CHAPTER VI

PROPOSED PLAN OF WORK

WORK TO BE DONE:

The proposed research work will take the maximum use of modern inputs as a determinant for agricultural development in upper Ganga-Yamuna doab in detail. This will be a comprehensive study taking into account the agricultural economy including production and productivity of the region in response to the modern inputs. However, a perusal of review of the work done by geographers on the role of modern inputs that increase the crop productivity will reveal that the problem has not taken up on scientific lines. Most of the studies are based on descriptive techniques and therefore, suffer from lack of precision. Further study would be accomplished in the following four stages.

1. Library work
2. Field work
3. Laboratory work
4. Writing of the thesis

The existing literature on the subject will be consulted. This requires the preparation of a detailed bibliography of the work done on the subject. The part has already been completed during the course of M.Phil study. Further study now material on the subject has to be consulted and incorporated in the Ph.D. thesis.
The present study is based on district level data to make an assessment of agricultural productivity in relation to modern inputs in upper Ganga-Yamuna doab. However the Ph.D. work would require a detailed field work collection. In this purpose the author has to visit to state and district headquarters. The field work will have to be undertaken in selected areas of region for an on-the-spot enquiry to ascertain the actual conditions related with the availability of all the required modern inputs with in time and also their impact on the agricultural productivity. On the basis of questionnaires data will be collected to study the impact of agricultural development in general on the socio-economic condition of the people.

The data obtained from the field work will be processed for the purpose of a detailed analysis of the modern inputs as a determinant for agricultural development. Besides processing and putting the data in the tabular form, a series of maps will also have to be prepared in order to have a better understanding of the regional variations in the use of modern inputs to avail maximum agricultural production.

On the basis of the studies made stages wise, it would be possible to analyse and interpret the relationship between the development of modern inputs and agricultural productivity. The thesis will be broadly divided into five part.
Part I. The study would include the analysis of the physico-ecological conditions of the upper gang-yamuna Doab, while effect directly the crop behavior and also cultural development of the region. In Part II the study will be based on the assessment of the importance of the modern inputs in the present period of new scientific and technological advancement in agriculture.

Part III will be deal because the agricultural development in the upper Ganga-Yamuna Doab would be determined in term of modern inputs and agricultural productivity. In the part IV the basic modern inputs such as irrigation, fertilizers, mechanary, High yielding varieties of seeds etc would be discussed. In this part the agricultural productivity in the region under study would be assessed in accordance with the increasing use of the modern inputs.

The conclusion would be drown in the last part (part V) where is a detailed inventory of modern implement would be discuss, which are infact responsible for the agricultural development. A critical qualitative and quantitative assessment of modern inputs and implements and their impact on agricultural development as a whole would be discussed.
METHODOLOGY

A number of techniques has been developed for the geographical study of the phenomena but the three techniques: correlation, multiple regression and principal component analysis may be applied to test and to analyse the hypothesis. Correlation techniques which may be helpful in the study of regional variations of the indicators of agricultural development are found here to exist in a complex integration of institutional and technological variables. Among these three techniques i.e. methods of calculating crop yield index of a farm, product momentum correlation and rank difference correlation are important.

In the present work method of calculating crop yield index of a farm has been used to determine crop index.

Product momentum correlation is expressed as:

\[ r = \frac{\sum_{i=1}^{n} x_i y_i}{\sqrt{\sum_{i=1}^{n} x_i^2 \cdot \sum_{i=1}^{n} y_i^2}} \]

The rank correlation coefficient (P) is obtained from the equation:

\[ P = 1 - \frac{6 \sum d^2}{n(n^2 - 1)} \]

Where 'd' refers to rank difference of the two variables and 'n' the number of observation. Both techniques may be tested
for significance with the of 't' distribution which may be
obtained from the following equations:

\[ t = \frac{r}{\sqrt{\frac{n-2}{1-r^2}}} \]

and

\[ t = \frac{1}{\sqrt{\frac{n-2}{1-r^2}}} \]

The second technique, i.e. multiple regression provides
the linear relationship between one variable and a number of
others. This may be expressed as:

\[ Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + \ldots \]

where \( Y, x_1, x_2, x_3 \) are the variables and 'a' is the constant
and \( b_1, b_2, b_3 \) are coefficients.

The third technique i.e. principal components analysis
is a measure of reducing the number of variables taken from
multivariate data. These sets of reduced variables may be
used to describe the variations as observed from the primary
data.

In brief, component analysis discovers as to how much
of the total variability exhibited by the primary variables
can be accounted for by a smaller number of new independent
variables of the principal components. The analysis involves
an orthogonal modern agriculture of a set of variables
\((x_1, x_2 \ldots \ldots x_m)\) into a new set \((y_1, y_2 \ldots \ldots y_m)\). The
modern agriculture may result in \((y_1, y_2, \ldots, y_m)\) being uncorrelated one with another, not withstanding the fact that the original variables \((x_1, x_2, \ldots, x_m)\) may have been quite highly intercorrelated.

There are as many components derived as there are variables, and the original total variance associated with \(x_1, x_2, \ldots, x_m\) is preserved exactly in the total variance of the components \(y_1, y_2, \ldots, y_m\). The solution, is such that \(y_1\) accounts for the highest proportion of the variance, \(y_2\) for second largest share, and so on, called as first principal component, second principal component and so on.

The first principal component is a linear combination of all the different variables taken as a meaningful indicator of the agricultural development of the region. The variance of this first principal component which will be maximum of all the variance of this component.