LECTURE NO – 4

AGRO-CLIMATIC ZONES OF INDIA

Based on the criteria of homogeneity in agro-characteristics such as rainfall, temperature, soil, topography, cropping and farming systems and water resources, the country has been divided into 15 agro-climatic regions.

1. WESTERN HIMALAYAN REGION:

This consists of three distinct sub-zones of Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh hills. The region consists of skeletal soils of cold region, podsolic soils, mountain meadow soils and hilly brown soils. Lands of the region have steep slopes in undulating terrain. Soils are generally silty loam with altitudinal variations. They are prone to erosion hazards and slides and slips are quite common.

Rice, maize, millets, wheat and barley are the main crops. The productivity level of all crops is lower than the all India average. Ginger, saffron, many temperature flowers and vegetables are grown in this region. This zone is having highest area (45.3%) under forests.

Land use planting based on the concept that land up to 30% slope is suitable for agriculture on terraces, 30-50% slopes for horticulture and silvi-pastoral programmes, and above 50% slopes for forestry is a suggested strategy for development of the region.

With the full backing of storage and cold storage facilities for transport, marketing and processing, this region will be able to supply fruits and vegetables to rest of the country.

2. EASTERN HIMALAYAN REGION

Sikkim and Darjeeling hills, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Tripura, Mizoram, Assam and Jalpaiguri and coochbehar districts of West Bengal fall under this region, having high rainfall and high forest cover. Shifting cultivation (Jhum), practiced in nearly one third of the cultivated area, has caused denudation and degradation of soils, with the resultant heavy runoff, massive soil erosion and floods in the lower reaches and basins.

Since this area has a high potential for agriculture including forestry and horticulture, a complete package of supply of inputs (quality seeds, saplings, fertilizers and pesticides) coupled with marketing and processing, has to be organized for each sub-zone.

3. LOWER GANGETIC PLAINS

The West Bengal – Lower Gangetic Plains region consists of four sub-regions. This zone accounts for about 12% of the country’s rice production. Floods and inundation of fields
Fig: 4.1 Agro Climatic Zones of India
in Barind and Central plains often destroy standing crops. Sesamum, Jute, mustard, rabi maize and potato are emerging as new crops of this zone. The per capita land availability here is very low (0.095 hectares) as this zone has highest density of population (692 per km²). Marine fisheries programme are well developed but need to be more organized. Scope for forage production and livestock rearing is very high.

4. MIDDLE GANGETIC PLAINS:

This zone consists of 12 districts of eastern Uttar Pradesh and 27 districts of Bihar plains. Eastern U.P. has been further sub-divided into nine regions based on the heterogeneity in soil, land use, topography and climatic factors. This region has a geographical area of 16 m. ha. and a high population of 85 millions. The rainfall is high and 30% of the gross cropped area is irrigated and the cropping intensity is 142%.

There is large area under salt affected (usar) lands. Rice is the principal crop but its productivity is low. Zinc deficiency in rice is wide spread. There is urgent need to improve the yield, through a technological backup along with supply of seeds of high yielding varieties and adoption of improved package of practices by the farmers. It is suggested to put uncultural wasteland under silvi-pasture and culturable land under agro-forestry.

Poultry, dairying and inland riverine fishery also should receive priority.

5. UPPER GANGETIC PLAINS:

This zone consists of 32 districts of Uttar Pradesh divided into three sub-zones of Central, North-West and South-West U.P. The zone has 144% cropping intensity.

Irrigation is largely through canals and tube wells. A good potential for exploitation of ground water exists. Growth in agriculture has to come through increasing productivity as net sown area is already exploited. In all the Diara lands (flood prone areas) development of fruit trees is important. Milk production from cows is very low. Genetic improvement through cross breeding and increasing the area under fodder crops is important.

6. TRANS-GANGETIC PLAINS

This zone consists of Punjab and Haryana, Union Territories of Delhi and Chandigarh and Sriganganagar district of Rajasthan. It is delineated into three sub-zones, namely, foothills of Shiwalik and the Himalayas, plains (Semi arid) and arid zone bordering the Thar desert. The major characteristics of the area are: highest net sown area, highest irrigated area, least poverty level, high cropping intensity (170%) and high ground water utilization.
Rice-wheat system is prevalent. There is need to evolve short duration genotypes and also to diversify of the cropping. Food processing industries should be established in areas where farmers have started taking up cultivation of vegetables and fruit crops.

7. EASTERN PLATEAU AND HILLS

The eastern Plateau and Hills region consists of the following sub-regions:

I. Sub-region of Wainganga, Madhya Pradesh Eastern Hills and Orissa inland,
II. Orissa Northern and M.P. Eastern Hills and plateau
III. Chotanagpur North and Eastern Hills and plateau
IV. Chotanagpur South and West Bengal Hills and Plateau, and
V. Chattisgarh and South-Western Orissa Hills.

The soils of the region are shallow and medium in depth and the topography is undulating with a slope of 1 to 10%. Rainfall is nearly 1300 mm. Integrated water shed development approach to conserve soil and rainwater should be strengthened.

Tank irrigation is significant for sub-zone 2 and sub-zone 5. Irrigation by tube wells is significant in sub-zone 1.

In kharif, 82% of the area is under rice. Most soils are acidic and in some areas application of lime is necessary. Cultivation of crops like redgram, groundnut, and soybean in uplands is to be encouraged. Mustard and vegetables are to be grown in irrigated areas.

The rehabilitation of degraded peripheral forests is to be taken up on a large scale. Nearly 30% of the forestland is estimated as degraded. Inland fisheries programme needs to be encouraged.

