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PG Department of Geography, Patna University

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Niharika Narayan

Assistant Professor (Guest)

Email Id- narayanniharika@gmail.com

Study of Agro-climatic regions- by the Planning Commission

Agro-Climatic Region- An “Agro-climatic zone” is a land unit in terms of major climates, suitable for a certain range of crops and cultivars. The planning aims at scientific management of regional resources to meet the food, fiber, fodder and fuel wood without adversely affecting the status of natural resources and environment. Crop yield is (FAO, 1983). Agro-climatic conditions mainly refer to soil types, rainfall, temperature and water availability which influence the type of vegetations. An agro-ecological zone is the land unit carved out of agro-climatic zone superimposed on landform which acts as modifier to climate and length of growing period.

Study of Agro-climatic regions according to the classification given by the Planning Commission

The Planning Commission, as a result of the mid-term appraisal of the planning targets of the Seventh Plan, has divided the country into fifteen broad agro-climatic zones based on physiography, soils, geological formation, Climate, cropping patterns, and development of irrigation and mineral resources for broad agricultural planning and developing future strategies. Fourteen regions were in the main land and the remaining one in the islands of Bay of Bengal and the Arabian Sea. The main objective was to integrate plans of the agro-climatic regions with the state and national plans to enable policy development based on techno-agro-climatic considerations. In the agro-climatic regional planning, further sub-regionalization was possible based on agro-ecological parameters.

1. Western Himalayan division

2. Eastern Himalayan division
3. Lower Gangetic plain region
4. Middle Gangetic plain region
5. Upper Gangetic plain region
6. Trans-Gangetic plain region
7. Eastern plateau and hill region
8. Central plateau and hill region
9. Western plateau and hill region
10. Southern plateau and hill region
11. East coast plain and hill region
12. West coast plain and hill region
13. Gujarat plain and hill region
14. Western plain and hill region
15. Island region

I. Western Himalayan Region:

The Western Himalayan Region covers Jammu and Kashmir, Himachal Pradesh and the hill region of Uttarakhand.

Topography and temperatures show great variation. Average temperature in July ranges between 5°C and 30 °C, while in January it ranges between 5 °C and -5 °C. Mean annual rainfall varies between 75 cm to 150 cm; in Ladakh, however, it is less than 30 cm. There is alluvial soil in the valleys of Kashmir, Kullu and Dun, and brown soil in the hills. The valley floors grow rice, while the hilly tracts grow maize in the kharif season. Winter crops are barley, oats, and wheat. The region supports horticulture, especially apple orchards and other temperate fruits such as peaches, apricot, pears, cherry, almond, litchis, walnut, etc. Saffron is grown in this region.

The high altitude alpine pastures, locally known as ‘dhoks’ or ‘margs’, are used by the Gujjars, Bakarwals and Gaddis to rear their sheep, goats, cattle and horses. The economy is largely agrarian.

The main problems of this region are poor accessibility, soil erosion, landslides, inclement weather, inadequacy of marketing and storage facilities. The population is generally rural-based and poor.

Research in better seeds and extension service for agricultural development are required.

II. Eastern Himalayan Region:

The Eastern Himalayan Region includes Arunachal Pradesh, the hills of Assam, Sikkim, Meghalaya, Nagaland, Manipur, Mizoram, Tripura, and the Darjeeling district of West Bengal. The topography is rugged. Temperature variation is between 25 °C and 30 °C in July and between 10 °C and 20 °C in January. Average rainfall is between 200-400 cm. The red-brown soil is not highly productive. Jhuming (shifting cultivation) prevails in the hilly areas. The main crops are rice, maize, potato, tea. There are orchards of pineapple, litchi, oranges and lime.

Infrastructural facilities in the region need to be improved and shifting cultivation controlled by developing terrace farming.



III. Lower Gangetic Plain Region:

West Bengal (except the hilly areas), eastern Bihar and the Brahmaputra valley lie in this region. Average annual rainfall lies between 100 cm-200 cm. Temperature in July varies from 26 °C to 41 °C and for January from 9 °C to 24 °C. The region has adequate storage of ground water with high water table. Rice is the main crop which at times yields three successive crops (Aman, Aus and Boro) in a year. Jute, maize, potato, and pulses are other important crops. Planning strategies include improvement in rice farming, horticulture (banana, mango and citrus fruits), pisciculture, poultry, livestock, forage production and seed supply.

