environmental changes.
- Research related to impact of environmental changes on food security in South Asia should focus more on the food system approach rather than only on food production functions.

Extent of undernourishment in South Asia



Population growth in South Asia

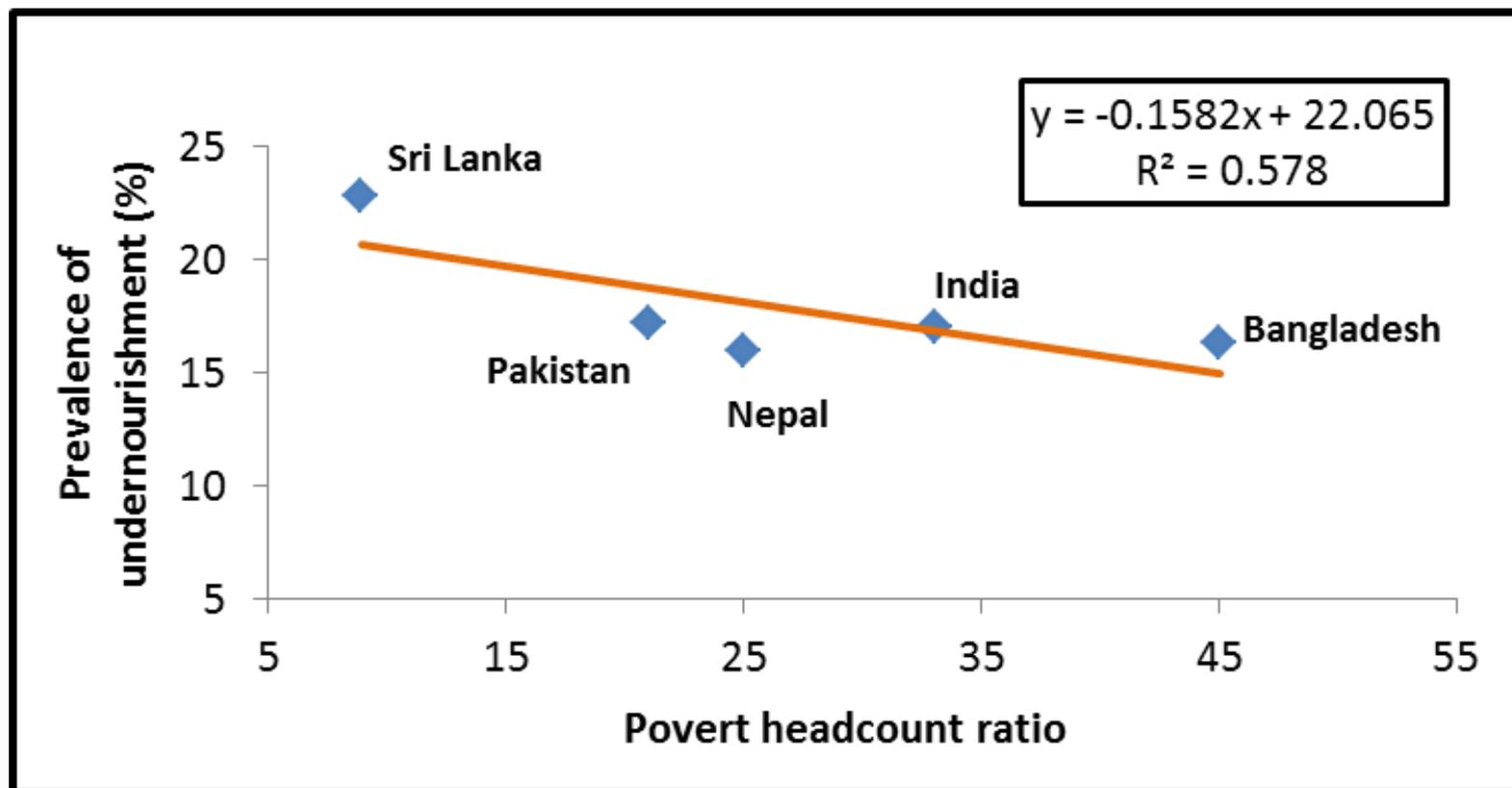


Source: EncyclopaediaBritannica.com

Cultivated land under rain-fed agriculture in South Asia

Country	Arable land (000 ha)	Rain-fed area (000 ha)	% rain-fed area
Afghanistan	7794	5487	70
Bangladesh	7880	2997	38
India	158720	98309	62
Nepal	2355	1187	50
Pakistan	21475	2345	11

