

# **INTRODUCTION TO AGRONOMY**

By

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**Presentation includes the following:**

**General Introduction**

**Characterization of Indo-Gangetic and Yellow River  
Basins**

**Agronomic Concepts**

**Production Constraints**

**Core Agronomic Issues**

**Agro Support Programm In India**

**Biotechnology**

## **OBJECTIVE**

**To educate the participant with the agronomic problems of  
Indo Gangatic basin.**

# **Agriculture in India**

## **Current Scenario**

# **Indian Agriculture has made rapid strides since independence**

- *From food shortages (1947) and import to self-sufficiency and exports (1971).*
- *From subsistence farming to intensive technology led cultivation.*
- *Today , India is the front ranking producer of many crops in the world.*
- *Ushered in through the green, white, blue and yellow revolutions*

# Indian Agriculture- Some Facts

- Total Geographical Area - 328 million hectares
- Net Area sown - 142 million hectares
- Gross Cropped Area – 190.8 million hectares
- Major Crop Production (1999-2000)
  - ❖ Rice 89.5 million tonnes
  - ❖ Wheat 75.6 million tonnes
  - ❖ Coarse Cereals 30.5 million tonnes
  - ❖ Pulses 13.4 million tonnes
  - ❖ Oilseeds 20.9 million tonnes
  - ❖ Sugarcane 29.9 million tonnes

## Indian Agriculture- Some Facts

- Contributes to 24% of GDP
- Provides food to 110 Billion people
- Sustains 65% of the population : helps alleviate poverty
- Produces 51 major Crops
- Provides Raw Material to Industries
- Contributes to 1/6<sup>th</sup> of the export earnings
- One of the 12 Bio-diversity centers in the world with over 46,000 species of plants and 86,000 species of animals recorded

## **Major Achievements**

India in the world is ranked as:

- Largest producer of pulses , tea , and milk.
- Second Largest producer of fruits, vegetables, wheat , rice, groundnut and sugarcane.

# Indian Agriculture Scenario

## STRENGTHS

- ✓ Rich Bio-diversity
- ✓ Arable land
- ✓ Climate
- ✓ Strong and well dispersed research and extension system

## OPPORTUNITIES

- ✓ Bridgeable yield gaps.
- ✓ Exports
- ✓ Agro-based Industry
- ✓ Horticulture
- ✓ Untapped potential in the N.E.

## WEAKNESS

- ✓ Fragmentation of holding.
- ✓ Low Technological Inputs
- ✓ Unsustainable Water Use.
- ✓ Inadequate Infrastructure
- ✓ Inadequate value addition

## THREATS

- ✓ Imbalanced land resource use.
- ✓ Lob sided regional development
- ✓ Input Imports

## **Current Concern**

- Rising Population Pressure on Land
- Skewed distribution of operational holdings
- Land Degradation in canal commands.
- Disturbing ground water Balance
- Insufficient farm mechanization
- Low Fertilizer and pesticide use

# National Agriculture Policy July 2000

- ❖ *A Growth rate in excess of 4 percent per annum*
- ❖ *Growth that is based on efficient use and conservation of soil, water , and bio resources.*
- ❖ *Growth with equity, i.e. growth which is widespread across regions, and different classes of farmers.*
- ❖ *Growth that is demand driven and stabilizes domestic markets and maximizes benefits from exports in the face of Global Challenges.*
- ❖ *Growth that is sustainable ,technologically , environmentally, and economically.*

# **Initiatives to achieve the Policy objectives**

- *Development of Sustainable agriculture*
- *Food and Nutritional security*
- *Generation and Transfer of Technology*
- *Improvement of input efficiency*
- *Provision of incentives for agriculture*
- *Promotion of Investments in agriculture*
- *Strengthening of institutional infrastructure*
- *Better risk management through insurance*
- *Introduction Land Reforms*

