16.9 Green Revolution

Seeds of Revolution

The seeds of the Green Revolution were sown during the Nehru Era. Though planned economy was heavily aligned with heavy and capital goods industries, agriculture was not neglected. Massive irrigation and power projects were undertaken, agricultural universities started, fertilizer plants set up, and research laboratories opened, in fact, "Nehru from the very beginning placed great emphasis on creating the physical and scientific infrastructure necessary for modern agriculture." Shastri and his able food Minister C.Subramaniam, with great foresight and boldness, shifted their strategy from institutional reforms and provided a strong technological base for agricultural development. Indira Gandhi retained C.Subramaniam as Food Minister and raised the super structure of Green Revolution on the firm foundation laid by Nehru and Shastri.

The Revolution

The epithet 'Green Revolution' refers to the paradigm shift from institutional and structural reform of land use to a package of agricultural technological practices which had promoted the increase in agricultural productivity and production. It also means the change in emphasis from the extensive integrated rural development to intensive development of districts through the ***Intensive Agriculture Development District Programme*** (IADP). It involved technical changes in agriculture through the development of an elaborate research and extension system originating from Agricultural Universities.

The New Agricultural Strategy was followed up and the High Yielding Varieties Programme (HYVP) adopted and integrated into the plans. In the 1970s, attempts were made to extend the benefits of the new variety seeds to small farmers and to intensify the agricultural extension system. In short, the Green Revolution was agriculture centered. During the first phase of Indira Gandhi Government, along with the new hybrid seeds state subsidies were given, electrical power, water, fertilizers and credit provided to farmers. Agricultural income was not taxed. As a result India became self-sufficient in food. Buffer grain stocks were built up to fight drought. India was a food exporter.

Results of Revolution

The results of the Green Revolution were 1) Food grain production, especially wheat, rose by leaps and bounds. 2) Aggregate food production

increased significantly. 3) Food availability expanded sharply and 4) as a result India erased her 'begging bowl' image. India managed to maintain the high rate of agricultural growth since independence.

