

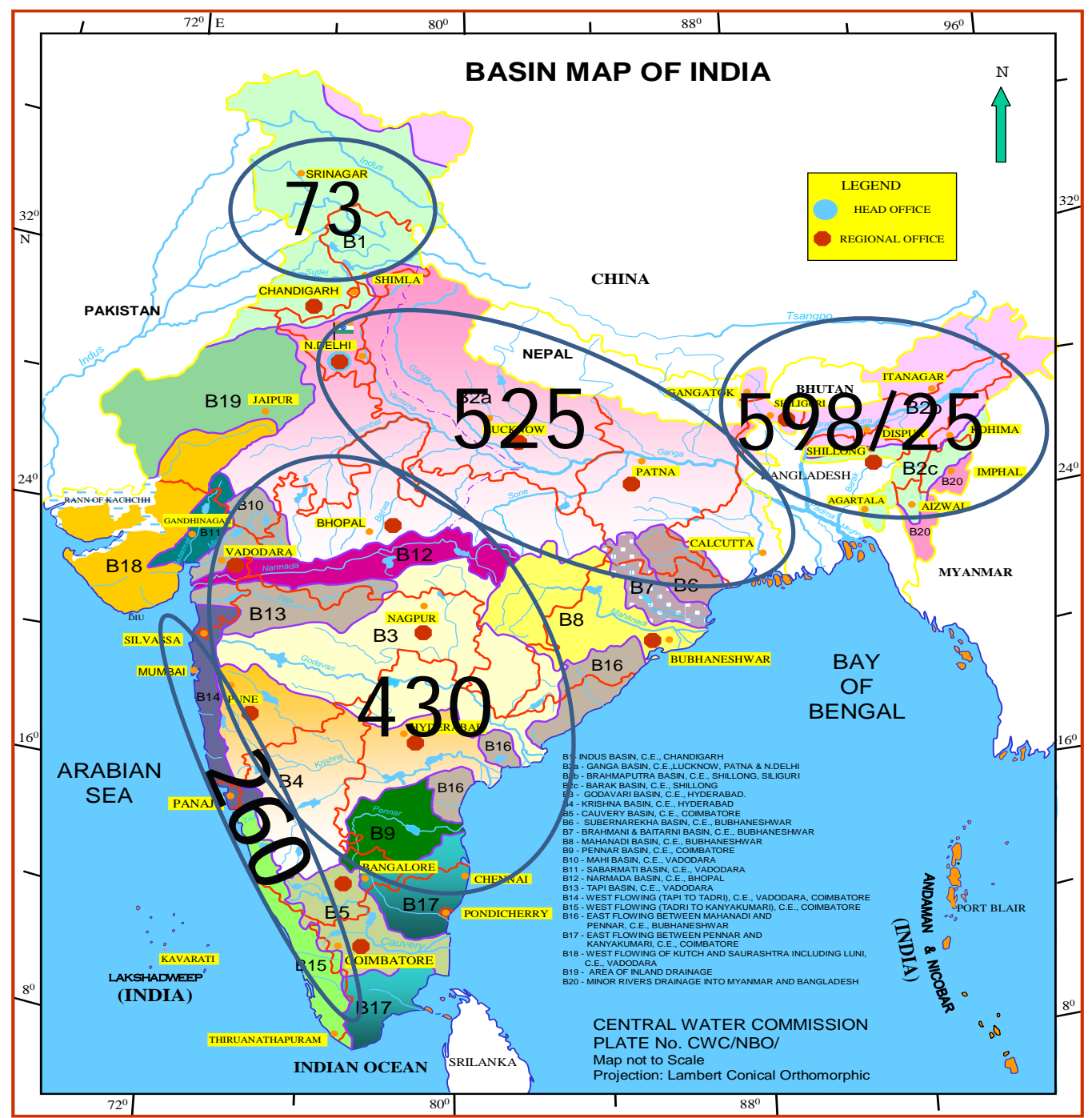
FOOD SECURITY FOR INDIA



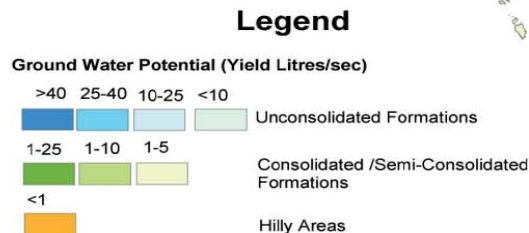