# Targets

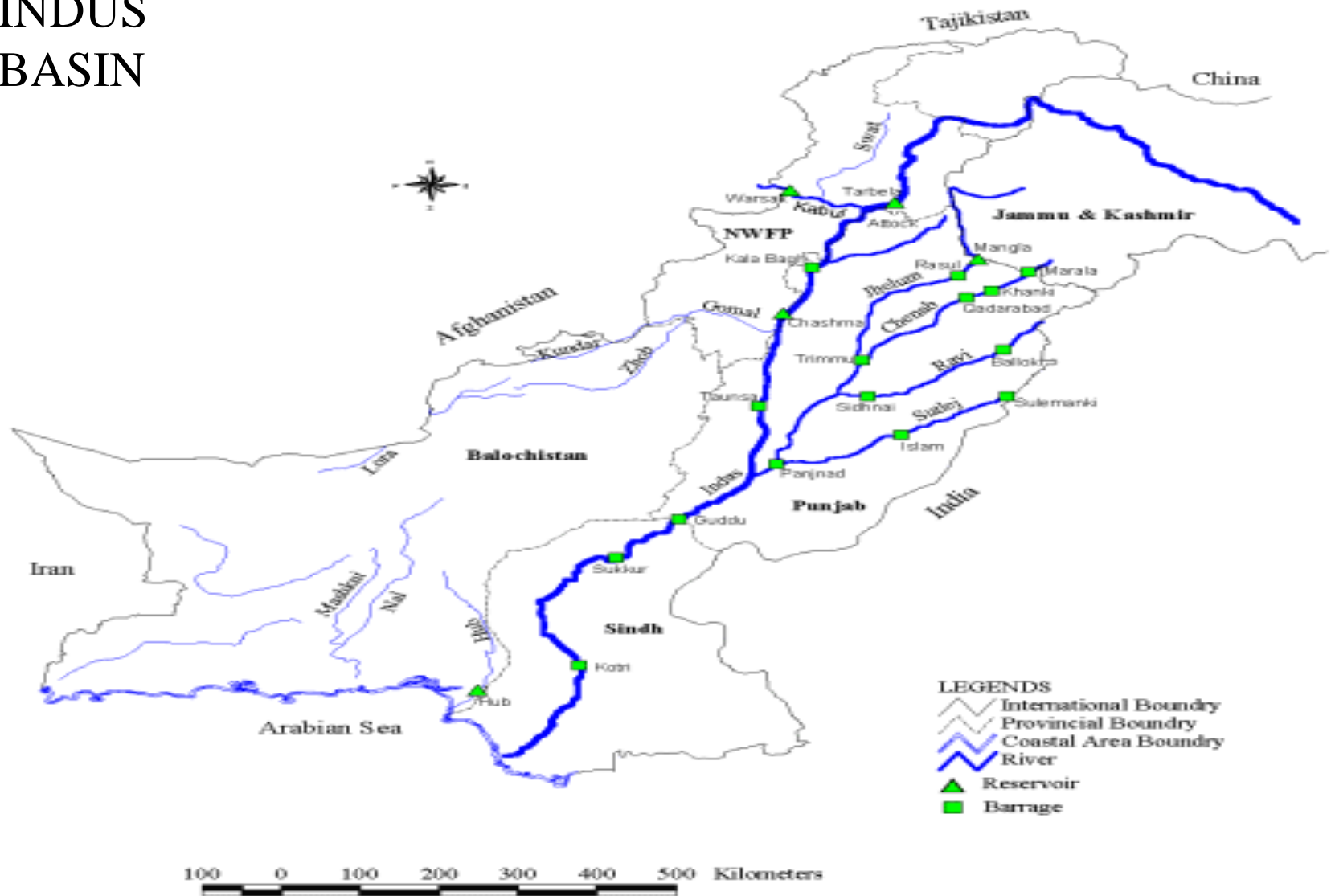
- Food Grain Production will be 350 mt by 2020.
- Special emphasis will be on horticulture production in order to achieve a quantum increase in quality food.
- Allied sectors like live stock, dairy poultry, fisheries, will be promoted
- Production of oilseeds and pulses will be raised substantially.