IV. Middle Gangetic Plain Region:

The Middle Gangetic Plain region includes large parts of Uttar Pradesh and Bihar. The average temperature in July varies from 26 °C to 41 °C and that of January 9 °C to 24 °C average annual rainfall is between 100 cm and 200 cm. It is a fertile alluvial plain drained by the Ganga and its

tributaries. Rice, maize, millets in kharif, wheat, gram, barley, peas, mustard and potato in rabi are important crops.

Alternative farming systems, and utilising chaur lands for pisciculture are some measures to boost agricultural production.

Reclamation of user lands, wastelands, and fallow lands for agriculture and allied activities (agro-forestry, silviculture, floriculture etc.) should be done.

V. Upper Gangetic Plains Region:

In the Upper Gangetic Plains region come the central and western parts of Uttar Pradesh and the Hardwar and Udham Nagar districts of Uttarakhand.

The climate is sub-humid continental with temperature in July between 26 °C to 41 °C and temperature in January between 7 °C to 23 °C. Average annual rainfall is between 75 cm-150 cm. The soil is sandy loam. Canal, tube-well and wells are the main source of irrigation. This is an intensive agricultural region wherein wheat, rice, sugarcane, millets, maize, gram, barley, oilseeds, pulses and cotton are the main crops.

Besides modernising traditional agriculture the region needs special focus on dairy development and horticulture. Strategies should include developing multiple mixed cropping patterns.



VI. Trans-Ganga Plains Region:

This region (also called the Satluj-Yamuna Plains) extends over Punjab, Haryana, Chandigarh, Delhi and the Ganganagar district of Rajasthan. Semi- arid characteristics prevail over the region, with July's mean monthly temperature between 25 °C and 40 °C and that of January between 10 °C and 20 °C.

The average annual rainfall varies between 65 cm and 125 cm. The soil is alluvial which is highly productive. Canals and tube-wells and pumping sets have been installed by the cultivators and the governments. The intensity of agriculture is the highest in the country.

Important crops include wheat, sugarcane, cotton, rice, gram, maize, millets, pulses and oilseeds etc. The region has the credit of introducing Green Revolution in the country and has adopted modern methods of farming with greater degree of mechanisation. The region is also facing the menace of waterlogging, salinity, alkalinity, soil erosion and falling water table.

Some steps that may be required to make agriculture in the region more sustainable and productive are:

(i) diversion of some rice-wheat area to other crops like maize, pulses, oilseeds and fodder;

- (ii) development of genotypes of rice, maize and wheat with inbuilt resistance to pests and diseases;
- (iii) promotion of horticulture besides pulses like tur and peas in upland conditions
- (iv) cultivation of vegetables in the vicinity of industrial clusters
- (v) supply of quality seeds of vegetables and planting material for horticulture crops
- (vi) development of infrastructure of transit godowns and processing to handle additional fruit and vegetable production;
- (vii) implementation of policy and programmes to increase productivity of milk and wool
- (viii) development of high quality fodder crops and animal feed by stepping up area under fodder production.

VII. Eastern Plateau and Hills:

This region includes the Chhotanagpur Plateau, extending over Jharkhand, Orissa, Chhattisgarh and Dandakaranya. The region enjoys 26 °C to 34 °C of temperature in July, 10 °C to 27 °C in January and 80 cm-150 cm of annual rainfall. Soils are red and yellow with occasional patches of laterites and alluviums. The region is deficient in water resources due to plateau structure and non-perennial streams. Rainfed agriculture is practised growing crops like rice, millets, maize, oilseeds, ragi, gram and potato.

Steps to improve agricultural productivity and income include cultivation of high value crops of pulses like tur, groundnut and soyabean etc. on upland rain-fed areas, growing crops like urad, castor, and groundnut in kharif and mustard and vegetables in irrigated areas, improvement of indigenous breeds of cattle and buffaloes, extension of fruit plantations, renovation including desilting of existing tanks and excavation of new tanks, 95.32 lakh ha of acidic lands through lime treatment, development of inland fisheries in permanent water bodies, and adopting integrated watershed development approach to conserve soil and rain water.

VIII. Central Plateau and Hills:

The region is spread over Bundelkhand, Baghelkhand, Bhandar Plateau, Malwa Plateau, and Vindhya Hills. Semi-arid climatic conditions prevail over the region with temperature in July 26 °C to 40 °C, in January 7 °C to 24 °C and average annual rainfall from 50 cm-100 cm. Soils are mixed red, yellow and black.

There is scarcity of water. Crops grown are millets, wheat, gram, oilseeds, cotton and sunflower. In order to improve agricultural returns, measures to be adopted are water conservation through water saving devices like sprinklers and drip system; dairy development, crop diversification, ground water development, reclamation of ravine lands.