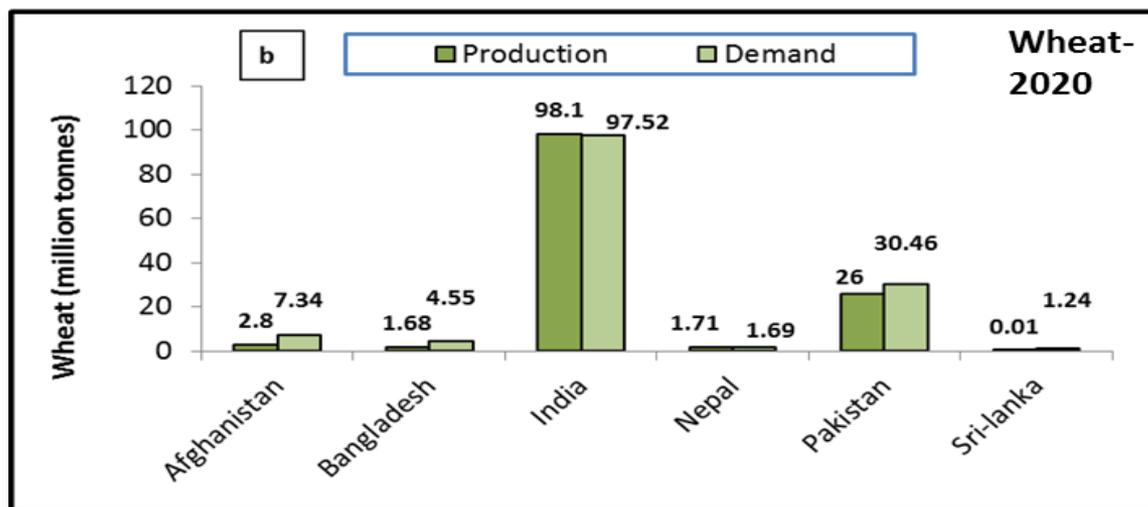
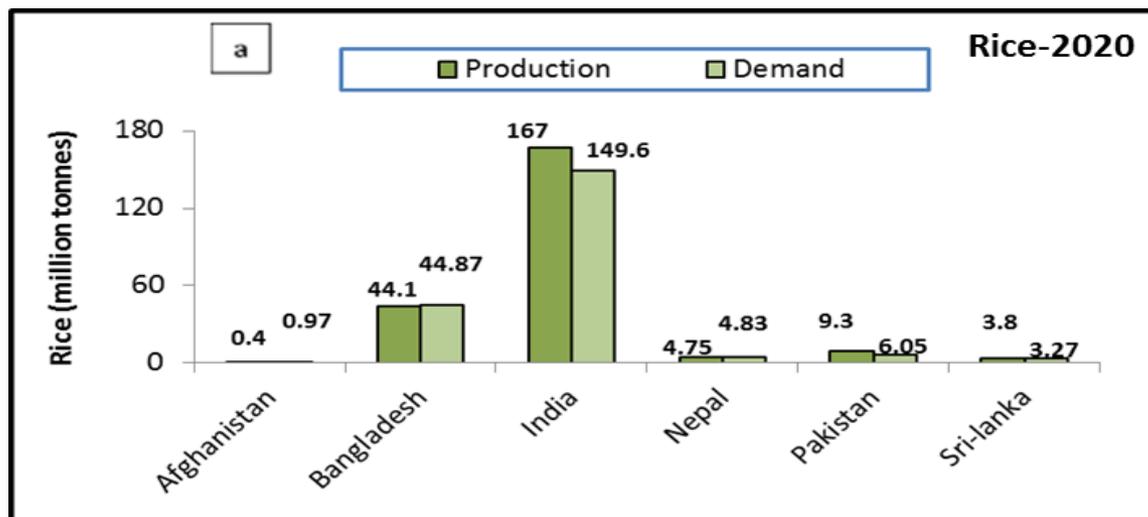
Under-nourishment and poverty rates in South Asia