Indo Gangatic and  
Yellow River Basin

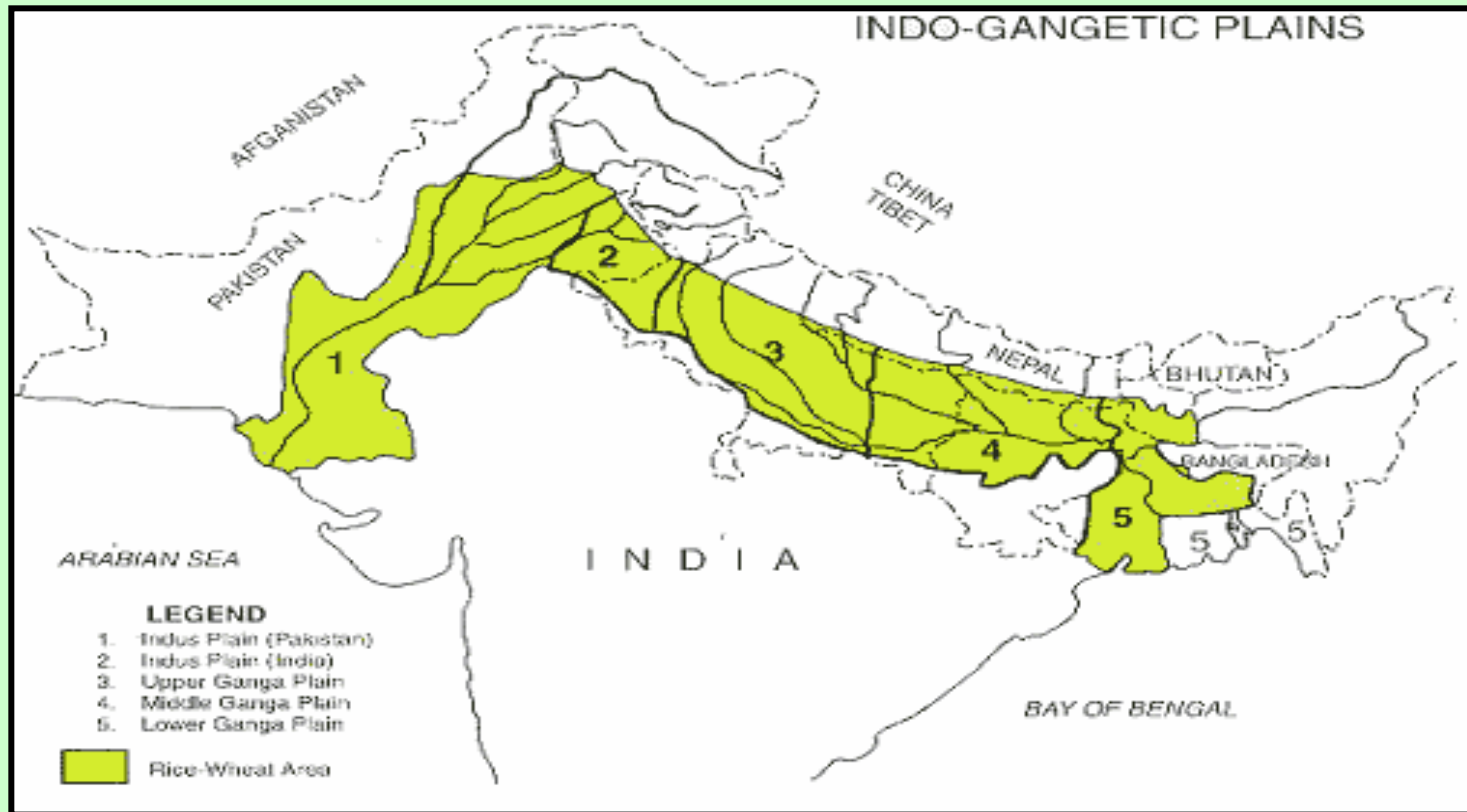
# Indo-Gangetic Plain in India

- Geographic Distribution : India, Pakistan, Bangladesh, Nepal, and china. ( Fig. [Map](#))
- Indian States : Punjab, Haryana, Uttaranchal, UttarPradesh, Bihar and West Bengal.
- Geographic Area : 60 million ha.
- Soils : Alluvium, Sandy loam to Clay loam.
- Climate Temporally : Rainfall 800-1800mm, Semi arid to Humid Spatially and Variable.
- Agriculture : Rice, Wheat, Cotton, Soyabean, Pulses & Oilseeds.
- Water Resources : Rich in Surface & Groundwater.
- River System : A : Indus – Indus, Beas, Sutlej, Ravi, Jhelum etc.  
B : Ganges – Ganga, Yamuna, Sharda, Chaglare, Gundak, Kosi etc.
- Population : Very High density (300-900\ km<sup>2</sup>).
- Average Size of Holding : Varies from about 4.0 ha in Punjab to 0.5 ha in WB.
- Population Growth Rate : 2.1- 2.7 per annum during 1990-2001.
- Socio economic Condition : Prosperity to poverty.
- Natural Calamities : Droughts and Floods.

