1. INTRODUCTION

The fact that pulses play a predominant role in our food and farming is well recognized and needs no emphasis. Pulses not only provide high nutritive food, but they are also good source of nutritive green fodder, and rich feed for our livestock. Pulses are unique by virtue of their inbuilt capacity of fixing atmospheric nitrogen through *Rhizobium* bacteria present in their root nodules. Thus, they meet substantially their own nitrogen requirement in the soil and leave nitrogen in the soil for use by the succeeding crops. The production of pulses did not keep pace with the population growth in the last two decades, resulting that the per capita per day availability of pulses declined from 64 g during 1951-52 to 35 g in recent times as against the WHO-FAO stipulated minimum recommendation of 80 g. The Indian Council of Medical Research (ICMR) has recommended 50 g per day per capita requirement of pulses but presently we consume less due to short fall in total pulses production in the country.

The grain legumes and chickpea in particular have more protein than cereals. Further more, protein of these legumes compliments cereals protein because of relatively high concentration of lysine, which enhances the nutritional value of diets (Huisman and Van Der Poel, 1994).

Chickpea has been well recognized as a valuable source of dietary protein, particularly in the developing countries where supplementation of cereal based diets with legumes is the best solution to widely spread protein
energy malnutrition. The per capita availability of 7.3 g per day chickpea is a source of approximately 3.1 per cent (69.5 K cal) energy and 6.3 per cent (3.4 g) protein to Indian diet besides being a major source of calcium and iron (12%).

The global production of pulses was 61.72 million tonnes from an area of 73.2 million hectare with an average yield of 843 kg/ha (Ali, 2005). Chickpea is one of the most widely grown pulses in the world which occupies an area of 10.61 million hectare with a total annual production of 8.30 million tonnes with an average productivity of 782 kg/ha (Ali, 2005). However, the productivity of chickpea in India is still far below as that in Mexico, Sudan, China, Israel, Lebanon, Yaman, Greece and Italy.

In India, the production of pulses was 13.38 million tonnes from an area of 22.39 million hectare with an average productivity of 598 kg/ha. Chickpea was grown under both rainfed and irrigated conditions over an area of 6.93 million hectare with total production of 5.60 million tonnes and productivity of 808 kg/ha, which represents 31 and 41 per cent of national pulses acreage and production, respectively (FAI, 2005).

In India, the productivity of pulse crops including chickpea is low because of several constraints like inadequate availability of quality seed of improved varieties, cultivation of pulses on the poor and marginal lands under rainfed conditions without recommended input application and moreover, there is lack of high yielding and stable varieties of this crop in our country.

The breeding approaches and crop improvement programme have been initiated by government of India and state agricultural universities to improve the productivity of chickpea through development of high yielding
plants types and other improved production technologies. It's also important to improve resistance to biotic and abiotic stresses, yield potential and stability of available cultivars. The breeding efforts are being made to improve genetic base of different cultivars.

Most of the available varieties of chickpea generally produce excessive vegetative growth with poor economic yield. Therefore, there is an urgent need for identifying chickpea genotypes with higher productivity, responsiveness to inputs and consistent yield under various conditions as has been emphasized by various research workers (Jeswani, 1986, Dahiya et al., 1990 and Lather, 1999).

Kabuli chickpeas have a good cooking quality and are nutritionally superior to desi chickpeas. The biological value of kabuli types is considerably higher than desi types and the former types contain more utilizable proteins, polyphenolic compounds in desi are more than twice those of kabuli (Singh and Jambunathan, 1981).

After cereals, food legumes such as lentils, chickpeas and dry beans are one of the most important sources of proteins, calories and other nutrients in India. Chickpea, a rich source of easily available inexpensive protein, when blended in optimum proportions, can complement cereal proteins and provide several essential amino acids. This is an important role, enhancing the biological value of staples based chiefly on cereals, roots, tubers and plantain crops.

To obtain suitable texture for consumption and to improve the nutritional quality chickpea seeds are processed. In the Mediterranean Basin, especially in Turkey, soaking and cooking are the traditional forms of
processing. Soaking, usually an overnight operation is an important step prior to cooking because it reduces the time necessary for tenderizing the texture. The use of soaking solutions containing different inorganic salts is a traditional method, used in home processing for quick cooking, as the most serious drawback in the utilization of legumes is their long cooking time. This process makes utilization cumbersome and uneconomic (Clemente et al., 1998), resulting in protein losses and lower availability of lysine (Badshah et al., 1987).

The findings indicated that remobilization of reserves, osmotic adjustment, pod abortion, and pod and seed growth are important traits for chickpea adaptation to drought.

Genetic variability is very important for the improvement of crop plants. More the variability in the population, the greater are the chances for producing desired plant types. Heritability estimates and genetic advance in a population provides information about the expected gains in the following generations.

The choice of plant breeding methodology, which is to be used for upgrading the yield potential, mainly depends on the availability of reliable information about the nature and magnitude of various genotypic parameters.

The main reasons for the relatively slow progress in pulse production have been identified to be the following (i) low level of genetic diversity and low yield potential of chickpea (Cicer arietinum L.) germplasm (ii) a preference by farmers for major cereal crops on land brought under irrigation and consequent relegation of pulse crops to marginal and sub-marginal lands (iii) lack of development of sufficient input-responsive and high yielding, short
duration varieties, (iv) susceptibility of pulse crops to pests, diseases and adverse weather, and (v) insufficient availability of quality seeds. This situation can only be chance if cultivation of pulse crops becomes more remunerative as compared to major cereals, which compete with them on fertile and irrigated lands. Besides these, lack of consistent performance by the recently developed varieties is also an important factor. Among pulse crops, chickpea (*Cicer arietinum* L.) is particularly a very sensitive crop to changes in environmental conditions including date of sowing, rainfall and fertility of soil. In addition, other topographical factors and various diseases and pests are some to the major reasons for low productivity.

Yield is a product number of component characters such as plant height, branches per plant, pods per plant, seeds per pod, 100-seed weight and biological yield. The knowledge of characters association and contribution of various characters to the seed yield would be useful in making the selection programme more effective. Limited information on above aspect under new and varying environments is available in chickpea. Keeping the above facts in view, the present investigation was undertaken with the following objectives:

(i) Estimation of the phenotypic stability.

(ii) To study genetic variability, heritability and genetic advance over wide range of environments.

(iii) To work out the direct and indirect effect of characters on yield over a range of microenvironments.

(iv) Characters association studies in different environment of chickpea.