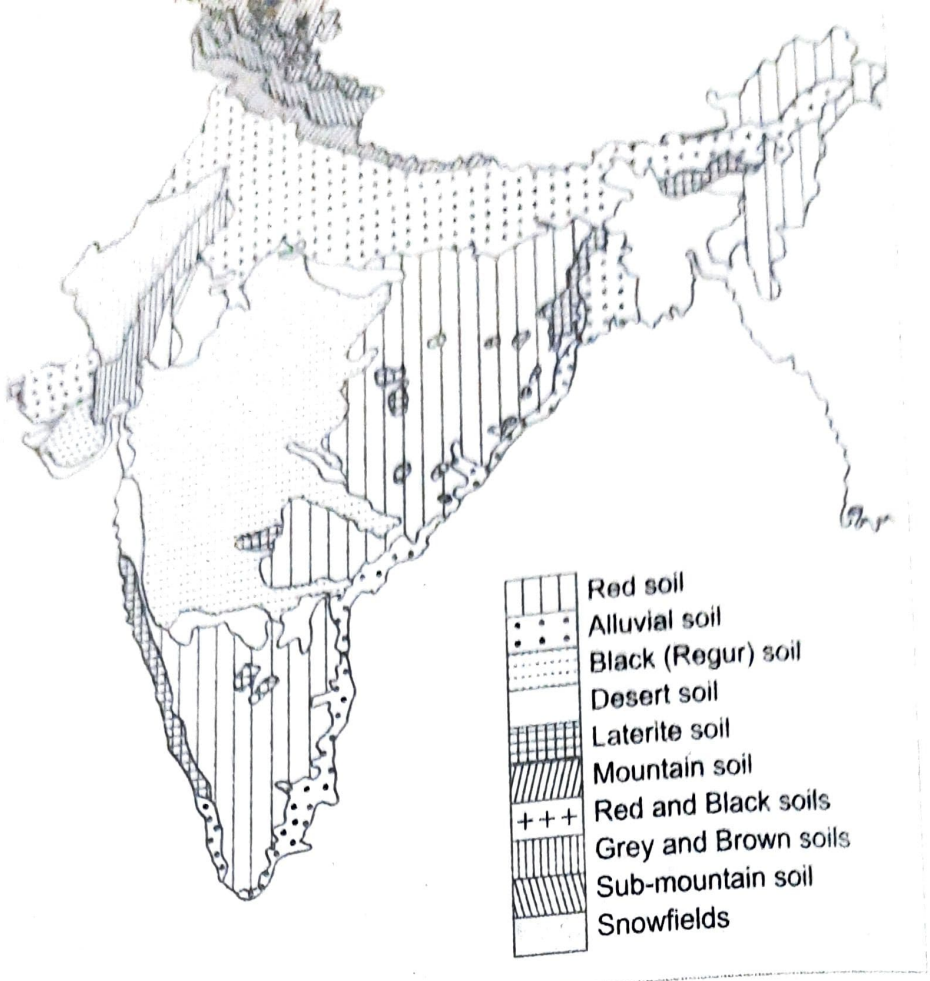
Criticism

However, the Green Revolution was not an unmitigated blessing. It had its black spots. It suffered from triple imbalances: 1) The larger benefits were reaped by farmers with larger holdings. 2) While major advances had been made in increasing the productivity of wheat and some other millets, similar progress was not possible in the case of rice, pulses, oil-seeds, fibres and seeds, and 3) There was the differential rates of economic progress between irrigated farms and unirrigated farms.[12]

Further, resources were concentrated on certain regions already developed in Punjab, Haryana and Western U.P. in the north and Andhra, Tamil Nadu and Kerala in the South. Mechanisation of agriculture displaced labour; promoted comercialisation of agriculture; and caused class polarization and class conflict in the countryside.[13] It led to rural unemployment. It cause environmental degradation. Above all, Green Revolution had not mitigated peasant protests and rice riots. Most of such allegations, though contained grains of truth, had been either baseless or grossly exaggerated. Indira Gandhi can not be faulted for making Green Revolution as "a key government priority".[14] Though the rubric of the Green Revolution did not apply to India as a whole, it did continue to increase agricultural productivity and production.

16.10 Estimate

After the successful Bangladesh War of 1971, Indira Gandhi was at the pinnacle of popularity. With renewed confidence, she carried on her crusade against monopoly and monopolistic practices of private players with vigour and Vendeptta. But the MRTP Act "turned out to be one of the most damaging in modern Indian History".[15] The 24th and 25th Constitutional Amendments were avoidable attempts to gag the Judiciary, though the Constitutional changes were justified on the ground that the Supreme Court came in the way of Indira Gandhi's progressive legislation.[16] Agrarian reform was an admirable attempt to translate Garibi Hatao rhetoric into reality. But the States, which were to implement the land reform and land ceiling measures, sabotaged her well-meant measures, though "there emerged a strong strand of agrarian radicalism in large parts of the country".[17] The Kesavananda Bharati Case verdict ensured that "tyranny and despotism shall not masquerade as constitutionalism".[18] The



AGRICULTURE IN INDIA

India is essentially an agricultural land. Two-thirds of its population still lives on agriculture. Agriculture is a primary activity which includes farming, animal rearing and fishing. *There are three crop seasons in India*

(i) **Kharif** Sown in June/July, harvested in September/October. e.g. rice, jowar, bajra, ragi, maize, cotton and jute.

(ii) **Rabi** Sown in October/December, harvested in April/May e.g. wheat, barley, peas, rapeseed, mustard, grains.

(iii) **Zaid** They are raised between April/June e.g. melon, watermelon, cucumber, toris, leafy and other vegetables.

Types of Farming

Shifting Agriculture

- It is practised by the tribal groups in the forest areas of Assam, Meghalaya, Nagaland, Manipur, Tripura, Mizoram, Arunachal Pradesh, Odisha, Madhya Pradesh, Jharkhand and Andhra Pradesh.