# INDUS BASIN



# INDUS GANGA BASINS



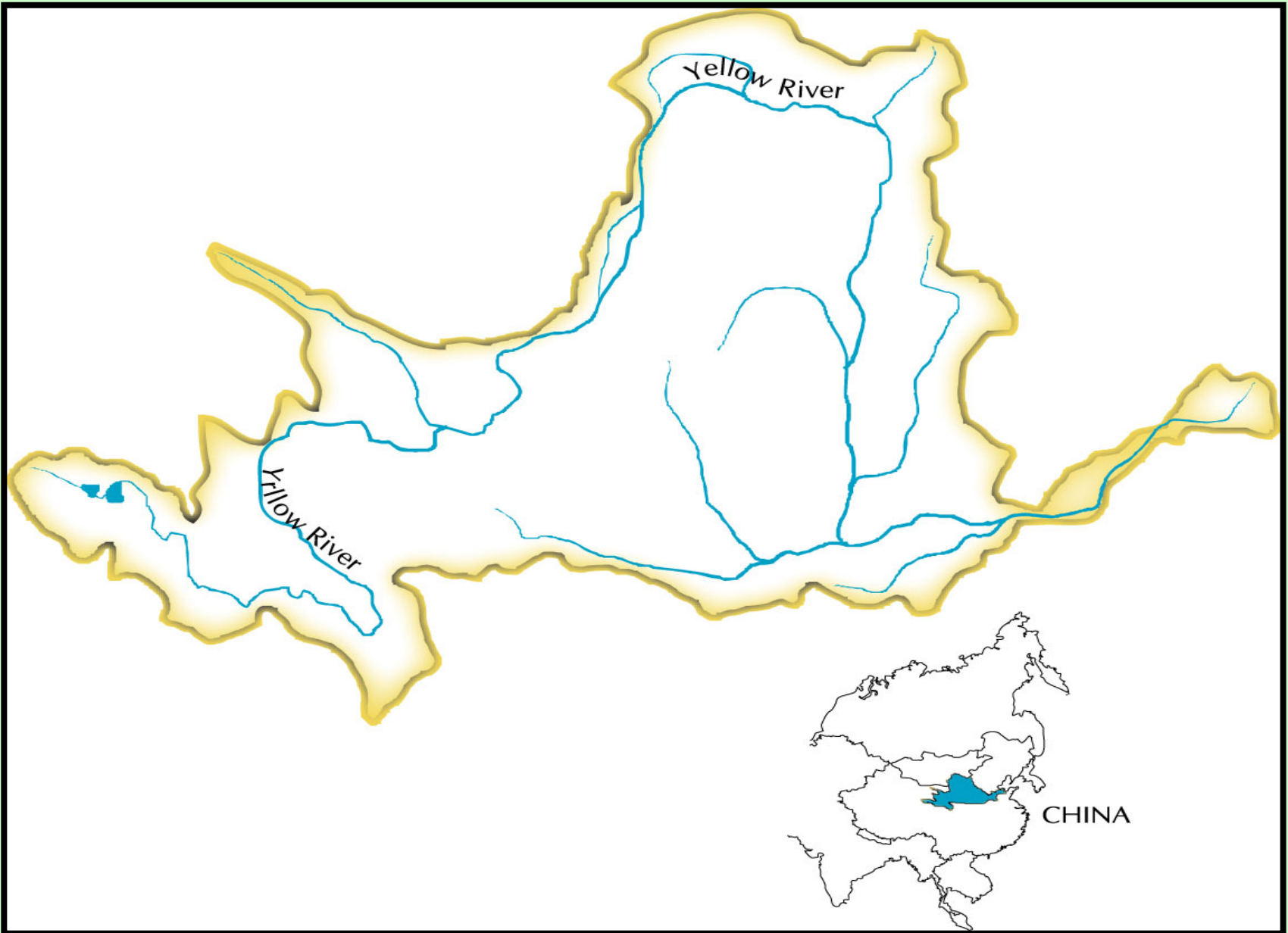
## Western Region (1, 2 & 3)

- high productivity – food surplus
- high investment in infrastructure
- major use of fertilisers and ground-water for irrigation
- in-migration of labour

## Eastern Region (4 & 5)

- low productivity – food deficit
- poor infrastructure and low inputs of fertilizer and water
- high risk of flooding
- out-migration of labour

