INTRODUCTION

India is predominantly an agriculture based country. Agriculture is the mainstay of Indian economy contributing major share to the gross national income. The vast majority of Indian population lives in rural areas of which about 80 per cent are engaged in agriculture. Agriculture is no longer being regarded as a subsistence occupation and has risen to the status of commercial activity. Till nineteen sixtees the main attention of policy makers and planners had been devoted to attain the self-sufficiency in food grains. This has helped in ushering the era of 'Green Revolution' in the country. Thereafter, the attention has been diverted towards improving the quality of food and to overcome the problems of malnutrition. So, substantial emphasis on diversification and commercialization of agriculture has been laid. As a country, we have not only to achieve self-sufficiency in production of food grains, pulses and oilseeds, but have to emerge as a force to reckon with on the international scene, so that our farm products gain ever-increasing acceptance and demand abroad.

Even though phenomenal growth has been registered in
the production of foodgrains in the country rising from 50 million tonnes to about 200 million tonnes during the last 50 years, we still have a long way to go to reach the goal of 225 million tonnes while entering the 21st century to feed an estimated population of over one billion. Apart from foodgrains, fibre and oilseed requirements of the country are tremendous and are to be increased further to meet the needs of the ever-increasing population of India. It is a big challenge to the scientists to develop sound technologies to make India a self-reliant nation on continuing basis. This is a gigantic task and requires intensified research, continuous upgradation and updating of the knowledge and skills of the extension workers and effective transfer of technology to farmers through these functionaries.

In Punjab, Agricultural Development Officers are working at the grass-root level and have to perform multifarious duties like dissemination of the latest technology, quality control of inputs, distribution of subsidies and providing feedback to research scientists. So, the paramount need of the hour is to educate and equip the Agricultural Development Officers about the new technologies for onward transmission to the 'sons of the soil'. Among the latest technologies that have been generated, tested and widely accepted throughout the country, the hybrid seed
production is vital because of all the agricultural inputs, seed is the basic and crucial input for attaining the sustained growth on agricultural production. Thus seed lies at the root of our planning for prosperity. In view of its importance, emphasis has been laid on the production and distribution of hybrid seed. The production of good quality hybrid seed is a scientific activity and requires high technical skill and heavy financial investments. The other important factors affecting the seed production of hybrids are source of planting material, ratio of male and female lines, synchronization of parental lines, isolation distance, inspections in the field, handling of produce at threshing, seed drying, processing and storage of seed etc.

To get full dividends of good quality hybrid seed of a crop, it is essential that a strict attention must be given during hybrid seed production and it must be carried out under standardized and well organized conditions. The hybrid seed production technology may vary from crop to crop. The hybrid seed production technology is available in crops like maize, bajra, sorghum, sunflower, cotton, rice and vegetables. Irrespective of the hardships in hybrid seed production, this technology is proving to be milestone in agricultural production. Although enough technical information has been generated by State Agricultural Universities and ICAR institutes, yet there exists a wide
gap between the scientific knowledge available for the farmers, their actual acceptance and integration into the farming system. This scientific knowledge needs effective communication for its dissemination to the farmers so that they are well equipped with scientific knowledge and technology.

In India, there has been a look out for suitable oilseed crops, for meeting the oilseed shortage which has resulted from the widening gap between the production and the requirement of edible oil. There has been much emphasis on the cultivation of oilseed crops like sunflower, soybean and palm. Sunflower (*Helianthus annus* L.), a wonderful non-traditional oilseed crop offered just that opportunity. This crop has become an important oilseed crop of the world in general and the Punjab state in particular in the recent past due to its high yield potential, short duration, low irrigation requirement and its lucrative production economics. For the present study, the 'hybrid seed production technology of sunflower crop' has been selected due to the importance of both sunflower crop and hybrid seed production in the present scenario of agriculture in India and Punjab, which is the leading state in agricultural production.

