UNIT-IV

Agricultural Regionalization

Delimitation or delineation of agricultural region is known as agricultural regionalization. It helps in the formulation of agricultural plans which may go a long way in reducing the regional disparities and inequalities. The agricultural regionalization may be done with the help of following methods:

1. Cropping pattern

Cropping pattern means the proportion of area under various crops at a point of time.It is a dynamic concept as it changes over space and time.

2. Crop combination

The crops are generally grown in combination and it is rarely that a particular crop occupies a position of total isolation other crop in a given areal unit at a given point of time. The first or first two or first three crops occupying the major area of the gross croppled land, are selected on the basis of their areal strength it is called moro crop region, two crop combination, three crop ….combination region.

a. Weaver's Method of Crop combination Region

Crop combination is method of analysis, first developed by J.C. Weaver (1954), for delineating agricultural regions. Weaver's method is also known as least square method of crop combination.

The method developed by Weaver compares the proportions of an observed distribution with a series of hypothetical distribution. The later are calculated for even distribution between 1-crop, 2-crop, 3-crop it goes on for a number of crops. For each sub area the percentage of land occupied by each crop is determined and the crops ranked from greatest to lowest. The observed percentage of crop land are compared with the theoretical percentages to determine which hypothetical category most nearly approximates the observed distribution.The comparison is based on the sum of the squard differences between each category of the hypothetical distribution and the observed distribution. The hypothetical distribution which generates the smallest sum of the squares is the one that best approximates the actual crop combination. The value is obtained in the three crop region means the region would be three crop combination. The formula used by Weaver is;

$$S.D. = \sqrt{\sum d^2/N}$$

Some people criticized this method saying that standard deviation is not a good method for working out crop combination region since here all negative and positive values are squared up and added so that their sign fails to give any imprint on the results.

b. Doi's Method of Crop Combination

The Weaver's technique was subsequently modified by Doi (1959). Doi's technique used to be considered as the easiest for aombination analysis prior to the application of computer programing facilities. The Doi's formula may be expressed as:

$$(\sum d^2)$$

The combination hving the lowest $(\sum d^2)$ will be the crop combination. In Doi's technique, it is not required to calculate $(\sum d^2)$ for each combination but the crop combination is actually established by one sheet table, which represents the critical values for various elements at different ranks against cumulative percentage of elements at higher ranks. The use of one sheet table requires only the summing up of actual percentages under different crops instead of finding differences between actual percentages and theoretical distribution.

c. Rafiullah's Maximum Positive Deviation Method

Rafiullah (1956) developed a new deviation method in his work "A approach to the Functional classification of Towns". The technique developed by Rafiullah expressed as follows:

$$D = \frac{\sqrt{\sum Dp^2 - Dn^2}}{N^2}$$

Where Dp is the positive differences,

Dn is the negative differences from the median value of the theoretical curve value and

N is the number of crops.

In this method the theoretical base curve value, Rafiullah considered for monoculture 50%, for two crops it is 25% each and for three crops it is 16.7% each and so on. In the maximum positive deviation method, unlike the standard deviation method, the differences of actual values are calculated from the middle value of the theoretical standard and thus this method also gives the desired critical combination. So we can say that statistical technique adopted by Rafiullah is more accurate, objective, and scientific and therefore quite popular for the delineation of crop combination region.

3. Crop Concentration

Crop concentration means the variations in the density of any crop in an area/region at a given point of time. Delineation of crop concentration region helps in ascertaining the areas where a particular crop grows well even with the help of minimum inputs, and thus has great significance for agricultural development and planning.

The percentage share of a crop in the total cropped area and the determination of relative density with the help of location quotient are some of the techniques that are frequently used for the demarcation of crop concentration regions. The Department of Agriculture, Government of India has adopted the following technique for the determination of crop concentration at the local, regional and national levels.

$$\text{Cropping Intensity} = \frac{\Sigma a_{ij}}{\Sigma a_{io}} \Big/ \frac{N_i}{N_o} \times 100$$

where

a_{ij} = area under the i^{th} crop in the j^{th} year.

a_{io} = area under the i^{th} crop in the base year.

N_i = net area sown in the j^{th} year.

N_o = net area sown in the base year.

Location Quotient method of crop concentration

In this technique the regional character of crop distribution is investigated and determined, first by comparing the proportion of sown area under different crops and ranking them, and secondly, by relating the crop density in each of the component area units of the region/country to the corresponding density of the region/country as a whole. The location quotient method expressed as under:

$$\text{Index for the determination of crop concentration} = \frac{\text{Area of x crop in the component areal unit}}{\text{Area of all crops in the component areal unit}} \div \frac{\text{Area of x crop in the entire region/country}}{\text{Area of all crops in the entire region/country}}$$

4. Crop Diversification

Crop diversification is a concept which is opposite to crop specialization. The farmers all over the world, especially in the developing countries, try to frow several crops in their

holdings in an agricultural year. For the measurement crop diversification, Bhatia (1965) developed a formula based on the gross cropped area. The formula expressed as:

Index of crop diversification= Percent of sown area under x crops/Number of x crops

Where x crops are those crops that individually occupy 10% or more of the gross cropped area in the area under study.

5. Agricultural Productivity

The measurement of production and inputs required for the production of that output is known as agricultural productivity, In other words, it is an input-output ratio. The measurement of agriculturalproductivity helps in knowing the areas that performing rather less efficiently in comparison to the neighbouring areas. By determining the areas of low, medium and high productivity, agricultural plans may be formulated to remove and minimize the regional inequalities. It also provides an opportunity to ascertain the ground reality, the real cause of agricultural backwardness of a tract/area or region. The techniques for the measurement of agricultural productivity and agricultural effiency per unit area/per unit of time are:

a. Output per unit area

b. Production per unitof farm labour

c. To assess agricultural production as grain equivalents

d. Input-Output ratio (Khusro)

e. Ranking coefficient method (Kendall)

f. Carrying capacity of land in terms of population

g. Determining an index of productivity

h. Computing the crop yield and concentration indices ranking coefficient

i. To assess agricultural production in terms of money

j. Assessing the net income in rupees per hectare of cropped area etc.

6. Degree of Commercialization

Commercialization of agriculture is mainly a process of production of cash crops. A cash crop is simply a crop produced for sale. Commercialization of agriculture involves moving from subsistence-oriented patterns to increasingly market-oriented patterns.

7. Patterns of Crop Rotation

Crop rotation is the practice of planting different crops sequentially on the same plot of land to improve soil health, optimize nutrients in the soil, and combat pest and weed pressure. For example, say a farmer has planted a field of corn. When the corn harvest is

finished, he might plant beans, since corn consumes a lot of nitrogen and beans return nitrogen to the soil.

A simple rotation might involve two or three crops, and complex rotations might incorporate a dozen or more. The crops are classified as one-year rotation, two-year rotation, and three-year rotation, depending upon their duration. Legumes are included in the crop rotation programme to increase soil fertility. The crops which require high fertility level (wheat) can be grown after the legumes. The crops which require low inputs can be grown after the crops that require high inputs.

Crops selected for Rotation

While selecting the crops for rotation, the following criteria should be adopted:

- Enough moisture should be available.
- Availability of fertilizers, man-power, and machine-power.
- Marketing and processing facilities.
- Availability of nutrients in the soil.
- The crop duration- short or long.

Advantages of Crop Rotation

- The soil fertility is maintained for a prolonged period.
- The growth of weeds and pests is prevented.
- A lot of chemical fertilizers are not required.
- The physical and chemical nature of the soil remains unaltered.