8. CENTRAL PLATEAU AND HILLS

This zone comprises of 46 districts of Madhya Pradesh, Uttar Pradesh and Rajasthan. Irrigation and intensity of cropping are low. The literacy percentage is low and the poverty ratio is high. Per capita availability of land is very high (0.446 ha).

Since 75% of the area is rainfed, a watershed management programme is to be implemented. Food crops should be replaced by oil seeds.

9. WESTERN PLATEAU AND HILLS

This zone comprises of major parts of Maharashtra, parts of Madhya Pradesh and one district of Rajasthan and is divided into four sub-zones. This region forms a major part of peninsular India, with an annual average rainfall of 904 mm. Net sown area is 65% and only 12.4% area is irrigated. Sorghum and Cotton are the major crops in nearly half of the cultivated area.
This zone is known for the best quality oranges, grapes and bananas. The area under fruit crops is about one lakh hectares.

Farmers are adopting sprinklers and the drip methods of irrigation, particularly, for fruit and vegetable crops.

10. SOUTHERN PLATEAU AND HILLS:

This zone comprises of 35 districts of Andhra Pradesh, Karnataka and Tamil Nadu, which are typically semi-arid zones. Rainfed farming is adopted in 81% of the area and the cropping intensity is 111%. Low value cereals and minor millets predominate in the cropping systems.

The adoption of proven dryland technology in the watershed areas should aid agriculture in this area.

Crop diversification has to be intensified and crops that require less moisture should be preferred. Poultry has developed quickly in many areas of the zone.

11. EAST COAST PLAINS AND HILLS:

This zone consists of six sub-zones i) Orissa coastal ii) North Coastal Andhra and Ganjam, iii) South Coastal Andhra, iv) North Coastal Tamil Nadu, v) Thanjavur and vi) South Coastal Tamil Nadu. Rice and groundnut are the important crops.

Nearly 70% of the cultivated area does not have irrigation facility and, therefore, a watershed management programme can be taken up to 6.45 m. ha. Tanks account for nearly 20% of the irrigated area in the zone and programmes such as desilting tanks, strengthening of bunds and structures and improvement of field channels need to be taken up through a community approach.

Drainage programmes, particularly in the south coastal Andhra Pradesh (Krishna – Godavari delta) and Cauvery delta areas are a vital need, because water logging is a critical constraint affecting crop yields. Alkaline-saline soils in the region total up to 4.9 lakh hectares.

Area under waste lands estimate to 25.33 lakh ha. Waste land development programmes should be given priority.

The zone with over 2,000 km of coastline and many inland waterways is suitable for fisheries. Brackish water fisheries and aquaculture hold great promise in this area. Roughly 40% of the marine potential is taken advantage of in Andhra Pradesh and 46% in the Tamil Nadu Coast.
12. WEST COAST PLAINS AND GHATS:

This zone runs along the west coast, covering parts of Tamil Nadu, Kerala, Karnataka, Maharashtra and Goa with a variety of crop patterns, rainfall and soil types. This is an important zone for plantation crops and spices and fisheries. Literacy is the highest in Kerala and so is unemployment. Cropping intensity is 124%.

Productivity of rice and millets is low and there is need for diversification to horticulture crops such as Mango, Banana and Coconut. Fruit marketing and processing should be systematized by developing appropriate infrastructure.

The approach of homestead (group farming) system (one of the agro-forestry systems) of reclaiming and using khar lands (saline soils) or pokhali lands (acidic soils) needs to be planned and implemented. This zone is important for multi-storeyed cropping.

13. GUJARAT PLAINS AND HILLS:

This zone consists of 19 districts of Gujarat classified into seven sub-zones. The zone is arid with low rainfall in most parts and only 22.5% of the area is irrigated, largely through wells and tube wells. Only 50% of the cultivated area is under food crops resulting in food deficit. However it is an important oilseed zone. The cropping intensity is 114% and nearly 60% of the zone is considered drought prone.

The major thrust should be on rainwater harvesting, dry farming and canal and ground water management.

The long coastline and river deltas should be used fully for developing marine fishing and brackish/backwater aquaculture.

14. WESTERN DRY REGION

This region comprises of nine districts of Rajasthan and is characterized by hot sandy desert, erratic rainfall, high evaporation, no perennial rivers and scanty vegetation. The ground water is deep and often brackish. Famine and drought are common features forcing people and animals to migrate to other places in search of water, food and fodder. The land-man ratio is high (1.73 ha/person). The average annual rainfall is only 395 mm with wide fluctuations from year to year. The forest area is only 1.2%. The land under pastures is also low (4.3%). The cultural waste and fallow lands are substantial, accounting for nearly 42% of the geographical area. The net irrigated area is only 6.3% of the net sown area. Cropping intensity is 105%.

Pearl millet, cluster bean (guar) and moth are the lead crops in kharif and wheat and gram in rabi, but the yield levels per hectare are low. Any change in the cropping pattern is not advocated because of the fodder value of the crops. The acute shortage of fuel, fodder and forage warrants stringent efforts for development of silvipastoral systems and energy
plantations to meet the scarcity and to stabilize partially the sand dunes. The Indira Gandhi Nahar Project and DDP are the two main water sources of great potential in this zone.

The small area of 0.31 m. ha. under forests is also in a degraded condition. Increasing tree cover is important to (a) check desertification, (b) provide fodder to livestock, (c) meet the fuel needs of the population, and (d) provide timber implements.

15. ISLANDS REGION:

This zone covers the island territories of the Andaman and Nicobar and Lakshadweep, which are typically equatorial. Rainfall of 3,000 mm is spread over eight to nine months. It is largely a forest zone having large undulating areas leading to heavy loss of soil due to runoff. Nearly half of the cropped area is under coconut. This is the smallest zone with a high literacy rate and low poverty levels.

(P.85 to 134 by F.K. Wadia).