Introduction
INTRODUCTION

Agriculture is the science of cultivating the soil in order to grow the crops, dairy farming, poultry farming, piggeries and other allied activities, whereas development is a process of change aiming at socio-economic transformation of traditional society into modern one which is greatly influenced by human beings. Agriculture in India through its multifarious relationships has bearing on the industrial, urban, technological and social development. Agriculture was started near about 10,000 B.C. Present day agriculture in India, as in other countries representing ancient civilizations, has evolved itself through ages. The origin and development of agriculture witnessed a boom in agriculture and trade much before significant developments took place as a result of the application of modern scientific methods in agriculture. During the early periods, an increase in production of food and other agricultural commodities came about mainly by increasing the area under cultivation. There has been an awareness all over the world, especially since the last 200 years, that the land resources are not unlimited and that in the business farming too the law of diminishing returns operates as it does elsewhere. In spite of this despair looming large all over the world, it has been possible so far, to meet the needs of the increasing population although catastrophes have resulted on some occasions. Agriculture itself is a system composed of multiple components.

Agriculture has been the oldest as well as the dominant profession in our country. Historical records bear testimony to the fact that agriculture in India had a highest level of development quite early as compared to the levels achieved in many of the countries. The dependence of Indian Agriculture on empirical methods continued until the early part of this century.

Dr. J.A. Voelcker (1898), an eminent British chemist who made a detailed study and gave a report in which he observed that the “Indian ryot or cultivator is as good as and in some respects superior to the British farmer, while at his worst it can only be said that this state is brought about largely by an absence of facilities for improvement which is probably unequalled in any other country; and the ryot will struggle patiently and uncomplainingly in the face of difficulties in a way that no one else would. The native, though he may be slow in taking up an improvement, will not hesitate to adopt it if he is convinced that it constitutes a better plan and one to his advantages”.
A landmark development of agriculture in India occurred in 1926 when the Royal Commission on Agriculture was appointed to conduct a detailed enquiry and make recommendation for the development of agriculture in the country. The commission made valuable and significant recommendation but their implementation was not possible because of economic depression during 1930s and the Second World War thereafter.

A statement made in the report of the Royal Commission on Agriculture in 1929 is noteworthy. It said “our enquiry has convinced us that given the opportunity the cultivators of India will be found willing and able to apply in progressive degree the services of science and organisation to the business of agricultural production”.

Indian agriculture has witnessed significant changes since independence. Whereas the expansion of area was the main source of growth until mid-sixties, it is mainly the growth in productivity achieved as a result of introduction of new seed-fertilizer technology that has sustained the tempo of growth during the more recent period. As a consequence of the agricultural sector recording a trend rate of growth of output that is slightly higher than the growth of population, Indian’s dependence on imports of foodgrains has been reduced considerably since the mid-seventies. Nevertheless these developments, the fact remains that the rate of growth has remained far short of the needs of the economy and has been lower than the plan targets. Further, the pattern of agricultural development in India is characterised by several serious distortions. Firstly, because of unequal distribution of assured irrigation facilities and other infrastructure across regions, the spread of new seed-fertilizer technology has been quite uneven. This has led to increasing inter-regional disparity in the levels and growth of agricultural output in India. Secondly, the gains of development have not been shared equitably among various strata of peasantry due to iniquitous structure of land ownership. Due to these distortions, quite a large proportion of landless labourers and small and marginal farmers continue to live below the poverty line, more so in slow growing regions of the country.

Recognising that the overall performance of agriculture hides the fact that there could be large inter-regional variations in both the level and growth of agricultural output, the achievement of a balanced regional development of the economy has been high on the agenda of policy makers in India since the inception of
planning process in the country. Balanced regional growth was sought to be promoted, among others, through agricultural development programmes that were expected to spread over the entire area within the shortest possible time.

Agriculture constitutes an important activity of people to earn livelihood in Malda district of West Bengal. Agricultural breakthrough provides a base in the form of research and technological application in increasing the quantum of production and productivity per unit area and per person engaged in agriculture. Agricultural development should be evaluated or assessed by the agriculture production and productivity yield per hectare and also by the various inputs like extent of cultivated area, consumption of fertilizers, irrigation, high yielding variety of seeds, labour, degree of mechanization etc. Agricultural development may constitute as one of the very important and dynamic component of socio economic transformation. Because it provides increase of food surplus to the growing population helps to expand the secondary and tertiary sectors, which raises the rural income and purchasing power which transform the society and improve the welfare of the population of the region.

