Chapter - I

INTRODUCTION

The bumper harvest of 151·54 million tonnes of food grains in India during 1983-84, the highest so far, hopping from a meagre 52 million tonnes in 1951-52, has attracted worldwide attention and appreciation. As compared to the last record production of 133·30 million tonnes (mt) in 1981-82 and 129·50 mt during 1982-83, it is a spectacular achievement which has not only changed the then ambitious target of 142 mt but also placed India among the food grain exporting countries. This has been possible by meeting many challenges successfully, by evolving and using high yielding varieties of crops along with improved methods of crop production and protection, improved farm implements, fertilizers, irrigation etc. These inputs have increasingly been used by the farmers to their advantage which has resulted in manifold increase in overall grain production. The compound growth rate of agricultural production in India during the period 1950-80 was 2·59 per cent per annum which world organizations believe could be 4 per cent hereafter.

Inspite of this fact, in the recent past the country has imported food grains, mainly because, it was not possible to maintain the buffer stock at the desired level from the grain available in the country. These stocks are necessary to meet the demand at the time of natural calamities like floods and drought which are occuring almost every year in some part of the country or the other.

The one area which deserves mention in which the Indian agriculture is lacking is the efficiency in post-harvest processing of crops in general and storage in particular which may be due to lack of attention on the part of the planners. While the production has maintained an upward trend, the facilities for processing, storage and marketing have not kept pace with it. Proper storage and handling of food grains is of utmost importance in view of the substantial losses of food grains arising from defective methods of storage.

About 70 per cent of the food-grains produced in India are retained in the villages to cater to the needs of 80 per cent human population, seed needs for the next crop and to a very limited extent as a feed to livestock. Only 30 per cent of the food-grain produced is the marketable surplus which gets into the trade channel and eventually stored in raw or processed form for short and long durations in public, cooperative and private sector godowns. The principal agencies dealing with these operations are the Food Corporation of India, Central and State Warehousing Corporations and Co-operatives. In all these agencies which are essentially urban based, skilled people handle and store the food grains resulting in less storage losses, about 2 per cent only. However, the bulk of the 70 per cent food grains retained in the rural homes is stored in traditional structures with the pseudoscientific and ineffective

preventive measures. As a result, losses due to insects, rodents, birds and excess moisture are on an average 10 per cent which is 4 to 5 times that of the so called properly managed godowns. In some cases, losses are very high, as most of the traditional domestic storage structures are neither moisture proof nor rodent proof.

United Nations Development Projects Action Committee stated (Gandhi,1983) that in India, over 10 million tonnes of grains are lost each year through spoilage by pests and moisture and that these losses could make up for the entire annual world shortage.

According to the Commonwealth Secretariat (Gandhi,1983) the post-harvest losses of grains vary from 10 to 25 per cent. The storage losses comprise more than two-third of the total post-harvest losses in most of the countries. In general, it is said that 10 to 15 per cent of the food grains are lost during storage in tropical and sub-tropical countries.

The post harvest losses have been estimated by the Panse Committee, appointed by Government of India in 1966, as 9.33 per cent of which nearly 6.6 per cent are due to poor storage conditions alone. The National Commission on Agriculture envisages to bring it down to 4 per cent by 2000 AD by creating adequate storage facilities.

Going by the Panse Committee's estimation, the total post-harvest losses from 1961 to 1982 account for about 208 mt and corresponding storage losses of 146·6 mt of food grains. As against this, the country has imported only 83·16 mt of food grains which is about 56 per cent of the losses occuring during storage alone during the same period. During most of these years, except for 1963-67 and 1974-75, imports had been less than the storage losses. Hence if the storage losses could be reduced the country will not only be able to wipe out the deficit but will increase the availability of food grains for export. This underlines the need and importance of an appropriate storage system which can reduce the losses.