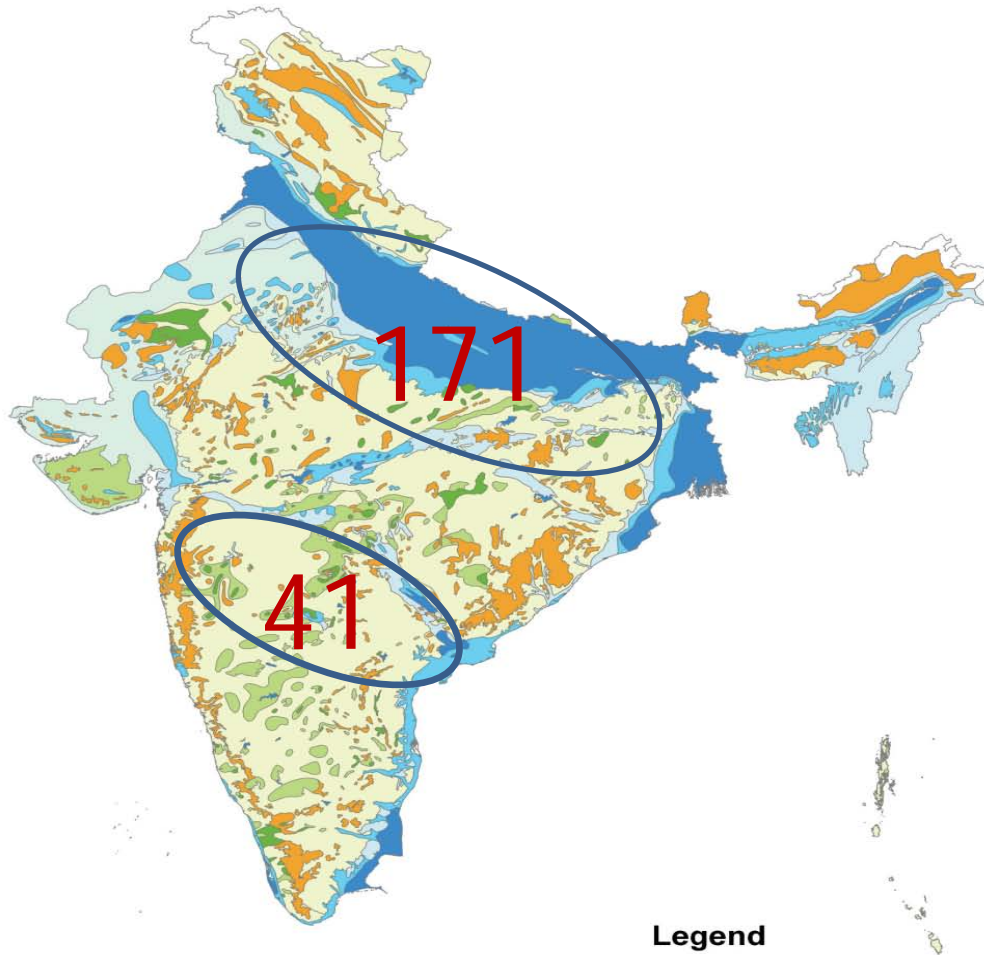
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SW- Potential & Variability