Land use is one of the vital aspects of development in agriculture fields, which is a multi-dimensional concept. Diffusion of agriculture innovation has a very strong bearing upon the agricultural efficiency and productivity in any region. Diffusion of agriculture innovation varies from one social system to another and also within the social system itself because of the way in which it is perceived is more important. Keeping this view in mind an attempt has been made to examine the level of agricultural development and its impact on socio-economic transformation in Malda district of West Bengal.

Statement of the Problem:

Development is an innovative process leading to the structural transformation of social system (Friedman, 1969). However, development is a state of mind, which emphasize on an individual to use national resource for the benefit of the society (Mishra, 1985). The motive of development is the context of regional development refers to a value positive concept, which aims at enhancing the level of the living of the people and general condition of human welfare in a region. The concept of diffusion of innovation forms an important aspect in geography, which is a model of time and space relationship. Not only geographers but also sociologists and
economists are also paying much attention towards diffusion studies because of its inter-disciplinary approach. Development implies not only expansion in qualitative terms but also structural change in the society. Structural changes include institutions, social and economic aspects. Development means change in a desired dimension and at a desired speed. The direction and rate of change will depend upon the goal and objective of development. Development involves policy interventions and includes socio-psychological transformations of human being to prepare them for eventual as well as current benefits. It involves temporal, sectoral and spatial planning as well as integrated planning. Diffusion of agricultural innovations varies from one social system to another and within the social system itself because of the way, in which it is perceived more important. It takes time for innovations to diffuse throughout a social system, because not all farmers in a community ever adopt an innovation just affect introduction. There is always variations among the members of a social system in the way they respond to an innovation i.e. idea or practice due to variation in nature and behaviour of different members within the society and any other societies.

The World population has been continuously increasing and according to UN estimates, by 2030 A.D. the population of world is likely to be about 8 billion. Increasing population naturally necessitates more food, more water and more power which are the three basic ingredients for smooth functioning of the metabolic system. Interestingly with the increase of global population, the population of poor people has also been witnessing a phenomenal growth. It is estimated that nearly 25 per cent of the World’s poor population live in the Indian sub continents.

There is, therefore, the need to enhance the agricultural development process in order to meet the challenges of increasing population. Agricultural development is much more comprehensive concept than generally understood. It is the manifestation of the combined effect of many factors viz; physical, environmental, institutional and technological. It also implies a process through which the real income of farmers is increased over a long period of time. Obviously, the term agricultural development refers to the growth and overall changes in agriculture resulting in vertical expansion. The level of agricultural development, therefore, may be considered as the degree to which agrarian structure gets strengthened leading thereby to increase production. There are various dimensions of agricultural development in which agricultural productivity is one of the most important dimension of agricultural development. The study area i.e. Malda district is very important geographical and administrative region
lies in north-central part of West Bengal, where about 70 per cent of the working population is directly or indirectly engaged in agriculture. Agriculture not only provides food to the people but also raw materials to numerous agro-based industries. In last three decades, agriculture has shifted from subsistence to commercial agriculture. Malda is one of the fertile regions of the state of West Bengal, but comparatively the yields of crops are below than the other districts of West Bengal. Developing agriculture and reducing gaps between regions with regard to the efficiency of the agricultural system can only achieve regional development in an overwhelmingly agricultural situation. Progress in agriculture releases resources, labour as well as capital for use in industry and services. Progress also leads to the modernization and social development and better living through education and generating tendency to consume other than agricultural goods. Findings of this research may help to design plans and formulate policies for the development of the area in general and reducing spatial inequalities at micro level in particular.

Therefore, there is considerable scope for the improvement of agricultural production and productivity per hectare and per agricultural worker, particularly for small and marginal farms, which will help to increase income levels and improve the quality of life of the people particularly in the rural areas. In this context, the agriculture and its all aspects should be explained with reference to Malda district.

**Objectives:**

The present study is intended to fulfil the following objectives:

1. To analyze the importance of physical setting of the region that facilitates the basic necessities for agricultural practices.
2. To analyze the land use pattern, cropping intensity and growth rate in area, production and yield of major crops in the study region.
3. To examine the spatial pattern of crop combination regions in the study area.
4. To assess the spread and diffusion of technological and institutional factors in the study area.
5. To measure the agricultural productivity in the study region.
6. To measure the level of agricultural development in the study region.
7. To identify the level of socio-economic transformation in the study area.
8. To assess the impact of agricultural development on socio-economic transformation of the study area.

**Research Hypotheses:**

- Agricultural development of the study region is directly related to agricultural technology.
- The farmers having adequate and assured irrigation are more adoptive of agricultural technology as compared to others.
- Socio-economic transformation is positively related to agricultural development.