In modern agriculture, cultivation of three crops a year is being advocated which gives very little time to the farmer between harvesting of one crop and the sowing of the next crop. Furthermore, for reducing the harvesting and transportation losses it is recommended that crop should be harvested early and at higher moisture content. As available time for threshing, drying and cleaning is very short, solely sun-drying,which is at present the practice, cannot be relied upon and it would be required to go for mechanical drying. The inclement weather conditions at the time of the harvest or just after it also create grain management problems. Sometimes rain causes heavy damage to the harvested crop and/or threshed grain. For proper storage, the grain has to be cleaned and dried to a suitable moisture content but adequate cleaning and drying facilities are not available to the farmers.

Following the law of demand and supply, when output declines in a bad year, demand being relatively steady, food grain prices rise. Conversely, in a good year, when output is abundant, the prices decline. Prices are still lower in the event of good harvest. They further fall during the harvest season. Farmers can not hold their marketable stocks, when the market prices are low, due to lack of know-how, inadequate infrastructure and compelling financial situation. These offset the benefit of high production to the growers. Thus there is a problem of reconciling the objectives of stabilization of prices and farm income on the one hand and farm income and consumer income on the other. The objective, therefore, should be to eliminate the undue low price-trough of the post-harvest period, especially in a good crop year and to eliminate the unreasonable high price peaks of the off season, especially in a bad crop year, because the low price-troughs affect the producer and the peaks affect the consumer adversely.

In India, the industries based on the food grains, like rice mills, flour mills etc are unable to run throughout the year because of non-availability of raw materials. They have to purchase grains during harvesting and threshing season only, in huge quantities to stock them. It blocks their financial resources. Their economic viability is strained as they do not always have the money to purchase enough quantity of grain at one time to run their mills throughout

the year. Furthermore, in some cases these industries are not allowed to purchase from the market and they have to depend on government supply only. For example, there are approximately 450 roller flour mills in the country with total installed capacity of 8.5 mt, but only 3.2 mt of wheat is released annually to the flour mills for conversion into flour. As a result the average capacity utilization of rolling flour mills comes to less than 38 per cent of total installed capacity. It is mainly due to nonavailability of wheat stocks.

Due to financial constraints, the small farmers cannot afford to retain the produce with themselves till the market prices are favourable. The need, therefore, is not only to provide the farming community facilities for scientific storage so that wastage and produce deterioration are avoided but also to get its credit requirements met without their being compelled to sell the produce at a time when prices are low.

Thus in the present grain storage and handling system post-harvest losses are more, farmers are not getting their due price, consumers have to pay more, food grain industries are unable to increase their productivity and small farmers are not getting proper credit facilities.

All these problems could probably be solved if the grain cleaning, drying, storage, marketing and credit facilities are made available to the farmers in an integrated

system. However, in any integrated system development, it is necessary to ensure that these do not become the note-worthy but nonfunctioning monuments because of bad planning and/or management. To avoid it, it is better to review the whole situation of production, processing, storage and marketing of grains in a smaller area, analyse it, discuss the various alternatives available and then develop a suitable system on scientific lines for that area. Mathematical modelling techniques to compare the efficacy of these alternatives may find better use in such planning.

Keeping in view the above mentioned points, Union Territory of Delhi was selected as the project region for the case study and future planning for grain management with the following specific objectives :

i) Study the existing food grain storage and handling system in the country with special reference to the project region of Delhi.

ii) Identify the problems of storage and handling of grain and to suggest a suitable system to overcome them.

iii) Develop a mathematical model for a community storage and marketing system of food grains.

iv) Determine the storage and handling capacity of community storage centres in Delhi.

v) Design a suitable storage system for community storage centre.

For meeting these objectives, the detailed study of the existing information on grain storage system and capacities was made to get an idea about the state of art. Detailed survey of existing storage methods and grain losses occuring in the project region - Union Territory of Delhi, which comprises of five development blocks viz., Alipur, Kanjhawala, Nazafgarh, Mahrauli and Shahadra, was undertaken. The information collected was analysed to identify the problems and needs of storage of these blocks. The idea for community storage centre was mooted to take care of the problem and needs. A linear programming model was developed and used for optimizing the storage requirements of each block. Design of R.C C silo was worked out on the basis of need and economy of construction and ease of operation. Taking the needs of storage of different grains into account the capacities under CAP storage, godown and silos to be constructed at each block, were worked out.