IX. Western Plateau and Hills:

Comprising southern part of Malwa plateau and Deccan plateau (Maharashtra), this is a region of the regur (black) soil with July temperature between 24 °C and 41 °C, January temperature between 6 °C and 23 °C and average annual rainfall of 25 cm-75 cm. Wheat, gram, millets, cotton, pulses, groundnut, and oilseeds are the main crops in the rain-fed areas, while in the irrigated areas, sugarcane, rice, and wheat, are cultivated. Also grown are oranges, grapes and bananas.

Attention should be paid to increasing water efficiency by popularizing water saving devices like sprinklers and drip system. The lower value crops of jowar, bajra and rainfed wheat should give way to high value oilseeds. Five per cent area under rain-fed cotton and jowar could be substituted with fruits like ber, pomegranate, mango and guava. Improvement of milk production of cattle and buffalo through cross-breeding along with poultry development should be encouraged.

X. Southern Plateau and Hills:

This region falls in interior Deccan and includes parts of southern Maharashtra, the greater parts of Karnataka, Andhra Pradesh, and Tamil Nadu uplands from Adilabad District in the north to Madurai District in the south. The mean monthly temperature of July varies between 25 °C and 40 °C, and the mean January temperature is between 10 °C and 20 °C. Annual rainfall is between 50 cm and 100 cm.

It is an area of dry-zone agriculture where millets, oilseeds, and pulses are grown. Coffee, tea, cardamom and spices are grown along the hilly slopes of Karnataka plateau.

Some of the area under coarse cereals may be diverted to pulses and oilseeds. Horticulture, dairy development and poultry farming should be encouraged.

XI. Eastern Coastal Plains and Hills:

In this region are the Coromandal and northern Circar coasts of Andhra Pradesh and Orissa. The mean July temperature ranges between 25 °C and 35 °C and the mean January temperature varies between 20 °C and 30 °C. The mean annual rainfall ~ varies between 75 cm and 150 cm.

The soils are alluvial, loam and clay and are troubled by the problem of alkalinity. Main crops include rice, jute, tobacco, sugarcane, maize, millets, groundnut and oilseeds. Main agricultural

strategies include improvement in the cultivation of spices (pepper and cardamom) and development of fisheries.

These involve increasing cropping intensity using water-efficient crops on residual moisture, discouraging growing of rice on marginal lands and bringing such lands under alternate crops like oilseeds and pulses; diversifying cropping and avoiding mono-cropping; developing horticulture in upland areas, social forestry and dairy-farming.

XII. Western Coastal Plains and Ghats:

Extending over the Malabar and Konkan coastal plains and the Sahyadris, the region is humid with the mean July temperature varying between 25 °C and 30°C and mean January temperatures between 18 °C and 30 °C. The mean annual rainfall is more than 200 cm.