Hydrogeological Map of India

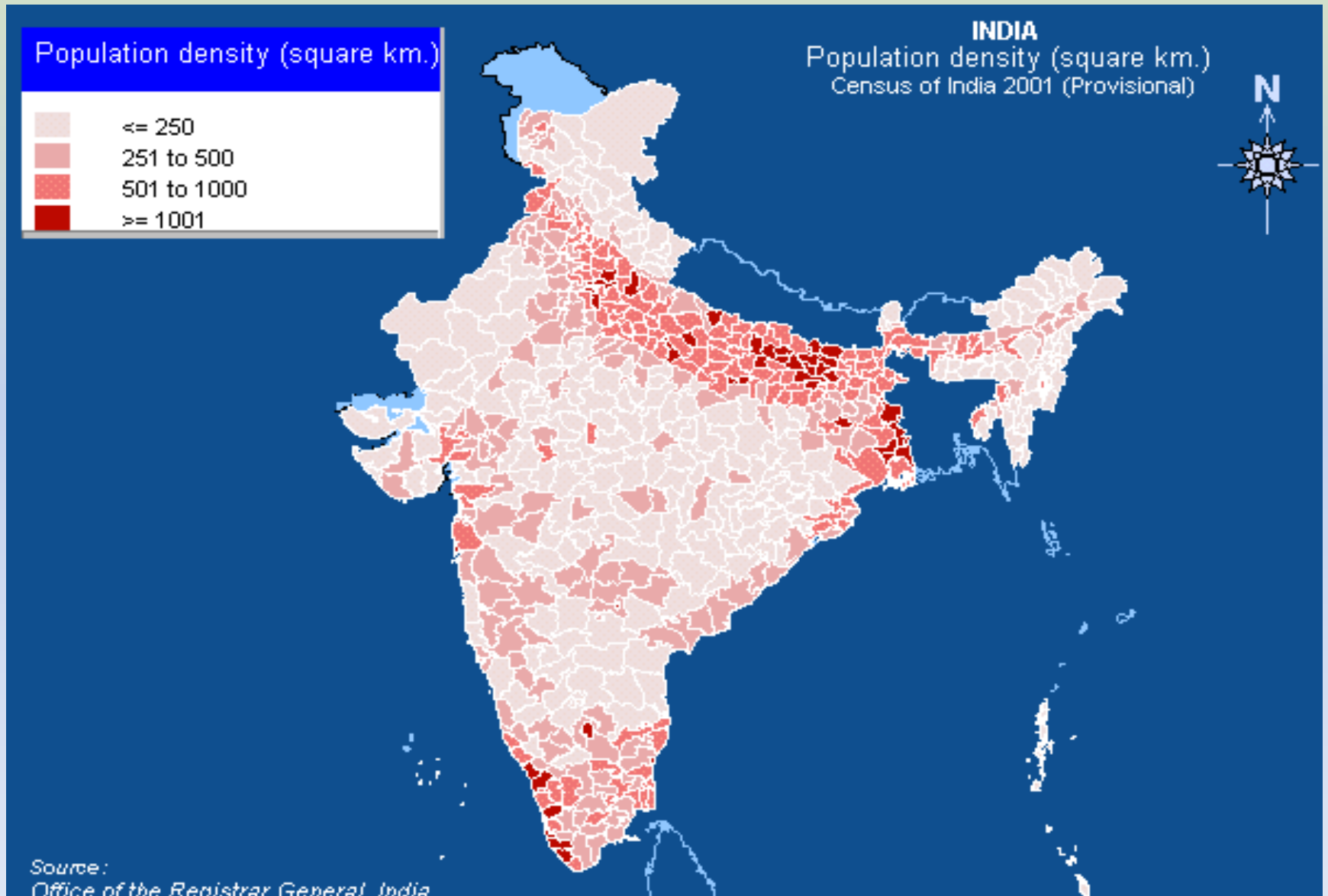


GW-Potential & Variability

Brahmaputra, Indus, and Krishna basins each have a potential of about **26** BCM/year.

Total GW Potential = **433** BCM/year.