**Research Design:**

The present work, which has been organized into seven chapters, is based on following steps:

- The reference material was collected from various Universities and the departmental library and reference cards were prepared for detailed study.
- Secondary data are collected from various departments of Government of West Bengal.
- Primary data are collected from field survey at village level.
- Classification and analysis of data.
- Preparation of maps, graphs, charts and diagrams through different cartographic and statistical techniques.
- Report Writing.

**Data Base:**

The present study is based on secondary as well as primary source of data. In the present study, the secondary data has been obtained from the published literature, government reports and district statistical bulletin and unpublished records of the public administration of government offices. The primary data has been obtained by conducting the field survey in some selected villages based on questions and personal interview.
Tools of Data Collection:

Both quantitative and qualitative methods were used in the data collection. The quantitative methodology used for socio-economic survey to collect data from 450 households over the 15 villages in the district. The qualitative methodology used to highlight ethnographic reports and case studies of the selected households. These methods are useful for identifying location specific pattern. The data also provided a qualitative explanation on the results of the household’s survey.

Methodology:

The following methods have been used for the study:

- Descriptive approach has been adopted to put down the account of physio-cultural account of Malda district.
- Gibbs-Martin index of crop diversification has been used to find out the different regions of crop diversification.
- J. C Weaver’s Least Square Method has been used to find out different crop combination regions.
- To process and analyse the data Z score and correlation techniques have been used. Standard Z Score represented by

\[ Z = \frac{X - \bar{X}}{\sigma} \]

Where,

- \( Z \) = Standard Score
- \( X \) = original value of the observation
- \( \bar{X} \) = Mean of all variable of \( X \)
- \( \sigma \) = Standard Deviation of \( X \)

- After standardized the variables, its score has been added together for each block and divided with number of variables considered which give the composite score of that blocks. The composite standard score is expressed as:

\[ \text{C.S.} = \frac{\sum Z_{ij}}{N} \]
Where:

\[ \text{C.S.} = \text{Composite Score}, \]
\[ N = \text{No of variables}, \]
\[ \Sigma Z_{ij} = \text{Z-score of all variables i in district j}. \]

- The indices of crop productivity have been calculated on the basis of Yang’s yield index method for two periods 2000-01 and 2010-11. To compute agricultural productivity the present study is based on Yang’s ‘Crop Yield Index’ method (1965) due to the fact that it considers the yield of all crops compared with the average yield of crops in the entire region. Initially it is needed to take the yields of all the crops considered in the district and compare them with the average yields of the same corps grown in the state, the average yield of each of crop cultivated in the entire region should be considered. Then, by dividing the yield per hectare of a crop in the district by the average yield of the same crop in the state, a percentage figure is obtained, which is multiplied by 100, gives an index number, as shown in column 5 of Table 1. By incorporating the area devoted to each crop as a weight to multiply this with the percentage index, the products are obtained as listed in column 6 of the table. By adding the products (of column 6) and dividing the sum of products by the total of crop area in the district (the sum of column 4).

<table>
<thead>
<tr>
<th>Name of Crops</th>
<th>Area of Crops in the Block in hectare</th>
<th>Yield in kg per hectare Average yield in the block</th>
<th>Average yield in the district</th>
<th>Crop yield in the distt.as % to the region ( \frac{5=\text{Col.3/Col.4x10}}{0} )</th>
<th>Percentage multiplied by area in hectare ( 6=\text{Col.5 x Col.2} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>6021</td>
<td>7665</td>
<td>3140</td>
<td>244.12</td>
<td>1469825.81</td>
</tr>
<tr>
<td>Wheat</td>
<td>7631</td>
<td>3909</td>
<td>3027</td>
<td>129.15</td>
<td>985556.13</td>
</tr>
<tr>
<td>Masur</td>
<td>428</td>
<td>1024</td>
<td>983</td>
<td>104.18</td>
<td>44589.07</td>
</tr>
<tr>
<td>Maskalai</td>
<td>1829</td>
<td>1571</td>
<td>917</td>
<td>171.36</td>
<td>313409.22</td>
</tr>
<tr>
<td>Khesari</td>
<td>257</td>
<td>1107</td>
<td>916</td>
<td>120.85</td>
<td>31058.28</td>
</tr>
<tr>
<td>Gram</td>
<td>716</td>
<td>1101</td>
<td>1096</td>
<td>100.42</td>
<td>71903.12</td>
</tr>
<tr>
<td>R &amp; M</td>
<td>3046</td>
<td>1030</td>
<td>1094</td>
<td>94.15</td>
<td>286780.62</td>
</tr>
<tr>
<td>Sesamum(Til)</td>
<td>52</td>
<td>600</td>
<td>360</td>
<td>166.67</td>
<td>8666.67</td>
</tr>
<tr>
<td>Potato</td>
<td>189</td>
<td>22309</td>
<td>28835</td>
<td>77.37</td>
<td>14622.29</td>
</tr>
<tr>
<td>Jute</td>
<td>1509</td>
<td>2194</td>
<td>2696.00</td>
<td>81.38</td>
<td>122802.15</td>
</tr>
<tr>
<td>Total</td>
<td>21678</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Computation of Crop Yield Index of Kaliachak-III Block = 3349213.36/21678 = 154.50

