Introduction

Pulses, the cheapest source of proteins in Indian diet, are one of the neglected areas in Indian agricultural economics. The need to change this situation has become acute in recent years because of the steady fall in the output and availability of pulses. If this decline continues, it will create harm by imbalancing Indian diet. This makes it essential to take the steps immediately to bring about an increase in output of pulses. So far, the study of pulses received little attention about the problems of production. According to the information available in Bulletin on Food Statistics, New Delhi, 1972, by Government of India, there has been a declining trend in the per capita availability of pulses since 1959. At that time per capita consumption was 75 grams which declined to 50.3 grams by 1971 (Chopra and Swami,1975). The consumption of pulses is very low. This is partly because of cereals which substitute pulses especially when relative prices favour such substitution, and partly due to lower production.

The major pulse crop in India and especially in Maharashtra is Red gram. Red gram (Cajanus cajan (L),Millsp.) commonly known as pigeonpea and locally called as Tur, ranks his amongst the pulse crops of India. It is mostly used in the form of split pulse as 'dal'. However, in some places green pods are also a favourite vegetable. The outer integument of its seed provide a valuable feed for milch

cattle (Kachroo, 1970). The stem and leaf protins are converted into "bhusa" which is a high protein cattle feed (Kumar et al.,1967).

In spite of the fact that the pulses are very much needed, there has been a decrease in acerage of pulses in recent years. In place of pulses cereals are being grown such a shift has been significant in areas where irrigation facilities are available and high yielding varieties of cereals, especially wheat, have been successfully introduced. The acerage under kharif pulses is more than under rabi pulses. The area under tur increased upto 1966. However, by 1972 it was decreased. In recent years (1977-78) the area under tur cultivation was 660.3 thousand hectares and the yield obtained was 344.3 hundred tones. The total area under pulses in the same year was 2842.3 thousand hectares and production was 912.5 hundred tones (Report of Pulse Breeder, Rahuri,1980-1981). Kolhapur region during the year 1978-79 had the total cultivation of Tur in 29,100 hectares. In this the highest hectarage was in Sangli (16,800 hectares) and lowest in Kolhapur (4,600 hectares). Out of the total production 25,300 tons, Sangli had 15,100 tons whereas the Kolhapur had 3,300 tons. This came to be 717 Kg/Ha. in Kolhapur, 896 Kg/Ha. in Satara and 899 Kg/Ha. in Sangli (Chopade,1980).

Red gram is grown in Uttar Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Mysore, Madras, West Bengal and Andhra Pradesh. In fact the distribution is all over India. However the extent of cultivation differs. Red gram is a deep rooted soil binding crop, usually grown as a mixed crop with cereals. In

some areas it is also planted as a pure crop. Numerous types of red gram are known differing in height, time of maturity and seed characteristics. Shaw et al.(1933) had distinguished 86 different types from all over India. Mehta and Dave (1931) reported 36 types from Madhya Pradesh alone. These types are broadly grouped under two varieties - Cajanus cajan var.bicolor D.C.(arhar) and Cajanus cajan var. flavus D.C.(tur). The arhar varieties include most of the perennial types. They are bushy plants with late maturing period. The tur variety comprises of early maturing plants.

The red gram occupies the field for about 6 to 8 months. Red gram flowers profusely however most flowers are shed without setting pods (Sheldrake,1979). Red gram is grown in various types of soils and it is tolerant to acidity or alkalinity in the soil but the most favourable pH value ranges from 5 to 7. It grows best in warm or moist climate. During the period of flowering and fruiting low temperature, dry and sunny weather is essential. Cloudy weather at flowering time causes drop of flowers and attack of pod borer. The crop is very susceptible to frost at any period of growth.

As the possibility of increasing yield of red gram (or also other pulses) by an increase in area is limited, this diverts attention to increase the yield per hectare by using high yielding varieties, application of fertilisers, use of irrigation water and use of short duration varieties with improved crop rotation. Among the crop environmental factors,

soil is the most important one. But unfortunately plant and soil scientists have found little common interest in the study of crop plants. Keeping this in mind, present study was designed.

Even though red gram grows in a variety of soil type, it is essential to investigate the role played by soil type in increasing the crop production. With this view, two types of soils are selected for the present study and a selection variety Cajanus cajan var.T-84 has been grown on these two types of soils. Cajanus cajan var.T-84 is a selection from local cultivar at ARS Niphad released in 1942. It requires 180-200 days for maturation. The flowering takes place in 105 to 110 days. It is yellow flowered variety with small brown seed. The height recorded is 110 cms. and this is thought to be a drought resistant variety. This variety was used for the experiment during 1979-1980 and 1980-1981. The first year's experiments were treated as pilots. The second year's results are presented here.

To study the effect of soil type on the growth of var.T-84 the organic and inorganic constituents and growth analysis were carried out. So as to differentiate the types of soil, physical and chemical characteristics of soil are also studied. Chapter 1 presents the data on the red and the black soils. It must be noted here that at many places mixed types of soils occur naturally. Many a times because of soil erosion and refilling of area with foreign soils, mixing of two types of soil takes

place. So as to understand the effect of such type of mixing the experimental lot contained mixture of red and black soil plots. The experiment was carried out in the field itself. There were 3 plots of each type with 1 m x 3 m area. One lot represented the red soil, the second the black soil and the third equal mixture of the red and the black. The soil analysis from all these field plots is presented in Chapter 1.

This has been extended to the analysis of plants from three types of soils at different stages of growth. The analysis of inorganic constituents is discussed in Chapter 2. The harvest was obtained and dry seeds were also analysed. The organic constituents of the plants as well as seeds are included in Chapter 3. The growth characteristics and the yield are recorded in Chapter 4. This piece of work ends in summary and conclusion. This work cannot be considered as complete. In fact it has opened new vistas on which further experiments can be based.