Population Distribution



India – Water balance

Average annual precipitation = 4000 km³

Monsoon rainfall = 3000 km³

Average annual flow in rivers = 1953 km³

Utilizable annual surface water = 690 km³

Replenishable groundwater = 433 km³

Total utilizable water = 1123 km³

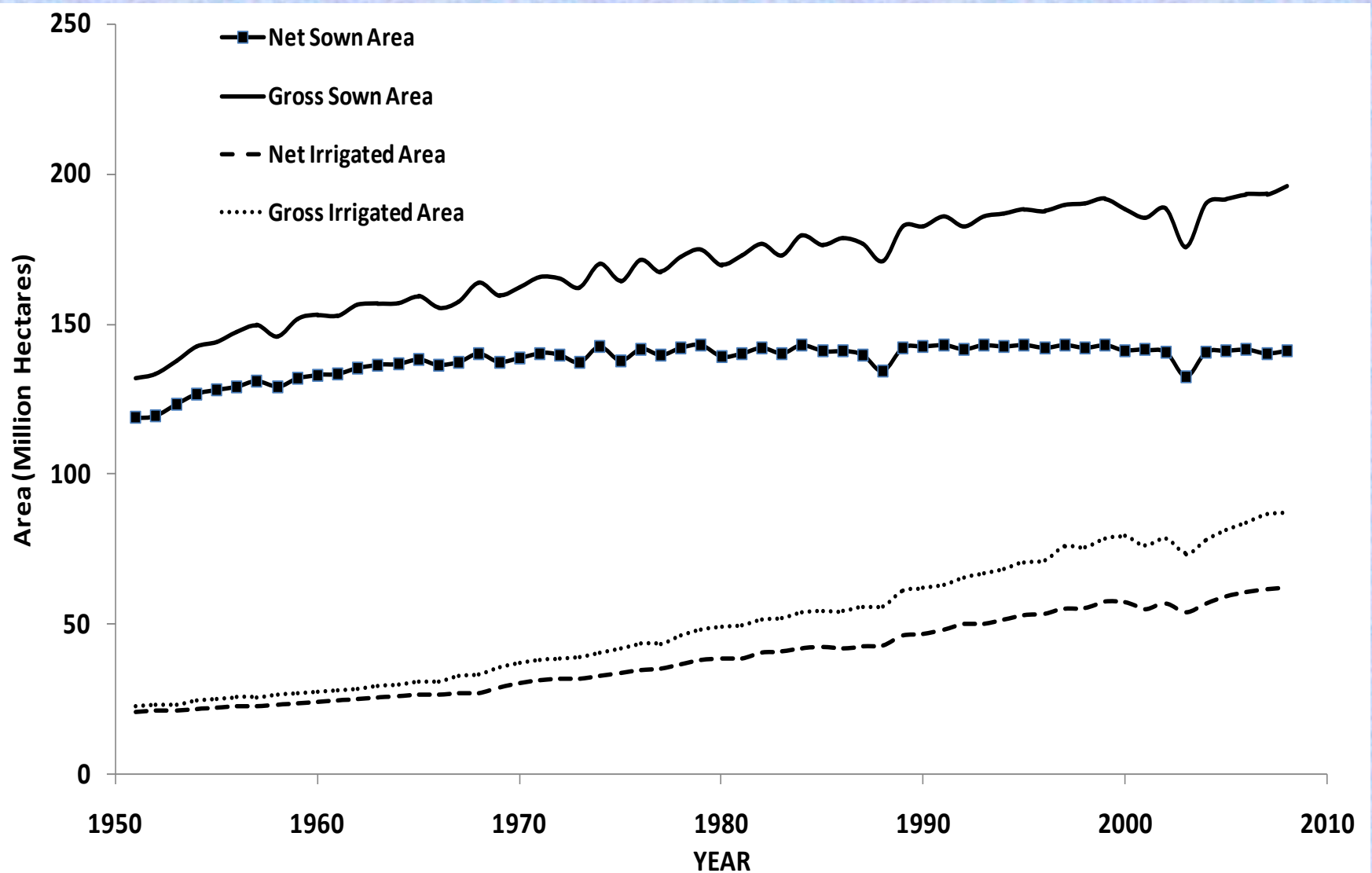
BROAD SETTINGS FOR INDIA

