



SOILS OF HARYANA-A BRIEF ANALYSIS

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ABSTRACT :

There is no resource more important to Haryana than soil. Whatever its production capabilities and however often quite unjustly and excessively mined, the soil as a medium of crop growth has furnished, directly or indirectly, a significant share of the income of the state. Therefore, the soil resources must be used in such a way that they are conserved and not exploited. (Singh, J. 1976)



KEYWORDS : *production capabilities , human being , basis of agriculture.*

INTRODUCTION

Soil is one of the properties of human being. It is the root base of human life which provides us food, clothing and shelter. All the living and non living things are based on soils. Soils are the cradles of Civilizations. All the education and civilization develops from soil. Indus valley civilization developed in the fertile soils of the Indus valley area. In Haryana about 70% of the population depends on agriculture. Soils are the basis of agriculture. Therefore, in Haryana green revolution technology developed soon after its implementation in India. Haryana supplies sufficient surplus food grain to other states because of high development of modern farm technology has increased agricultural production. The pattern of soils in Haryana is complex, reflecting a variety of parent materials. It is, therefore, necessary to prepare the soil map of Haryana, which will be helpful to grow the different types of agriculture as their capability of soil. Assessment of soil survey is necessary to understand the development of agriculture. The similarities and differentiation in soils of Haryana can be easily understood about the distribution of crops and their regional imbalances in crop yield. For example the sandy soils of south west of Haryana are suitable to low yield crops while loamy soils of north west is suitable to high yielding cotton crops. It is, therefore, necessary to prepare the soil map to know the pattern of cropping in the state and analysis of soil from field to field at farm level. Based on the soil analysis soil management system may be developed for that farm. Growth of population has increased pressure on land and green revolution technology is bringing about a breakdown in the traditional farming system in the State. Due to farm technology fallowing is being shortened and the intensity of cropping is increasing. Therefore, available soil resources must be conserved. The proper utilization of soil resources should be described, identified and mapped of the types and qualities of major soil groups. The basic soil data for mapping may be derived by combing settlement reports, surveys conducted by certain organizations, district gazetteers. Capability of soil for its agricultural use must be understood to raise crops or bear fruits depending upon the physical and chemical characteristics of the soil. Therefore, soil testing is very much essential for the agricultural development in Haryana State. The major

part of the soil cover of Haryana is well drained. Irrigation in arid and semi arid parts of the State is mostly done by tubewells. In sandy and loamy sand areas cultivation of pulses crop help in the fixation of nitrogen in the soil. A very detailed survey of soils of Haryana is very much essential to know the soil conditions to make recommendations for crop rotations. The importance of soil in agriculture cannot be denied. Since it determines the land use capability as well as its carrying capacity, no agricultural planning is possible without a proper study of soils. Loamy soils respond well to cash crops, the sandy soils do not, but they are quite suitable for the cultivation of barley, wheat, local variety of sugarcane, maize, rice and pulses.(Saha Pijush-1973) Therefore, this valuable natural resource must be used in a proper way.

CLASSIFICATION OF SOILS:

Jasbir Singh has classified the soils of Haryana based on the agricultural capabilities as per detail given below.

1. The very Light soils: The soils which have contents of sand and loam are called very light soils. Bhiwani, Mahendergarh, Hisar and Fatehabad districts have sandy and loamy sand soils. The sand dunes in Bhiwani district are of undulating types. Wind erosion takes place here, therefore, undulating and drifting sand dunes are found here. A high content of salt is available here. The underground water is not fit for irrigation purpose because of its brackish nature. The soils are highly permeable and their average yield is poor. Here inferior crops like coarse grains, food pulses and seed crops are grown.

2. Light soils: Varying components like sandy loam, sandy soft loam and light loam are included in this category. Fatehabad, Hisar, Sirsa and Bhiwani, Dadri, Mahendergarh, Jhajjar, Rewari tehsils cover barani area called as sandy loam. The sandy loam is granular and porous. The water holding capacity in this soil is very less. The capacity can be increased by using addition of silt by canal water irrigation or by green manuring. Use of sprinkler irrigation is high in this area. The sandy loam is found in Sirsa, Ghaggar and Dabwali tehsils where silty clay is available. The soft loam is less granular than the relatively sandy loam. Here the canal irrigation facilities are high. The light soils are good for agriculture and generally easily ploughed. In these soils different types can be grown like wheat, barley, cotton, and oilseeds.

3. The Medium soil: The varying physical composition like silt, sand and clay proportions are found in the medium soils. In some parts of Ambala, Gurgaon, Nuh, Rewari, Jhajjar, Firozpurjhirka, Fatehabad, Hisar, Palwal, Balabgarh, Gohana, Kaithal Sonipat, Panipat, Karnal, Thanesar and Jagadhari tehsils are included in this category. Loam (Bhangar) soft loam (Dahar) and light loam are the main soil components in this medium soil. A major part of Haryana is covered by loam which is compact due to addition of silt over years by canal water. Irrigation is needed in loamy areas during Rabi crops. The medium soils are fertile and capable of producing different crops like wheat, cotton, sugarcane and rice.