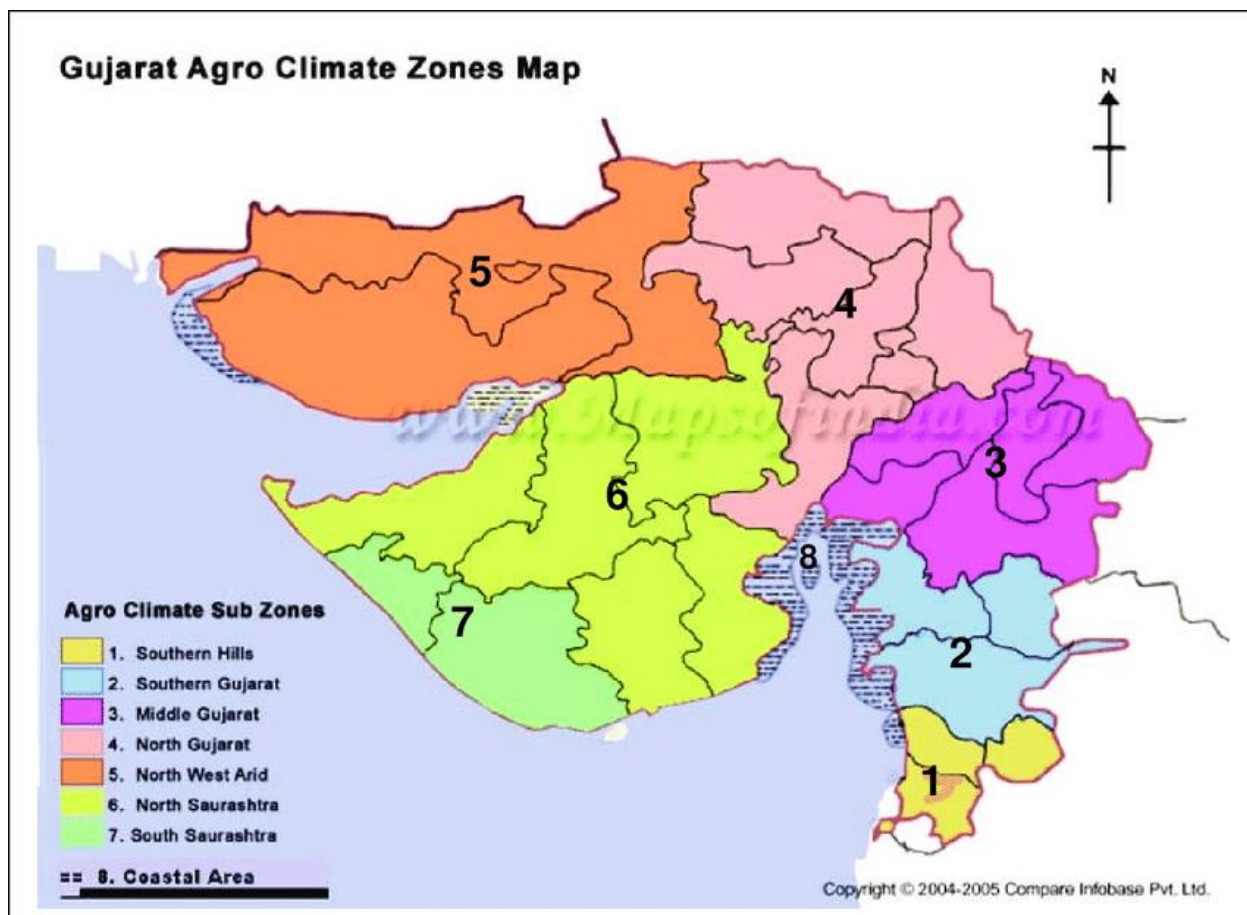
The soils are laterite and coastal alluvial. Rice, coconut, oilseeds, sugarcane, millets, pulses and cotton are the main crops. The region is also famous for plantation crops and spices which are raised along the hill slopes of the Western Ghats. The agricultural development must focus attention on raising of high value crops (pulses, spices, and coconut). Development of infra-structural facilities and promotion to prawn culture in brackish water should be encouraged.

XIII. Gujarat Plains and Hills:

This region includes the hills and plains of Kathiawar, and the fertile valleys of Mahi and Sabarmati rivers. It is an arid and semi-arid region with the mean July temperature reading 30 °C and that of January about 25 °C. The mean annual rainfall varies between 50 cm and 100 cm.

Soils are regur in the plateau region, alluvium in the coastal plains, and red and yellow soils in Jamnagar area. Groundnut, cotton, rice, millets, oilseeds, wheat and tobacco are the main crops. It is an important oilseed producing region.

The main strategy of development in this region should be canal and groundwater management, rain water harvesting and management, dry land farming, agro-forestry development, wasteland development and developing marine fishing and brackish/back-water aquaculture development in coastal zones and river deltas.



XIV. Western Dry Region:

Extending over Rajasthan, West of the Aravallis, this region has an erratic rainfall of an annual average of less than 25 cm. The desert climate further causes high evaporation and contrasting temperatures—28 °C to 45 °C in June and 5 °C to 22 °C in January. Bajra, jowar, and moth are main crops of kharif and wheat and gram in rabi. Livestock contributes greatly in desert ecology.

The main areas needing a thrust for development are rainwater harvesting, increasing yield level of horticultural crops like water melon, guava and date palm, adopting high quality germ- plasm in cattle to improve their breed; and adopting silvi-pastoral system over wastelands.

XV. Island Region:

The island region includes Andaman-Nicobar and Lakshadweep which have typically equatorial climate (annual rainfall less than 300 cm; the mean July and January temperature of Port Blair being 30 °C and 25 °C respectively). The soils vary from sandy along the coast to clayey loam in valleys and lower slopes.

The main crops are rice, maize, millets, pulses, arecanut, turmeric and cassava. Nearly half of the cropped area is under coconut. The area is covered with thick forests and agriculture is in backward stage.

The main thrust in development should be on crop improvement, water management and fisheries. Improved variety of rice seeds should be popularised so as to enable farmers to take two crops of rice in place of one. For fisheries development multi-purpose fishing vessels for deep sea fishing should be introduced, suitable infrastructure for storage and processing of fish should be built up, and brackish water prawn culture should be promoted in the coastal areas.