Year	Population (million)	Food grain production (million tons)	Per capita water availability (m ³)	Per capita food availability/ day (gms)
1951	361.1	50.8	5177	395
1961	439.2	82.0	4256	469
1971	548.2	108.4	3558	469
1981	683.3	129.6	2735	455
1991	846.3	178.4	2208	510
2001	1027.0	196.8	1816	416
2011	1210.0	241.6	1545	463

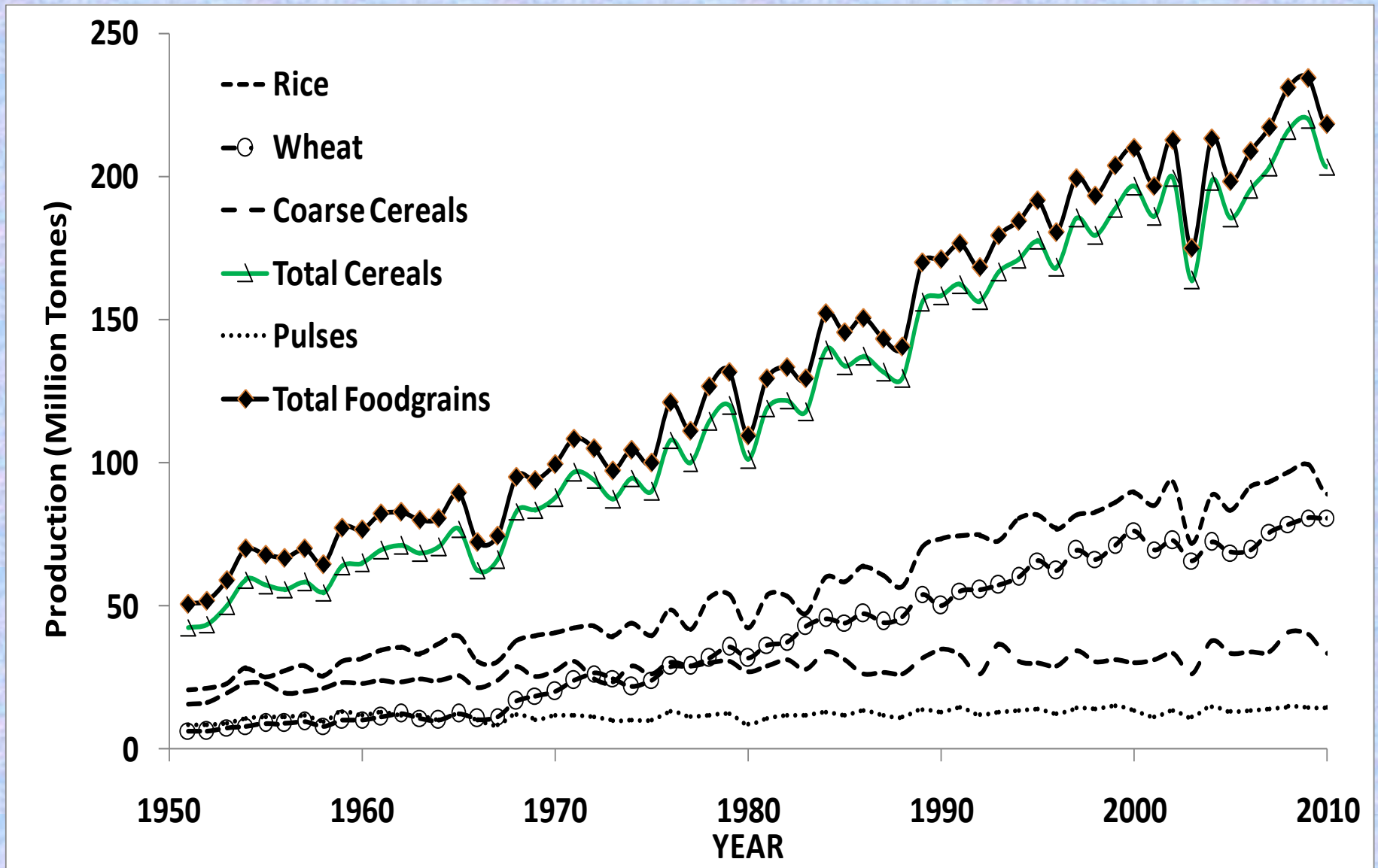
Annual Water Requirement (km³)

