The nature of the data required is obviously determined by the objectives of the study. The objectives that we have set before us necessitate an examination of the input-output data for a set of farms at different points of time.

It would be ideal to have input-output data collected according to the same methodology and for the same set of farms. There was only one source of time series data which could have been used for the present study. It was the 'Farm accounts for the Punjab' which are prepared annually by the Economic and Statistical Organisation (E.S.O.), the Punjab. The number of farms studied in the 'Farm Account for Punjab' has not been same for the whole of the post independence period. It was 17 in 1946, 46 in 1965, 26 in 1966 (after the bifurcation of the State of erstwhile Punjab into Haryana and Punjab) and at present, it is fifty-three.

The data for farm accounts were found unsuitable for our purpose for three reasons. In the first instance, the various farms studied by E.S.O. are dispersed all over the State. Therefore, these do not represent homogeneous farms, with regard to the nature of the soil, crop pattern,
crop practices, climate, socio-political set up etc. We had to be fastidious regarding the homogeneity of the farms studied. We had to confine our attention to one homogeneous region. If after choosing a homogeneous region we used the data from the 'Farm Accounts for Punjab', we would have had only too small a number of farms to derive any meaningful conclusion.

Secondly, it was our desire that the farms studied at different points of time should be the same. On face, these accounts appear to be studying the same farm year after year. However, the method followed in compiling these accounts does not ensure that the accounts will pertain to the same piece of land from year to year. This is because the focal point in the collection of data for preparing these accounts is the cultivator rather than the farm. The same cultivators are expected to submit their accounts of cultivation year after year irrespective of whether they cultivate the same piece of land or not. These accounts could better be termed as 'Farmers' Accounts' rather than 'Farm Accounts'. If any farmer parts with a segment of his holding, the accounts will not at all consider the input-output data pertaining to that segment. The accounts consider only the individual on the list and his operation only on that part of the holding which he cultivates.

Thirdly, the method of recording these accounts makes them unreliable for any scientific study. Each farmer on the list is supplied with a set of schedules which he is
required to fill every day. He is given some allowance for filling up these schedules. Owing to the illiteracy and indifference of the farmers concerned, towards the necessity of the information, most of these schedules remain incomplete. The gaps are filled in on the occasion of the quarterly visits of some officials of the Statistical Organisation to these farmers. Thus the data given in the farm accounts may have many inaccuracies.

The available time series data thus were not reliable. We, therefore, turned to a comparative study of the resource allocation at two points of time for which reliable as well as comparable data were available. These time points are the years 1956-57 and 1969-70. These two years can be considered to represent two eras of agricultural development in this State; 1956-57 as the era of traditional agriculture, and 1969-70, as the era of progressive agriculture.

For the year 1956-57, we relied upon the data collected by the Economic and Statistical Organisation, Punjab (E.S.O.) on behalf of the Ministry of Food and Agriculture, Government of India. There was another source of data which could claim our attention for examining resource allocation during the fifties. This was the data collected by the Reserve Bank of India for its Rural Credit Survey. We, however, did not make use of this source of data as the data collected were not comprehensive from the point of view of the present study. Moreover, the follow up surveys conducted by the Reserve Bank of India were not confined to the same region as were covered by the main survey. A comparative study covering the same region, at two points of time was thus not possible.
of India, for the purpose of Farm Management studies! During this year, 200 farms in 20 villages spread over two adjoining districts of Ferozepur and Amritsar were thoroughly studied by the E.S.O. from the point of view of costs and output. These districts were selected to represent the most important and typical crop mix of the Punjab State. A day to day record of inputs used as well as output produced was maintained by the investigators belonging to the organisation. The Economic and Statistical Organisation, after selecting these two districts for investigation, divided each district into two more or less homogeneous regions, the homogeneity criteria being the soil fertility, irrigation facilities, farm practices and the crops produced. Then from each region, 5 villages were chosen at random with probability proportional to the cultivating population as given in the census hand-book for the Punjab. Ten holdings in each of the sample villages were then selected on the basis of systematic random sampling, from the list of cultivators arranged according to the size of their operational holding. For these holdings, input-output data were recorded by the investigators of the E.S.O.

In order to have an indepth study, we concentrated only on data for farms, lying in one of these four regions, namely Fazilka-Muktsar region in Ferozepur District. Our

1 It may also be pointed out here that although data were available for the years 1954-55 and 1955-56 also, these were not suitable for our studies. The data for 1954-55 was considered unreliable by the government itself because of lack of experience on the part of the investigating agency. The year 1955-56 was not a normal year due to excessive floods in the area under study.

2 Ministry of Food and Agriculture, Government of India 89, Intro...
sample for 1956-57 is thus a four stage sample. The first stage sampling unit was a district, the second stage sampling unit was the region of a district selected on a purposive basis. The third stage sampling unit was the village, selected at random with probability proportional to cultivating population. The fourth stage units are the farms, selected on the basis of systematic random sampling.