4. The Moderately Heavy Soil: This type of soil is called khaddar. Which is found near river course of the Yamuna Here alluvium deposits are found due to floods during monsoon seasons. Yamunanagar, Karnal, Panipat, Sonipat, Palwal districts near The Yamuna river tract are the fertile areas of moderately heavy soil. The components of silt and clay are found in this soil. During dry season it is very difficult to work in this soil. If good management of soil is done then it gives good yields and variety of crops can be raised on these soils.

5. Very Heavy soil: Such type of soil is found along the Ghaggar Markanda seasonal drainage system. Clayey silt is found in heavy soil which forms a good area of alluvium. The very heavy soil consists of silty clay and confined to drainage lines in Ghaggar river valley in Hisar, Guhla and Thanesar and Jagadhari tehsils and east Ambala. Stiff clay is found in the areas of eastern Ambala and Thanesar tehsils, intersected by several hill streams. Heavy soils have poor salt content and rich organic matter, therefore, their quality is good. The

rainfall is good in these areas and therefore, the yields are high. These soils are fit for gram, barley in rainfed agricultural fields and wheat and rice in irrigated areas.

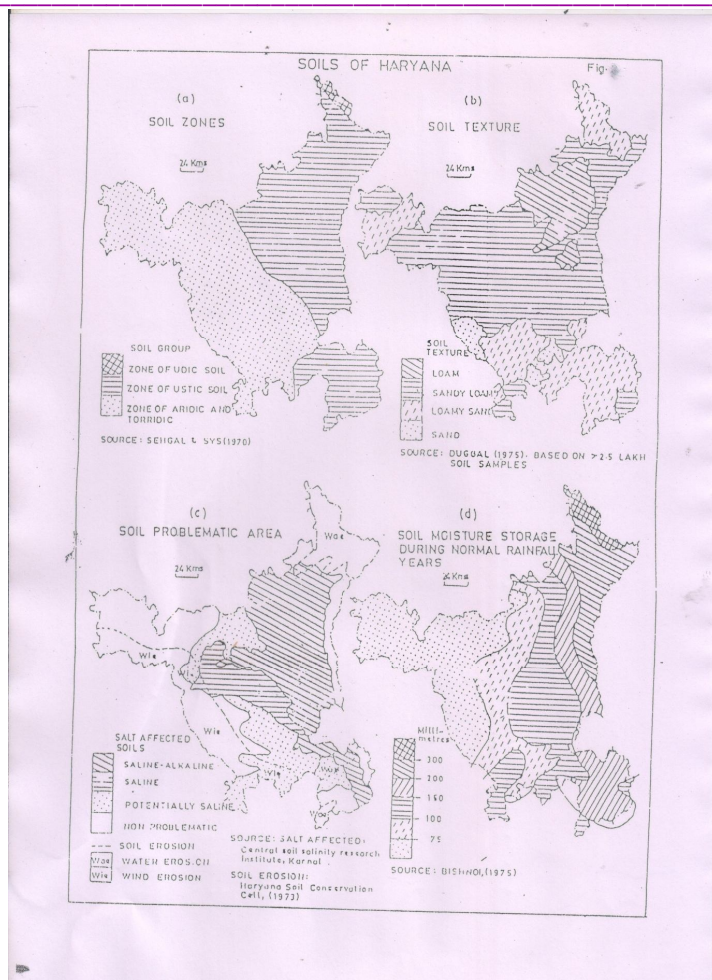
6. The soils on the Rocky surfaces and piedmont plain: The sedimentary deposits of sandstones, sand and conglomerates with boulders and pebble beds by rivers are found in the Siwaliks in Kalka and Naraingarh tehsils. The piedmont plain is covered with uneven sandy soil in Jagadhari tehsil. The soil pattern of the rocky surfaces of Aravallis in south and south west of Haryana is not deep and therefore, soil is infertile to grow crops. The rocky surfaces of Aravallis are found in parts of Bhiwani, Mahendergarh, Rewari and Gurgaondistricts where uneven sand dunes, pebbles and boulders often lie close to the surface. The soil of the rocky surfaces is coarse, light inferior with below average fertility and not deep thus not sufficiently favourable for crop production.

Sehgal and Sys (1970) have classified the soils of Haryana into three major soil zones (**Fig. A**) as discussed below:

Zone of Aridisols: There is a large area bordering the Rajasthan desert, where light coloured 'Aridisols' are found. Such soils are found in Sirsa, Fatehabad, Hisar, Bhiwani, Mahendergarh, Rewari, Jhajjar and Rohtak districts. Mainly sandy loam, loamy sand and sand are the average soil textures in this zone. The organic matter content is low and decreasing with depth. Availability of potash as well as phosphorus is medium to high in the zone. Wind erosion and soil moisture deficiency are the serious problems in this zone. Some areas of saline and potentially saline soils are also covered by this zone. The annual rainfall is less than 500 mm in this zone. Two sub-zones may be recognized in this zone (Duggal, 1966) viz., (i) desert soils with annual rainfall below 250 mm and (ii) sierozem soils with annual rainfall between 250 and 500 mm.