Various Names of Shifting Agriculture

States	*Names of Shifting Cultivation*
Assam	Jhum
Kerala	Ponam
Andhra Pradesh and Odisha	Podu
Madhya Pradesh	Beewar, Mashan, Penda and Beera

- In this type of agriculture, a piece of forest land is cleared mainly by tribal people by felling and burning of trees and crops are grown.
- Dry paddy, buck wheat, maize, small millets, tobacco and sugarcane are the main crops grown under this type of agriculture.

Intensive Farming

- This is a system of farming, in which the cultivator uses large amount of labour and capital on a relatively small area.
- In regions, where the size of population is big, but land is less, this type of farming is done.
- Agriculture is done with the help of manual labour.

Extensive Farming

- This is a system of farming, in which the cultivator uses a limited amount of labour and capital on a relatively large area.
- This type of agriculture is practised in regions, where population size is small and land is enough.
- Agricultural is done with the help of machines.

Green Revolution

It is the phrase generally used to describe the spectacular increase that took place during 1968 and is continuing in the production of foodgrains in India.

The components of Green Revolution are as follows:

- High Yield Variety Seeds
- Irrigation
- Use of Fertilizers
- Use of Insecticide and Pesticide
- Command Area Development
- Consolidation of Holdings
- Land Reforms
- Supply of Agricultural Credit
- Rural Electrification
- Rural Roads and Marketing
- Farm Mechanisation
- Agricultural Universities

Impact of Green Revolution

Positive Impact

- Increase in agricultural production
- Reduction of the import of foodgrains
- Capitalistic farming
- Industrial growth
- Rural employment

Negative Impact

- Inter-crop imbalance
- Environmental impacts
- Increase in regional imbalance
- Unemployment due to mechanisation
- Negligence of other crops

Major Crops and Producing States

Crop Type	*Crop Name*	*Major Producers*
Cereals	*Wheat*	Uttar Pradesh, Punjab and Madhya Pradesh
	Rice	West Bengal and Uttar Pradesh
	Gram	Madhya Pradesh and Tamil Nadu
	Barley	Maharashtra, Uttar Pradesh and Rajasthan
	Bajra	Maharashtra, Gujarat and Rajasthan
Cash Crops	*Sugarcane*	Uttar Pradesh and Maharashtra
	Poppy	Uttar Pradesh and Himachal Pradesh
Oil Seeds	*Coconut*	Kerala and Tamil Nadu
	Linseed	Rajasthan Madhya Pradesh and Haryana
	Groundnut	Gujarat, Andhra Pradesh and Tamil Nadu
	Rape seed and Mustard	Rajasthan, Madhya Pradesh and Haryana
	Sesame	Uttar Pradesh and Rajasthan
	Sunflower	Andhra Pradesh and Maharashtra Karnataka