# YELLOW RIVER BASIN



# AGRONOMIC CONCEPTES

*Selection of site, soil, crop season, seed and variety, field preparation, sowing method, field preparation, fertilizer application, weed control, insect-pest and disease control, irrigation, harvesting and threshing etc.*

Tables: (1), (2), (3), (4), (5),

# **Production Constraints**

**Climatic Condition**

**Social and Demographic Condition**

**Land, Water and Bio Resources**

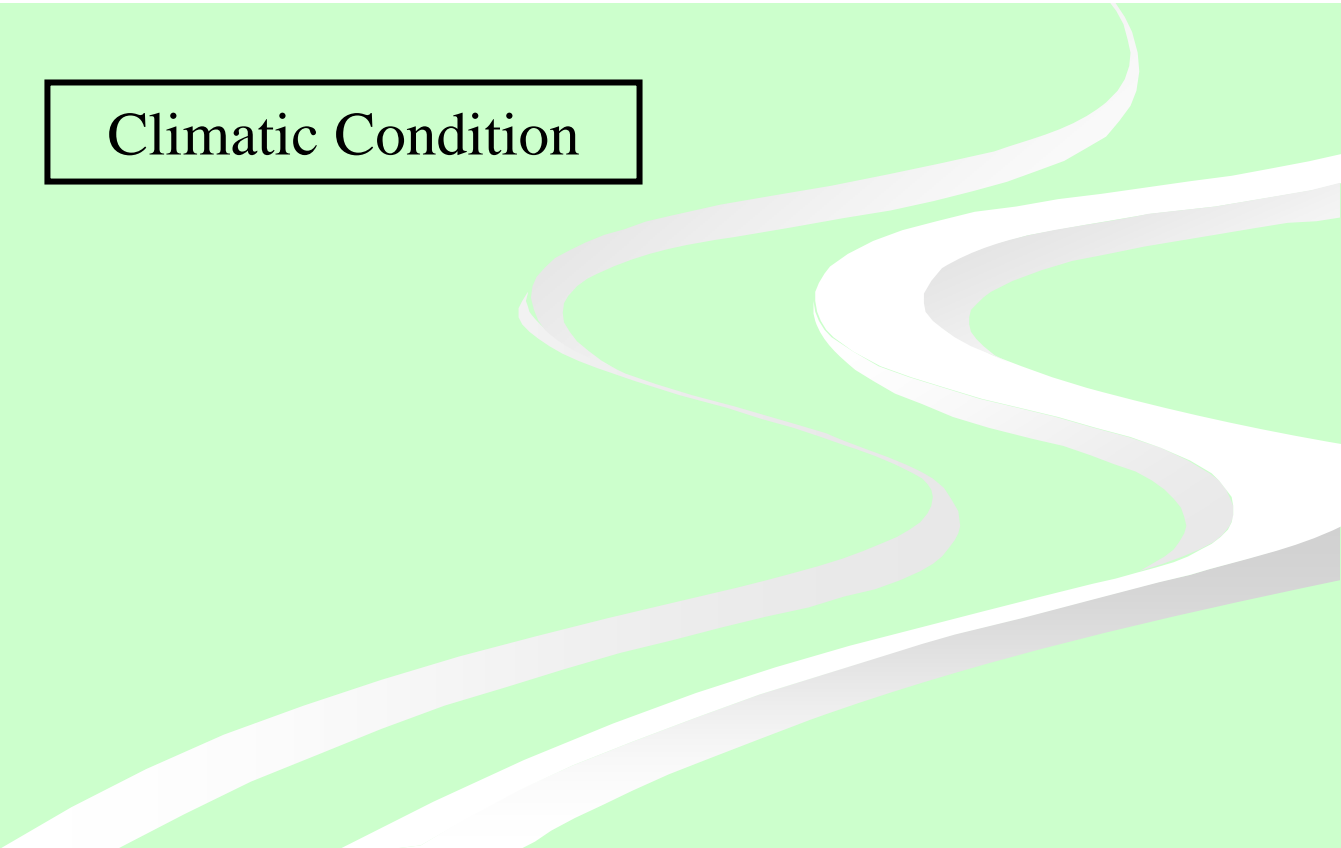