Zone of Ustic soils: Such soils are found in an extensive zone in the districts of Faridabad, Gurgaon, Sonapat, Jind, Karnal, Kurukshetra and parts of Ambala. These soils are pedocal brown-coloured of alluvial origin having fine loamy and coarse loamy mixed texture. The Ustochrepts and Ustalfs with patches of salinity and alkalinity are the dominant soils. The northern parts of Ambala district have water erosion problem in this zone. This zone is having annual rainfall between 500 and 1000 mm. The soil moisture storage is found between 100 and 300 mm during normal years of rainfall in the zone.

Zone of Udic soils: Such soils are found in the extreme north of the state and cover a very little area of the state where dry sub-humid type climatic conditions prevail. The annual rainfall is more than 1000 mm and the available soil moisture during normal years of rainfall is more than 300 mm in this zone. The reddish-chestnut soils are found in this zone. These soils are acidic to neutral and contain little soluble salts. These soils are clayey with a large preponderance of clay and silt fraction.



The soil texture determines the growth and production of crops. Soils, therefore, must be treated in terms of their agronomic characteristics and classified according to their textural capability for crop production. Such classification is necessary for irrigation and agricultural planning. Soil texture map of Haryana (Fig. B) based on 2.5 lakh samples analysed at various soil testing laboratories in the state, has been prepared by Duggal-(1975)

PROBLEMS PERTAINING TO THE SOILS OF HARYANA

The soils of Haryana pose three problems (Singh-1976)

- (a) The salinity-alkalinity, leading to waterlogging
- (b) The soil moisture deficiency
- (c) The soil erosion.

All these problems hamper agricultural prosperity.

(a) The Salinity-Alkalinity

Salinity and alkalinity are serious problems in major parts of Haryana, particularly in Kurukshetra, Karnal, and Sonapat (excluding Jhajjar tehsil) districts, and Jind, Safidon, Hansi, northern Gurgaon, Ballabgarh and Palwal tehsils. (Fig.C) They have been presenting difficulties for agricultural use of the soils, even though the soluble sodium percentage in many of them is within safe limits. They do not allow the fields to grow sensitive crops which have low salt. After reclamation these lands will provide good fields for paddy

cultivation in the districts of Karnal and Kurukshetra and tehsils of Jind, Safidon, Hansi, Gohana, Sonipat, Rohtak and Fatehabad where a large extent of arable area has been damaged by thur and kallar. Thus, the soil is suitable for cotton, rape and barely highly salt tolerance crops and wheat, rice, maize, linseed, pulses and millets (medium salt tolerance crops).

(b) The soil moisture deficiency (Fig.D)

Soil drought is related to soil moisture. Drought resistant crops with improved varieties should be raised and dry farming techniques can be improved. Dry farming is a system of conserving soil moisture for its best uses, of preventing soil erosion and of crop management in areas of low and uncertain rainfall. Farmers of south and southwest Haryana are using dry farming techniques to maintain the moisture and fertility of the soil. The above mentioned techniques are secondary remedies against drought. Supplementary irrigation by tube-wells and canals is the only final and permanent remedy for soil drought in Haryana. The soil moisture in the soil may be maintained by improving land use and agricultural pattern. When the same crop is continuously grown on the same piece of land then the nutrient in soil becomes poor. Therefore, rotation of crops is necessary so that the deficiency of minerals in the soil may be compensated. The fertility of land becomes very poor when the crops are grown on the same piece of land. Therefore, to maintain the fertility and to compensate the soil moisture deficiency same land should be left fallowed for some time to regain the fertility of soil of that land to grow more crops. Drought tolerance crops may be sown. Dry farming technique may be developed so that crops may be grown in low rainfall areas. The water to the crops should be given as per their need so that the water logging problem may be avoided. Use of chemical and biological fertilizers may be used to maintain the fertility of the soil.

(c) The soil Erosion

Haryana Soil Conservation Department has outlined the water and wind erosion zones corresponding to the northeast top of Haryana under the influence of water erosion and the southwest region comprising Hisar, Bhiwani, Mahendergarh and West Gurgaon districts under wind erosion. Therefore, measures of soil conservation on a large scale are needed in the northeast to check water erosion and waterlogging and in the southwest to check wind erosion and to conserve the soil moisture effectively and efficiently.

It can be concluded that the soils are fertile and respond to irrigation. Most of the soils require little expenditure for cultivation because the major part of their soil cover is well drained. In arid and semi arid parts irrigation by tubewells or canals is very much required to remove soil moisture deficiency by providing water and to keep the soil compact for facing wind erosion. In the sandy and loamy sand areas more and more plants should be planted to furnish the soil with necessary plant nutrients and to face wind erosion. The cultivation of melon should be encouraged to protect the soil from wind erosion and to withstand the moisture deficiency of soils. Crops of pulses and grams should be grown in arid areas to improve the structure of soil. The pulses and grams help in the fixation of nitrogen in the soil. A very detailed survey of the soils is needed to know the soil conditions to make plans for cropping patterns, crop combinations and cultivation methods. Such a scientific soil survey will prove useful to study the areas which are facing the waterlogging problem while the other areas are facing the problem of deep ground water level so that solution to these problems may be done with judicious plan.

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