Industries in India	Details
Cotton Textile Industry	• The first modern Cotton textile mill was established in Bombay in 1854 by local Parsi entrepreneurs with the name of Bombay spinning and weaving company. • Mumbai is called Cottonopolis of India. • Ahmedabad is called Manchester of India. • Coimbatore is called Manchester of South India. • Kanpur is called Manchester of Uttar Pradesh. • **Distribution** Maharashtra (Mumbai, Solapur, Pune, Kolhapur, Satara, Wardha, Aurangabad and Amravati), Gujarat (Ahmedabad, Vadodra, Rajkot, Surat, Bhavnagar, Porbandar, Maurvi and Viramgam), Tamil Nadu (Chennai, Tirunelveli, Madurai, Tuticorin, Salem, Virudhnagar and Pollachi), Karnataka (Bengaluru, Belgaum, Mangalore, Chitradurga, Gulbaraga and Mysore), Uttar Pradesh (Kanpur, Etawah, Modinagar, Moradabad, Bareilly, Agra, Meerut and Varanasi), Madhya Pradesh (Indore, Gwalior, Ujjain, Bhopal), Rajasthan (Kota, Jaipur, Sriganganagar, Bhilwara and Udaipur).
Woollen Textile Industry	• The first Woollen textiles mill was set-up in 1876 at Kanpur. Jammu and Kashmir is a large producer of handloom woollen products. • **Distribution** Punjab (Dhariwal, Amritsar, Ludhiana, Ferozpur), Maharashtra (Mumbai), Uttar Pradesh (Kanpur, Mirzapur, Agra, Tanakpur).
Jute Textile Industry	• First modern Jute mill was set-up in 1855 at Rishra near Kolkata. India is the largest producer of raw jute and jute good production, whereas it is second largest exporter of jute goods after Bangladesh. • **Distribution** West Bengal, Bihar, Uttar Pradesh, Andhra Pradesh, Assam, Odisha, Tripura and Chhattisgarh.
Silk Textile Industry	• India is the second largest proudducer of natural silk, after China and is the only country producing all four varieties or natural silk *viz* Mulberry, Tasar, Eri and Muga of which Golden yellow Muga silk is unique in India. • **Distribution** Karnataka is the leading producer followed by West Bengal, Bihar etc.
Rubber Industry	• The first factory of synthetic rubber was set-up at Bareilly. • **Distribution** Bareilly (Uttar Pradesh), Baroda (Gujarat) Synthetic Rubber Units-Mumbai, Ahmedabad, Amritsar-Reclained Rubber Units.
Tea Industry	• Tea cultivation in India was first started in the mid-19th century in Darjeeling, Assam and Nilgiris. • Nearly 98% of the tea production comes from Assam, West Bengal, Tamil Nadu and Kerala, while the rest of it comes from Karnataka, Terai regions of Uttarakhand, Himachal Pradesh, Arunachal Pradesh, Manipur and Tripura.
Sugar Industry	• Uttar Pradesh is the leading producer of sugar. **Distribution** Uttar Pradesh (Gorakhpur, Deoria, Basti, Gonda, Meerut, Saharanpur, Muzaffarnagar, Bijnor and Moradabad), Bihar (Darbhanga, Saran, Champaran and Muzaffarpur), Punjab (Phagwara and Dhuri) Haryana (Ambala, Rohtak and Panipat), Maharashtra (Nashik, Pune, Satara, Sangli, Kolhapur and Sholapur) and Karnataka (Munirabad, Shimoga and Mandya).

Industries	Details
Paper Industry	• The first Paper mill in the country was set-up at Serampore (Bengal) in 1832, which failed. In 1870, a fresh venture was started at Ballygunj near Calcutta. • Raw material : Bamboo (70%), Salai wood (12%), Sabai (9%), Bagasses (4%) and Waste paper and Rags (5%) • **Distribution** Madhya Pradesh (Nepanagar), Hindustan Paper Corporation, Vellore, Mysore Paper mill, Bhadravati, Maharashtra (Mumbai, Pune, Ballarpur and Kamptee produce Paper and Vikhroli) Andhra Pradesh (Rajahmundry and Sirpur), Madhya Pradesh (Indore, Bhopal and Shahdol), Karnataka.
Iron and Steel	• **Distribution** Bhadrawati (Karnataka), Jamshedpur (Jharkhand), Durgapur, Burnpur (West Bengal), Bokaro (Jharkhand), Rourkela (Odisha), Bhilai (Chhattisgarh), Salem (Tamil Nadu) and Visakhapatnam (Andhra Pradesh).
Ship	• **Distribution** Cochin Shipyard , Mumbai (Mazgaon Dock), Hindustan Shipyard at Visakhapatnam and Kolkata (Garden Reach workshop). Mazgaon dock at Mumbai builts Vessels for Indian Navy.
Aircraft Industry	• **Distribution** Hindustan Aeronautics India Limited was formed by merging two aricraft factories at Bengaluru and Kanpur. Four other factories are at Nashik, Lucknow, Koraput (Odisha) and Hyderabad.
Fertilizer Industry	• The Fertilizer Corporation of India (FCI) was set-up in 1961. • National Fertilizer Limited (NFL) was set-up in 1974. • **Distribution** Sindri (Bihar), Nangal, Gorakhpur (Uttar Pradesh), Durgapur, Namrup, Cochin, Rourkela, Neyveli, Varanasi, Vadodra, Kanpur, Visakhapatnam and Kota.
Heavy Machinery	• **Distribution** Durgapur, Mumbai, Ranchi, Visakhapatnam, Tiruchirapalli and Naini.
Machine Tool Industry	• It forms the basis for the manufacturing of industrial, defence equipments, automobiles, railway engines and electrical machinery. • **Distribution** Hyderabad, Bengaluru, Pinjore (Haryana), Kalamassery (Kerala), Secunderabad, Ajmer and Srinagar.
Heavy Electrical Equipments	• **Distribution** Bengaluru, Bhopal, Jammu, Tiruchirapalli, Ramchandrapuram (Hyderabad) and Jagdishpur (Uttar Pradesh).
Photo Films Industry	• The Hindustan Photo Films Manufacturing Company at Udagamandalam (Tamil Nadu) is the only factory in the public sector, producing photo paper and films.
Glass Industry	• **Distribution** Uttar Pradesh (Firozabad, Balijoi, Hathras, Naini, Secunderabad, Maharashtra (Mumbai, Telogaon, Pune Sitarampur), Tamil Nadu (Tiruvottiyur) and Karnataka (Belgaum, Bengaluru).