**Geological Variation**

**Water Resources Development**

**Infrastructure facilities.**

**National / State policies.**

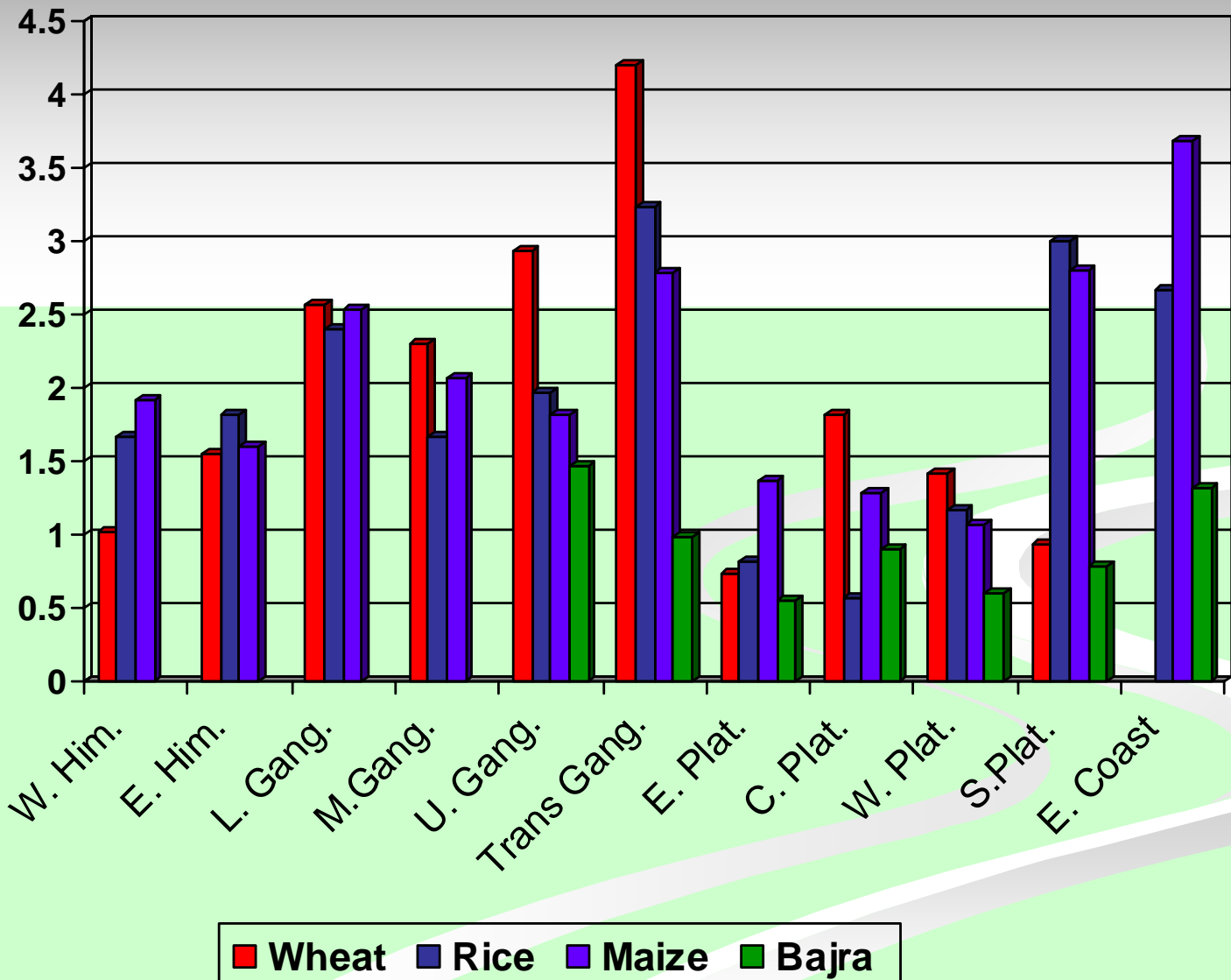
Climatic Condition

The image features a light green background with a white-to-gray gradient at the top. In the center, the text "Climatic Condition" is enclosed in a black rectangular box. To the right, there are several thick, wavy, white-to-gray gradient lines that curve across the lower half of the image.