We selected the year 1969-70 as another reference point for comparative study. The study would have yielded best results if we could compare the performance of the same farmers, operating on the same farms at two points of time. This was, however, not feasible. Old farms, as they were investigated in 1956-57 were no longer there. The intervening land reforms, transfers of land and the process of consolidation of holdings had changed the structure of old farms. The farms in their original form were generally not traceable. Even if we could trace some of these farms, we would have not been able to study their input-output structure, by using the cost accounting method used by the E.S.O. investigators in 1956-57 due to the time constraint on us.

Since it was not possible to study the same farms, the next best was to select those farms which were similar to the old ones with regard to their basic characteristics, i.e. soil and climate. This required that the farms should
belong to the same agro-climatic region. The constraint that
the data for two time-points should be comparable, necessitated
that the basic methodology of collection and recording of the
data should be the same for the two years. Fortunately such
data were available. The Economic and Statistical
Organisation, Punjab had conducted farm management studies
for the whole of the Punjab for the year 1967-68, 1968-69
and 1969-70. This very agency had collected the data for
the fifty farms referred to above for the year 1956-57. For
the year 1969-70 the same agency had conducted another
enquiry entitled "Economics of Tractor cultivation and
High Yielding Varieties". Methodology used by E.S.O. for
collecting data for both these investigations in 1969-70
was broadly the same (cost accounting method) as was used
by it in 1956-57.

For the data for the Farm Management Studies for the
year 1969-70, a Patwar circle, instead of a village was
randomly selected in each of the 18 tehsils of the state
which were themselves selected according to stratified
random sample-method. A Patwar circle is a cluster of 2 to 4
contiguous villages. For the selection of holdings, a
consolidated list of operational holdings in the selected
Patwar circle was prepared. The holdings were then arranged
according to their operational areas and a cumulative total
of the areas was made. The distribution so formed was divided into five groups in such a way that each group accounted for approximately equal area. The size of the class interval thus determined on the basis of the equal area for each of the five groups, was then used for selecting 15 holdings (three from each group) from each of the selected Patwar circles. Data for farm management studies for 1969-70 were thus collected on the basis of three stage random sampling - the tehsil, the patwar circle, the holding being the sampling units at the 1st, 2nd and 3rd stage respectively.

In case of the data of "Economics of Tractor cultivation and Higher yielding varieties" a development block was the sampling unit at the first stage. Its selection was random and on the basis of probability proportional to the number of tractors in the various blocks. At the second stage, a list of gram sewak circles in the selected blocks with at least 10 tractors was prepared. One gram sewak circle was then selected at random in each block. A patwar circle with the maximum number of tractors in each of selected gram sewak circles was the third stage sampling unit. In the selected patwar circle, the farms were classified into 5 groups according to their size. Two non tractorised holdings were selected at random from each group. Two tractorised

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1 Economic and Statistical Organisation, Punjab 1978, p. 47.

2 The Punjab Agricultural University had also collected data for farm management studies for Ferozepur District for the year 1969-70, on similar lines. We, however, preferred to use the E.S.O. data on the ground that the data for the two periods were collected by the same agency, these would be better for a comparative study.
holdings were selected at random from each of the last three groups. Sixteen holdings were thus finally selected from each patwar circle for study. It was thus a method of four stage random sampling which was used for collecting the necessary data. A day to day recording of the inputs used and output produced was maintained for each farm as was done in case of the farm management studies.

Out of 18 patwar circles, covered by the Farm Management studies in 1969-70, only one, namely Channon (15 farms) fell in the Fazilka-Muktsar region. The sample for 'Tractor cultivation' study covered two patwar circles namely Rupana and Gobindgarh from this region (32 farms). We combined these farms covered by the two studies into one group. This would not violate the homogeneity criterion as the method adopted for collecting the data in the two studies was basically the same. We thus got input-output data for 47 farms in all.

The following table depicts the nature of random sample under investigation.

1 Economic and Statistical Organisation, Punjab 197, p.2.
<table>
<thead>
<tr>
<th></th>
<th>Year 1956-57</th>
<th>Year 1969-70</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Collecting Agency:</td>
<td><strong>E.S.O.</strong></td>
</tr>
<tr>
<td>2</td>
<td>Source of data</td>
<td>Farm Management Studies</td>
</tr>
<tr>
<td>3</td>
<td>No. of farms</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Region</td>
<td>Fazilka-Muktsar</td>
</tr>
<tr>
<td>5</td>
<td>Sampling units</td>
<td></td>
</tr>
<tr>
<td>1st stage</td>
<td>District</td>
<td>(a) Tehsil (b) Block</td>
</tr>
<tr>
<td>2nd stage</td>
<td>Village</td>
<td>(a) Patwar circle (b) Gram sewak circle</td>
</tr>
<tr>
<td>3rd stage</td>
<td>Farm (ultimate)</td>
<td>(a) Farm(ultimate) (b) Patwar circle</td>
</tr>
<tr>
<td>4th stage</td>
<td>-</td>
<td>(a) - (b) Farm(ultimate)</td>
</tr>
<tr>
<td>6</td>
<td>Method of Collection of Data</td>
<td>Cost Accounting</td>
</tr>
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</table>
A glance through the above table will provide sufficient grounds for feeling sure that the comparative study about the performance of agriculture in the region in the two years, if based on the data provided by the two samples, will yield reasonably reliable results.