S. N.	Uses	Estimates for year	
		2050	2065
1	Irrigation	826.7	852.9
2	Domestic	118.6	122.6
3	Industries	90.0	90.0
4	Power	70.0	75.0
5	Inland Navigation	15.0	15.0
7	Environment Afforestation -	1.0	1.0
8	Environment - Ecology	90.0	90.0
9	Evaporation Losses	80.0	80.0
	Total	1291	1327
	Population (million)	1692	1718

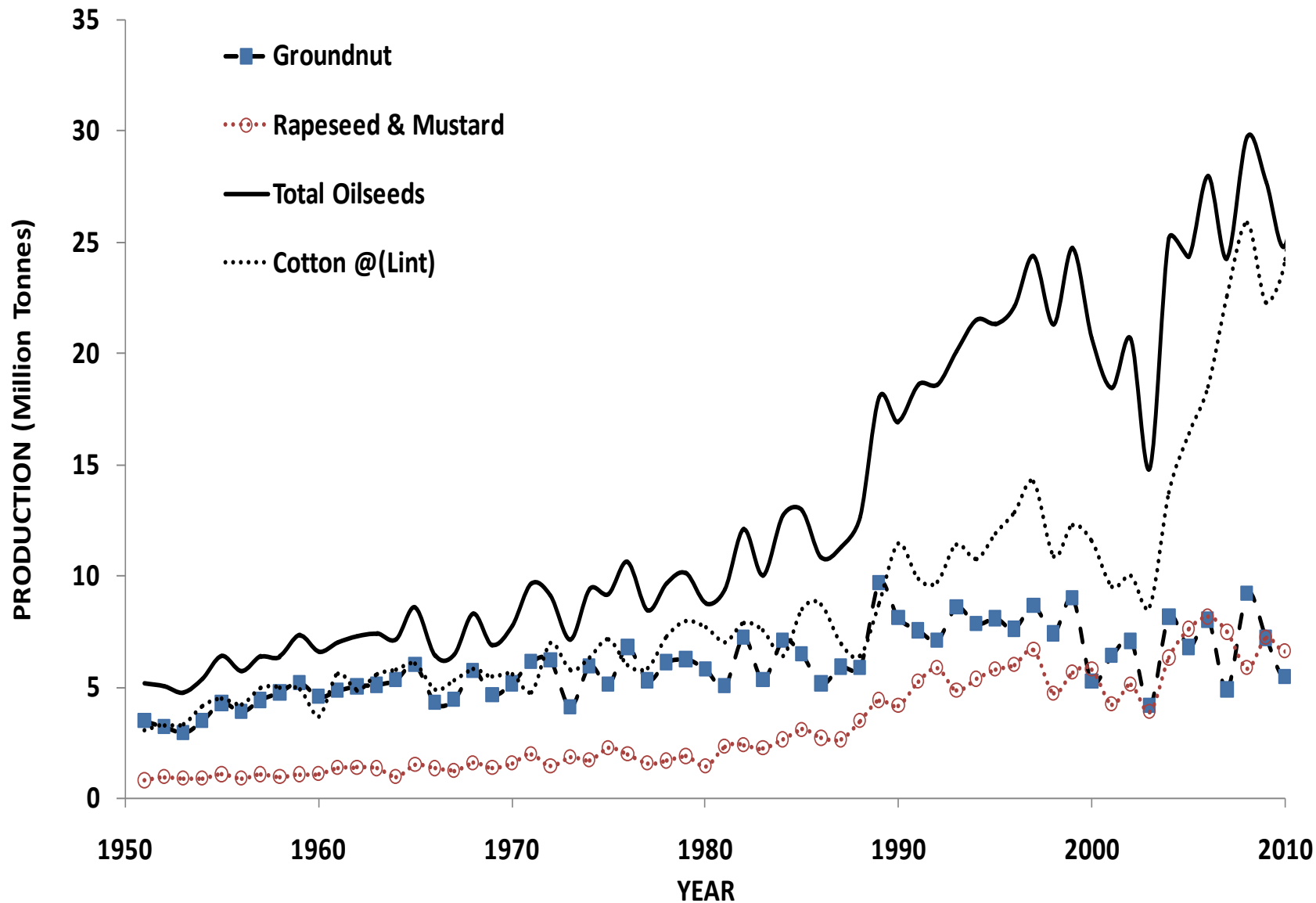
VARIATION OF SOWN AND IRRIGATED AREA WITH TIME



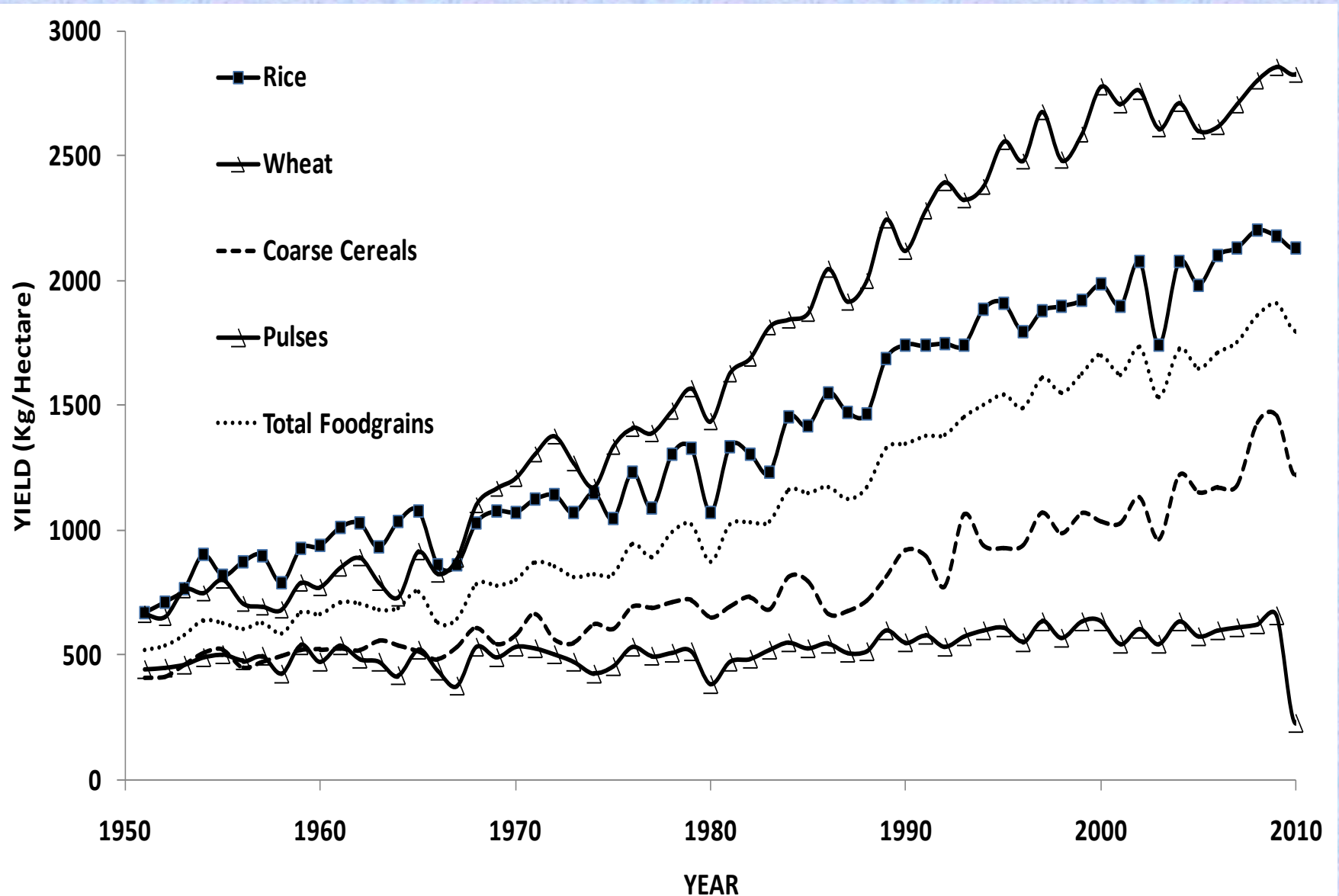
GROWTH OF FOODGRAIN PRODUCTION WITH TIME