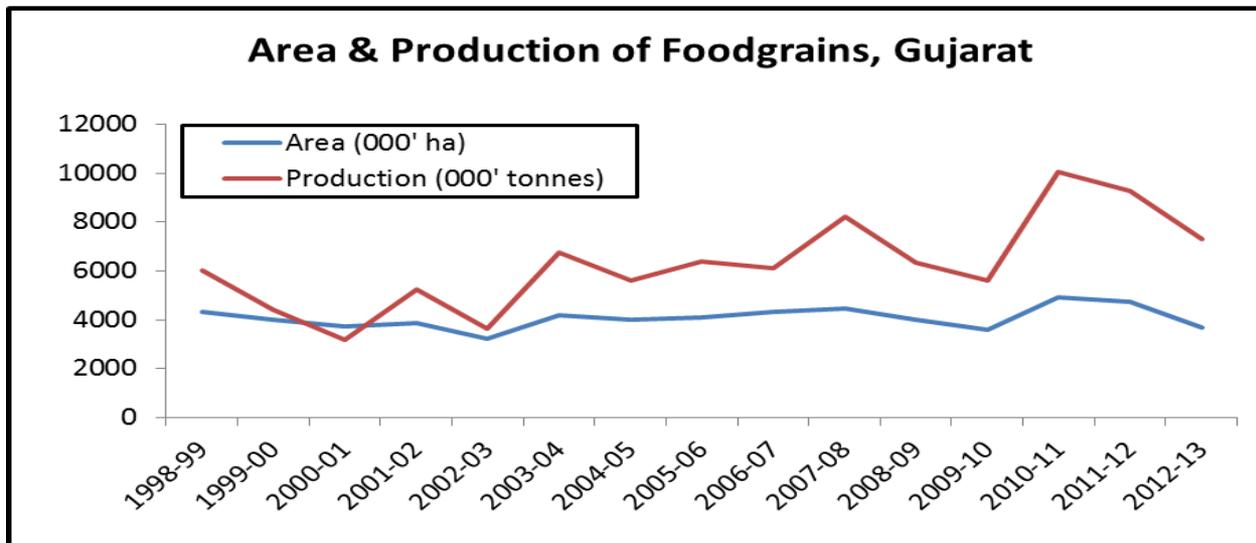
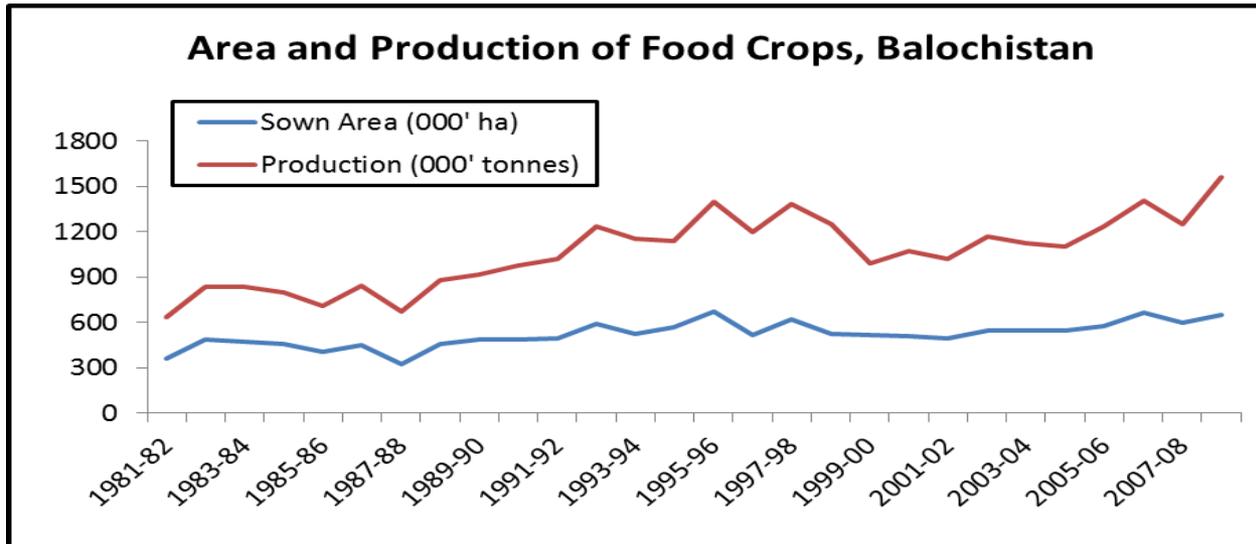
Projected food demand by 2020