ENERGY

- India is a fast growing country and therefor the demand for energy is also continuously growing. India is exploiting almost all the sources of energy such as hydroelectricity, thermal energy, nuclear energy, solar energy and wind energy etc.
- Power development commenced in India with the commissioning of electricity supply in Darjeeling during 1897, followed by a hydropower station at Sivasamudram in Karnataka during 1902.
- Himachal Pradesh, Meghalaya, Nagaland, Sikkim and Uttarakhand are largely dependent upon hydroelectricity.
- National Hydro Power Corporation (NHPC) was set-up in 1975, under public sector for the generation of hydropower in India.
- National Thermal Power Corporation (NTPC) was set-up in 1975, for generation of thermal energy. NTPC has 18 coal based super thermal power projects and 7 gas/liquid based combined cycle projects.
- Atomic Energy Institute at Trombay was set-up in 1954 and renamed as Bhabha Atomic Research Centre (BARC) in 1967.
- Heavy Water Plants are at Vadodra, Tuticorin, Kota, Thal, Hazira and Manuguru. The first heavy water plant was set-up in Nangal in 1962.
- The Renewable Energy Programme started with the establishment of the Department of Non-Conventional Energy Sources in 1982. Indian Renewable Energy Development Agency was set-up in 1987. In 1992; DNES was converted into Ministry of Non-conventional Energy Sources.

Renewable Energy Plants

Types of Energy	Plants	States
Wind Energy	Muppandal	Tamil Nadu
	Perungudi	Tamil Nadu
	Kayattar	Tamil Nadu
	Satara	Maharashtra
	Jogimati	Karnataka
	Lamba, Mandvi	Gujarat
Geothermal Energy	Manikaran	Himachal Pradesh
	Puga Valley	Jammu and Kashmir
	Tattapani	Chhattisgarh
Tidal Energy	Gulf of Khambat	Gujarat
	Gulf of Kachchh	Gujarat
	Sundarban	West Bengal
Wave Energy	Vizhinjam	Kerala
Solar Energy	Tirupati	Andhra Pradesh

The Major Atomic Power Stations

Power Station	Location
Tarapur	Maharashtra
Rawatbhata	Rajasthan
Kalpakkam	Tamil Nadu
Narora	Uttar Pradesh
Kakrapara	Gujarat
Kaiga	Karnataka
Kudankulam	Tamil Nadu
Banswara	Rajasthan (UC)

UC : *Under Construction*

Ultra Mega Power Plants (UMPP)

Plants	States	Capacity (MW)	Awarded to
Sasan	Madhya Pradesh	4000	Reliance
Mundra	Gujarat	4000	Tata
Krishna-patnam	Andhra Pradesh	4000	Reliance
Girye	Maharashtra	4000	NA
Tadri	Karnataka	4000	NA