PRODUCTION OF MAJOR COMMERCIAL CROPS



YIELD PER HECTARE - FOODGRAINS



WHAT IS FOOD SECURITY?

- **World Food Summit Definition:** 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.
- **Four pillars of food security: availability, access, utilization and stability.**
- **Availability is supply side of food security depends on production, stocks and trade.**

WHAT IS FOOD SECURITY? (Contd.)

- Access includes physical and economic access; influenced by incomes, markets, and prices. Also includes food affordability.
- Utilization: how body takes advantage of various nutrients contained in food. Influenced by care and feeding practices, food preparation, dietary diversity, and intra-household distribution.
- Stability is an indicator of time dimension. Periodic shortfalls in food availability enhance food insecurity.

FOOD SECURITY

- **Food security is closely linked with eradicating poverty which is a stated goal of good governance.**
- **In any society, poor are the first and the worst sufferers from food insecurity.**
- **Adverse impacts of climate change will impose new constraints and problems.**

CHALLENGES IN MEETING FOOD SECURITY IN INDIA

- Food demand is increasing due to increasing population and economic growth.
- Per capita water availability is falling and water quality is deteriorating.
- Agricultural area is reducing due to urbanization and industrialization.
- VW is currently not being exported from water surplus to deficit regions.

CHALLENGES IN MEETING FOOD SECURITY IN INDIA (contd.)

- **Price of energy needed for agricultural operations are increasing.**
- **Lack of infrastructure for transport, storage and distribution of agricultural products resulting in delays and damages.**
- **Climate change may adversely impact agricultural productivity.**

Do We Have Enough Water ?

- **Comprehensive Assessment by IWMI: Yes, if we act to improve water use in agriculture.**
- **Besides agriculture, larger quantities of water will be needed for aquatic and terrestrial ecosystems, industries.**
- **Efficiencies are around 40 % in most surface systems which leaves large scope for saving.**

Scope for Improvement

- Land and water productivity.
- Productivity can be increased many times in several places in India.
- Dryland/ rainfed areas offer the greatest potential for yield enhancement.
- Long distance water transfer from water rich to water deficit places.

Scope for Growth in Eastern Region

Key Features:

- Abundance of water resources
- Small and fragmented land holdings
- Poor infrastructure
- High population pressure
- Frequent flooding
- Currently food importer
- Good potential exists for agricultural development

Threats to Food Security

- Increasing pollution of surface and sub-surface water sources.
- Rapidly declining water tables in many areas.
- Wastages in harvesting, storage, transportation, and consumption of food.
- Deteriorating infrastructure.
- Biofuels.
- Uncertainties and variabilities introduced by climate change.
- Changing dietaries preferences.

Thanks ...