# AGRO-CLIMATIC REGIONS

1. Western Himalayan
2. Eastern Himalayan
3. Lower Gangetic Plains
4. Middle Gangetic Plains
5. Upper Gangetic Plains
6. Trans Gangetic Plains
7. Eastern Plateau & Hills
8. Central Plateau & Hills
9. Western Plateau & Hills
10. Southern Plateau & Hills
11. East Coast Plains & Hills
12. West Coast Plains & Ghats
13. Gujarat Plains & Hills
14. Western Drylands
15. Islands

# Regional Variation in Productivity of Foodgrains (tons / ha)



## REGION SPECIFIC CONSTRAINTS

<b>Agro-Climatic Region</b>	<b>States / Parts of States</b>	<b>Region Specific Constraints</b>
Western Himalayan Region	J & K, H.P., Uttaranchal	Severe soil erosion, degradation due to heavy rainfall/floods and deforestation
Eastern Himalayan Regions	Assam, N.E. States, Sikkim	Alu. toxicity and soil acidity, Soil erosion and floods, shifting cultivation
Lower and Mid Gangetic Plains	West Bengal, Bihar, Eastern UP	Flood/ water logging, poor drainage, Salinity/alkalinity, Arsenic contamination
Upper and Trans Gangetic Plains	Western U.P., Punjab, Haryana	Groundwater depletion, decreasing soil carbon content, micronutrient deficiency
Eastern Plateau & Hills	Orissa, Jharkhand, Chattisgarh	Moisture stress, drought and Soil acidity, Iron toxicity
Central, Western and Southern Plateau and Hills	Bundelkhand (in U.P & MP), parts of Rajasthan, Maharastra, AP, Karnataka & Tamil Nadu	Drought, moisture stress, Soil crusting & cracking, soil salinity / alkalinity
East & West Coast Plains & Ghats	Pondicherry, Coastal area of Orissa, AP, TN and Kerala, Goa, parts of Karnataka & Maharastra	Salinity, Water management, Poor nutritional status of soil, saline lands
Western Dry Region and Gujarat Plains & Hill Regions	Gujarat, D&N Haveli, Daman & Diu, North Western Rajasthan	Frequent drought, moisture stress and high evaporation, poor soil
Island Region	Andaman & Nicobar, Lakshdweep	Soil salinity & acidity, frequent cyclones

# CORE AGRONOMIC ISSUES

Availability of food grains in India, fertilizers consumption and yield of principal crops, nutrient removal etc. is shown in:

Table (6) : Net availability of food grains and pulses in India from 1951 to 2000.

Table (7) : % Annual Growth rate of Production and Productivity of major crops during different periods in India.

Table (8) : Yield levels (kg/ha) of some selected crops in India, China and World.

**Magnitude of  
GROUND WATER  
Use in Different Countries**

**Table (X)**

# AGRO SUPPORT PROGRAMME IN INDIA

- ✦ Intensive Agricultural Area Programme (IAAP) and Intensive Agricultural District Programme (IADP).
- ✦ Command Area Development Programme (CADP).
- ✦ Intensive High-Yielding Varieties Programme (HYVP).
- ✦ Integrated Rural Development Programme (IRDP).
- ✦ Community Development Programme (CDP) .
- ✦ Marginal Farmers and Agricultural Labours Agency (MFALA).
- ✦ Small Farmers Development Agency (SFDA).
- ✦ Drought Prone Area Programme (DPAP).
- ✦ Minimum Needs Programme (MNP).
- ✦ Tribal Area Development Project (TAD).
- ✦ Antyodya Yojna or Movement.
- ✦ The National Scheme of Training of Rural Youth for Self-Employment (TRYSEM).

# BIOTECHNOLOGY



Biotechnology is a powerful technological tool for converting biological resources into economic wealth

## **DIVERSIFICATION OF CROPPING SYSTEMS**

**Diversification** of rice from non traditional Northern region (Punjab, Haryana and Western UP) to potential areas.

Increased productivity from potential areas will offset the loss of production of rice in Punjab, Haryana and Western UP.

# CONCLUSION

Let me conclude my lecture with following:

- **Crop(s) and varieties selected should be well adapted to the soil, land and climatic conditions.**
- **Agro System adopted should be compatible to the practice Socially acceptable in the area.**
- **Cropping should have minimum adverse residual effect on ecology, environment and sustainability.**
- **Cultivation practice should be comprehensive in the nature.**
- **Resources of the farmers and the area should be appropriately utilized in the cultivation of crops.**