Food Items	Production (Mt) in 1999-2000	Demand (Mt) in 2020	% Increase
Rice	85.4	122.1	43
Wheat	71.0	102.8	45
Coarse Grains	29.9	40.9	37
Pulses	16.1	27.8	73
Fruits	41.1	77.0	87
Vegetables	84.5	149.7	77
Milk, Meat and Eggs	79.0	142.7	81
Marine Products	5.7	11.8	107

Demand-supply gap in rice and wheat



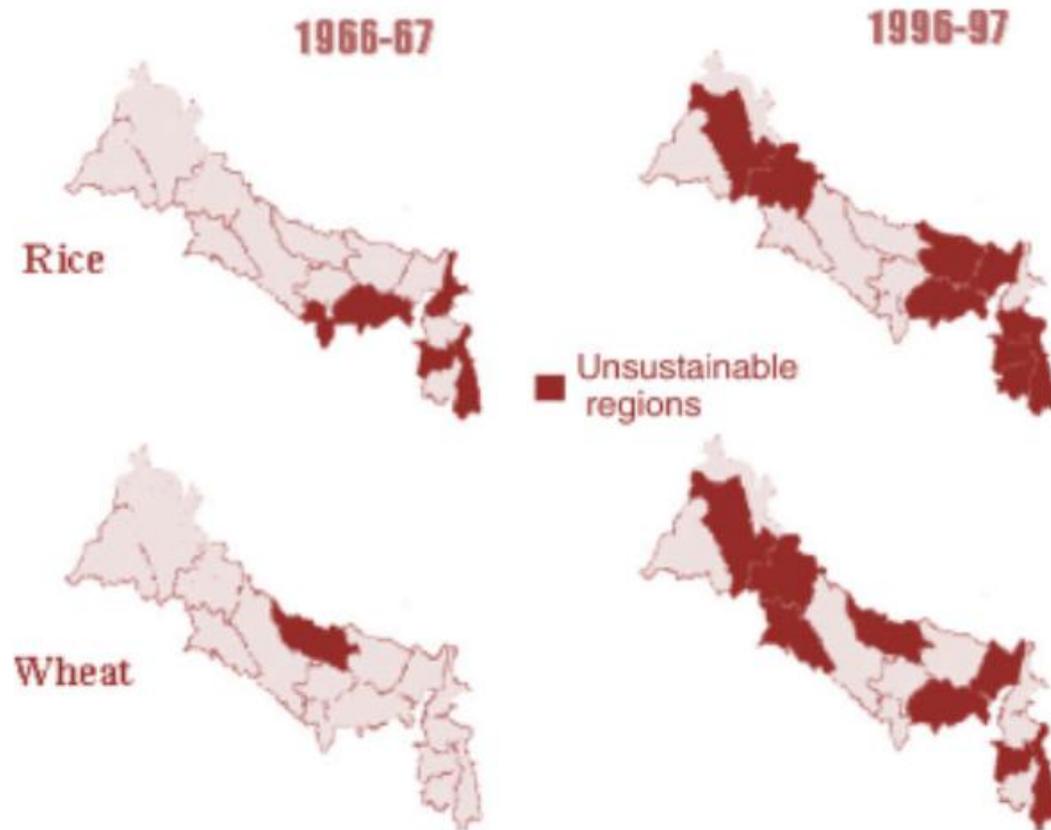
Impact of droughts on food production



Impact of floods on food production

Region	Year of flood event	Extent of inundation of arable land (ha)
Bangladesh	2012	1000
Assam state, India	2013	6100
Sindh province, Pakistan	2011	70,000