Sunflower (*Helianthus annus* L.) belongs to the family Compositae of flowering plants. The genus *Helianthus* derives
its name from the Greek world 'Helios' meaning sun and 'anthos' meaning flower. Sunflower has made a significant impact in the country as a rich source of high quality edible oil because of high degree of polyunsaturated fatty acids content and nutritional value. Its pleasant taste and odour have made it acceptable as edible oil among the masses. Sunflower being a photo and thermo insensitive crop, could be grown throughout the year, i.e. during kharif, rabi or summer/spring season and fits well in crop rotations with potato, 'toria', cotton, sugarcane and oats fodder. It also has wider adaptability in different agro-climatic regions and soil types, provided adequate inputs are applied (Sidhu and Kolar 1996).

Sunflower was commercially introduced in India during early nineteen seventies. However, a number of production problems were faced. For example, unseasonal rains received at and during flowering, consequent problems of poor seed set and high incidence of stem/root rots. Therefore, the need for hybrids, which were tolerant to diseases, insect pests, drought as well as excessive wet weather conditions etc. was felt. The discovery of cytoplasmic male sterility (CMS) in 1968 in France and fertility restoration in 1970 in USA made possible efficient production of hybrid sunflower. Sunflower has become popular in Punjab only after the introduction of $F_1$ hybrids. These hybrids are
commercially produced by the Punjab Agricultural University, Ludhiana and some private firms only. The seed producers and progressive farmers can also produce the F$_1$ seed of this hybrid for commercial cultivation. But the seed production technology of hybrid sunflower is different from the cultivation of general sunflower crop. The finalization of package of practices in 1988 and selection of cultivation season during 'spring' gave a boost to the cultivation of sunflower hybrids. The sunflower hybrid has caught the imagination of the Punjab farmers and now it has established itself as an important oilseed crop. The area under sunflower in Punjab is increasing every year. The area under sunflower crop was 96,502 hectares during spring, 1993 and it is anticipated that the area under this crop may stabilize approximately at 1.5 lakh hectares in the near future. With the increase in the area under cultivation of sunflower, the demand for hybrid seed will also increase. It is essential to make the extension workers skilled and familiar with the hybrid seed production technology of sunflower for launching a successful seed production programme. Such a programme is necessary to make the farmers self-dependent for their seed requirements, thus bringing down the cost of production and increasing the profit margin.
This great task can be done through effective extension-teaching methods. The extension worker has to choose the best suitable method according to the prevailing situation as well as availability of source and time. These methods differ in their effectiveness and applicability from situation to situation, technology to technology and from learner to learner. Development competence is considered to be the end product which is expected to be possible only through the reactions of technology and extension teaching methods. Thus, technology in the form of new improved techniques and the proper treatment of this technology by the use of various extension teaching methods, helps us to attain the end product. The extension worker needs the help of some tools and devices, which he uses to transfer or impart knowledge and skills to the learners and changing their attitudes. These can be termed as extension teaching methods.

People learn primarily by seeing, hearing or doing the things. These opportunities are provided to the people through extension teaching methods. According to Leagans (1961), "Extension methods are to the block staff and village level workers what machines, wrenches and hammers are to the mechanics". The learners vary in their age, education, interest, intensity of need and socio-economic status. These socio-economic and personal attributes are so
vital that they are likely to influence effectiveness of various extension teaching methods. The choice of method involves careful consideration because even the best subject matter when badly presented may not appeal to the audience.

The Agricultural Development Officers (ADOs) are the extension functionaries working in the State Department of Agriculture, Punjab at the grass root level and serve as medium for dissemination of agricultural information and new technologies. Though various extension teaching methods have been used for imparting knowledge, yet very few attempts have been made in studying their relative effectiveness in the gain of knowledge of hybrid seed production technology of sunflower by Agricultural Development Officers with the use of selected extension teaching methods.