Source: Yang, W.M. (1965): Methods of Farm Management Investigation For Improving Farm Productivity, No. 80, F.A.O., Rome
Introduction

- For measuring agricultural development 22 variables were taken at block level. Composite Index was used to calculate agricultural development in Malda district.
- In addition to the above mentioned methods other methods like Karl Pearson’s coefficient of correlation (r) and Factor Analysis with the help of SPSS have been used.
- For conducting primary survey, the sampled derived for the study is based on purposive random sampling technique. For the quantification of socio-economic transformation 30 respondents were interviewed from each of 15 villages of the district i.e. one village from each block of the district. Therefore, total 450 respondents were surveyed. These villages have been selected on the basis of following criteria:
  i. The village should be, as far as possible, the representative of its own region especially with respect to the concentration of agricultural occupational structure because the focus in this study was on agricultural development and socio-economic transformation.
  ii. The village should be easily accessible by road.
  iii. The village should be inhabited by the different caste and religion.
  iv. The village should be having minimum 250 households.
- After completing field survey of selected villages, the processing of data was carried out, first of all entries of questionnaire was done.
- Moreover, Arc View 3.2 software has been used for digitization of relevant maps and diagrams and necessary analysis are being carried out to acquire meaningful results. The other important steps like cartographic works in preparing maps, diagrams, graphs, charts, report writing, data processing and analysis, have been carried out through computer operations.

Study Area:

For the present study Malda district of West Bengal has been taken which lies between latitudinal and longitudinal figures of $24^\circ 40'20''$ N to $25^\circ 32'08''$ N and $87^\circ 45'50''$ E to $88^\circ 28'10''$E respectively and surrounded by Bangladesh and Dakhsin Dinajpur in East, Santhal Parganas of State of Jharkhand in West, Uttar Dinajpur in North and Murshidabad in South. The district of Malda has total area of 3733 sq.km
Introduction

(Census 2011) and the total population of Malda district is 39, 88,845 (Census 2011). For administrative purpose the district has been divided into fifteen Blocks. Three broad sub-regions can be defined physiographically within Malda district on the basis of nature of topography and soil, i.e. Tal, Barind and Diara. Tal region consists of 6 community development blocks namely, Harishchandrapur-I, Harishchandrapur-II, Chanchal-I, Chanchal-II, Ratua-I and Ratua-II whereas Barind region comprises the blocks of Old Malda, Gazole, Bamongola and Habibpur. The southern part of the district consists of 5 community development blocks namely, English Bazar, Manikchak, Kaliachak-I, Kaliachak-II and Kaliachak-III is known as Diara region.

Organization of Research Work:

The present study “Level of Agricultural development and its impact on Socio-Economic Transformation – A case study of Malda district (W.B)” has been organized into seven chapters these are as follows:

- **Chapter first** deals with the various physio-cultural setting of the study area which includes locational extent, relief and topography, soil characteristics, drainage system, climate, natural vegetation, population growth and density, literacy, sex-ratio and transportation system of the study area.
- **Chapter second** focuses on conceptual framework and literature review
- **Chapter third** deals with the dynamics of agriculture
- **Chapter fourth** describes the spatial distribution of technological and institutional factors
- **Chapter five** is devoted to measurement of agricultural productivity
- **Chapter six** focuses on the level of agricultural development
- **Chapter seven** is devoted to socio-economic transformation - a micro level analysis
- At last researcher has incorporated conclusion and suggestions regarding the development of agriculture in Malda district.
References:
Census of India, 2011
Comprehensive District Agricultural Programme, Malda, West Bengal
Datt, R. and Sundharam, K.P. (2009), Indian Economy, S. Chand and Company Ltd., New Delhi
District Statistical Handbook of Malda
Malda District Gazetteer
Sengupta, S. (2008), Indian Agriculture, ABD Publishers, Jaipur