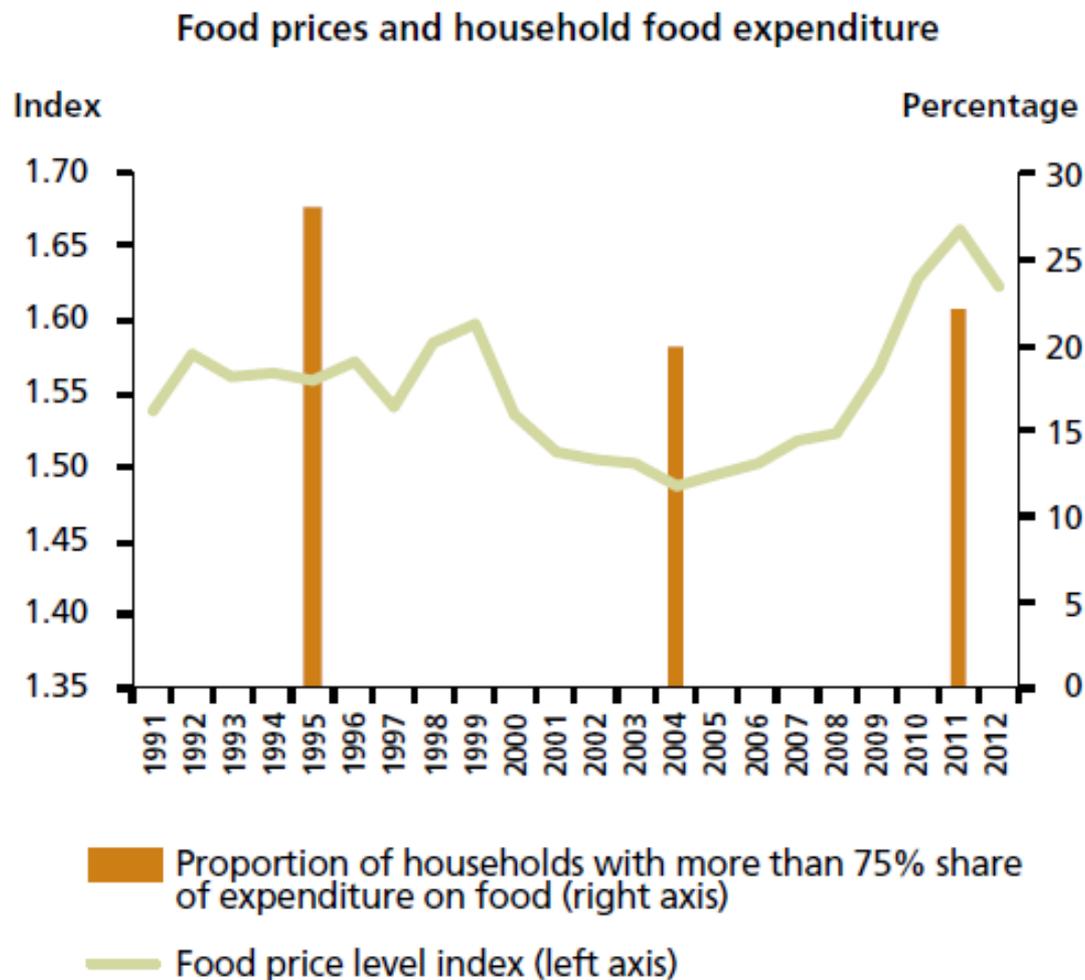
Unsustainable regions of rice and wheat in Indo-Gangetic Plains



Extent of damages due to disasters in South Asia

Countries	Droughts (1960-2013)			Floods (1960-2013)		
	No.	No. of people affected (million)	Economic damages (million US \$)	No.	No. of people affected (million)	Economic damages (million US \$)
Afghanistan	6	7	142	73	1	396
Bangladesh	5	25	-	85	318	12038
India	12	1062	2441	238	817	37146
Iran	2	38	3300	66	4	7653
Nepal	6	5	10	39	4	1038
Pakistan	1	2	247	72	77	19368
Sri Lanka	9	8	-	56	13	981

Economic access to food in Nepal



Impact on food utilisation

- Droughts in western India, many parts of central and peninsular India, south-western Pakistan, and Afghanistan result in unavailability of safe food and drinking water and hence escalates the malnutrition problems.
- Increased flooding in eastern India and Bangladesh, expose people to diarrhoeal and other infectious diseases which lower their capacity to utilize food effectively.
- South Asian floods of 2007, around 54 people lost their life and 0.24 million were affected due to an outbreak of cholera in Bangladesh and eastern India.