Thus, it would be interesting to know how effective are these selected extension teaching methods of presentation in imparting knowledge to the ADOs? With this basic question in mind, the present study entitled, "RELATIVE EFFECTIVENESS OF SELECTED EXTENSION TEACHING METHODS IN IMPARTING KNOWLEDGE ABOUT HYBRID SEED PRODUCTION TECHNOLOGY IN SUNFLOWER TO THE AGRICULTURAL DEVELOPMENT OFFICERS OF THE PUNJAB STATE" was designed with the following specific objectives:
1.1 OBJECTIVES OF THE STUDY

(1) To assess the gain in knowledge of the Agricultural Development Officers about hybrid seed production technology in sunflower through selected extension teaching methods.

(2) To evaluate the relative effectiveness of selected extension teaching methods in imparting knowledge about the hybrid seed production technology to the Agricultural Development Officers.

(3) To find out the relationship, if any, between the selected socio-personal characteristics of the Agricultural Development Officers and the knowledge gained through selected extension teaching methods.

1.2 SCOPE AND SIGNIFICANCE OF THE STUDY

The research studies have revealed that the extension teaching methods have significant effect on motivating the learner, creating interest in the learner and helping in clarifying the concepts. A large number of extension teaching methods are available to the extension workers for imparting knowledge about sunflower hybrid seed production technology to the Agricultural Development Officers. In order to make message more effective, clear and more expedient, the proper selection and use of extension teaching methods is essential. A skilfully selected method fitting into the socio-personal characteristics and needs of the respondents will prove more effective. During off-season when crop is not available for method demonstration in the
field, the extension worker have to select some alternative extension teaching method such as video, slide-tape synchronization etc. Moreover, when the training is to be conducted before the commencement of sowing season of a particular crop then these extension teaching methods will help the extension workers/Agricultural Development Officers to disseminate the relevant information to the farmers in advance.

This study will highlight the comparative effectiveness of selected extension teaching method in imparting knowledge about the hybrid seed production technology of sunflower. This will also help to identify the efficient extension teaching method and the extension teaching method best suited for gain in knowledge. The study has a considerable significance for the extension workers, planners, administrators and trainers. This study will be helpful for the extension trainers to develop new extension strategies by selecting appropriate combination of teaching methods. Being experimental in nature and design, the study appears to be a pioneering one and can be expected to stimulate other investigators to undergo further research in less explored areas by using the new combinations of extension teaching methods.
1.3 ASSUMPTIONS

(1) The knowledge imparted through different extension teaching methods is measurable.

(2) The selected extension teaching methods apt to differ relatively in their effectiveness in imparting knowledge.

(3) The respondents apt to differ in knowledge gained on account of the differences in socio-personal characteristics.

(4) The trainers have equal competence in use of the selected extension teaching methods.

1.4 LIMITATIONS

It is an experimental research with a design as sound as could be conceived and practically implemented under the prevailing conditions and circumstances. Thus, being an experimental study, it has basic limitations inherent in experimental research design. These limitations are as under:

(1) The information imparted through different extension teaching methods on the basis of the same selected subject matter, may not completely match with each other, thus resulting into different impact on respondents.

(2) Due to short duration of the research project, only selected extension teaching methods were used.

(3) All the respondents in different selected groups were equated only on the basis of selected independent variables.
like age, education, professional experience, area of specialization, family background, etc.; while some other intervening variables like IQ, previous experience of respondents in hybrid seed production technology of sunflower etc. may also affect the results.

(4) The findings of the study may not be applicable to the other states of India due to various features of Punjab state which is an agriculturally advanced state.

1.5 OPERATIONAL DEFINITIONS

1. Effectiveness: It is the efficiency of the particular extension teaching method as reflected in mean knowledge gained scores as compared with other extension teaching methods.

2. Gain in Knowledge: The net knowledge gained by respondents under different treatments and is measured by deducting the pre-test scores of the respondents from the post-test scores.

1.6 ORGANIZATION OF THE THESIS

The statement of the problem, objectives, scope and significance of the study, assumptions, limitations and operational definitions constituted the contents of the first chapter. The second chapter dealt with the brief