Chapter- II

Conceptual Framework and Literature Review
2.1. Conceptual Framework:

Agriculture has features that make it a unique instrument for development. Agriculture can work in concert with other sectors to produce faster growth, reduce poverty, and sustain the environment. Agriculture can be the lead sector for overall growth in the agriculture-based countries. Agriculture in India through its multifarious relationships has bearing on the industrial, urban, technological and social development. Agriculture is said to have its root in the innovations that took place about 10,000 years ago. Present day agriculture in India, as in other countries representing ancient civilizations, has evolved itself through ages. The ancient countries witnessed a boom in agriculture and trade much before significant developments took place as a result of the application of modern scientific principles in agriculture. During the early periods, increased production of food and other agricultural commodities came about mainly by increasing the area under cultivation. There has been 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 for centuries. 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.

Indian agriculture has witnessed significant changes since independence. Whereas the expansion of area was the main source of growth until the 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 since 2001-2011. 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. Notwithstanding 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 characterized 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.

Recognizing 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 West Bengal as well as in Malda district. 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 and also by the various inputs like extent of cultivated area, consumption of fertilizers, high yielding variety of seeds, labour, degree of mechanization etc. Agricultural development may constitute as one of the very important and dynamic components 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 regional area. 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.

**Agricultural Development:**

The concept of agricultural development is unquestionably a multi-dimensional concept. Agricultural development is much more a comprehensive concept than generally it is understood. It is the manifestation of the combined effect of many factors like physical, environmental, technological and institutional. It also implies a process through which the real income of the farmers is increased over a long period. Obviously, the term agricultural development refers to the growth and overall changes of agricultural development. Agricultural development implies an optimal use of land sources through applying a higher degree of modern inputs. The development of agriculture should be such as to result in the provision of balance and adequate diet to the entire population of the country. It is not enough to provide adequate supply of food to the people but it is also necessary that agriculture should provide sufficient raw materials to a large number of agro-based industries. Agricultural development denotes the quality of agricultural systems of regions in terms of productivity, diversification and commercialization.

A scientific investigation and evaluation of different aspects of development both over space and through time is highly necessary in order to have a clear picture of the nature of agricultural growth and development. Keeping these facts in view the Malda district of West Bengal has been selected as the study region, which exhibits spatial disparity in the level of agricultural development. The agricultural development of the district is lagging behind as compared to some other districts of the State. Constantly the pressure of farming community over the arable land, insufficient irrigation facilities, lack of mechanization etc. are some of problems of agricultural development in the district. In spite of such draw backs, there occurs some spectacular changes in agricultural sector of the district like participation of unemployed youths in plantation and commercial agriculture, introduction of new crops, extension of agricultural activities to wet lands and reverine tracts etc. and so
on. Nevertheless development of agriculture achieved so far is not evenly distributed over space and through time, rather there is marked spatio-temporal variation in agricultural development of the district. Considering the different innovative practices in agriculture and variations in agricultural development, the present study has been undertaken in order to examine the spatial and temporal variations in agricultural development and the causes related to it. This study is likely to help in proper agricultural planning for the future socio-economic development in the district.

### 2.2. Review of Literature:

Review of literature furnishes the spectrum of information on the nature of research work already done by other scholars on the related theme and on the research area. A review of geographical literature reveals that in India very few attempts have been made to define agricultural development and to select criteria of development in light of any conceptual framework.

**A. Chatterjee and P. Maitrya (1964)** concluded that the variation in agricultural productivity in the two extremely heterogeneous regions of West Bengal was dependent on the closeness with the industrial area.

**V.M. Dandekar (1964)** attributes the prevalence of tenancy conditions and continuous pressure of population on land as the two main factors inhibiting the pace of development of agriculture in West Bengal.

**D. Radhakrishnan (1964)** concludes with the remarks that regional productivity in agriculture is largely governed by the nature of soil of the region and that productivity differs considerably from soil to soil and soil on the nature of amounts of inputs.

**Bina Roy and T. Maitra (1964)** on the basis of the study on regional variation remarks that the yield per acre of principal crop during the decade 1950-51 to 1959-60 have not change by significant extent.

**Jain (1966)** also concluded that mechanization is highly responsible for raising the agricultural productivity.

**B.D. Shukla (1967)** in his paper which covers 234 farms of various size group in Jaunpur District of U.P. concludes that the net income per acre increase with the increase in size of farms while female labour income and farm business income is
highest on the smallest farms projecting almost the reverse trend because of the relative higher contribution of family labour to total labour on farms in lowest ranges. The study also reveals that the input-output ratio exhibits an increasing trend with the increasing in the size of farms.

Raza (1968) suggested that the output of food per head can be raised out by increasing the yield or productivity per acre. This can be achieved through carrying out necessary land reforms. He pointed out that there are strong reason to support the view that there has been some causal link between the land reform and agricultural productivity.

According to Pal (1968) the irrigation alone cannot increase the required agricultural production; it is the other inputs also used with adequate water supply which can increase the agricultural production.

The immediate outcome of green revolution was in the form of increased agricultural production, but in the view of Arshad (1986) it has failed to make any appreciable differences in the overall rate of agricultural growth. According to him, the introduction of HYV of seeds along with new technology and fertilizers alone cannot balance agricultural production. An all-round production and growth in all crops in all regions is the only solution.

Tara Shukla (1969) pointed out certain problems of growth of traditional agriculture, stages of increasing agricultural production, spread of new technology and bases of technological research.

In view of Kanwar (1969) for maximum output from land, it is required to bring more land under irrigation, fertilizers, high yielding varieties of seeds and better organic technology.

Mathur (1969) has revealed in relation to pests’ studies that the use of high yielding varieties of seeds and seed treatment with organomercury compound is an important step towards the control of a number of seed born diseases.

R.N. Tiwari (1970) attempts to study the relationship between the agricultural development and pressure of population on it. The problem of agriculture has been explicitly examined in the light of internationally accepted norms. The objective of the study was to analyse the trend pattern and sufficiency of agricultural development vis-a-vis population growth from the year 1951 to 1961 in the regional frame work
and he observes that unless agriculture is not activated and its rate of growth does not surpass the growth of population the per capita income would not be increased sufficiently. The study does not accept the prevailing pattern of planning which lays stress on schemes rather than on regions in the state.

**Sharma (1971)** pointed out that agricultural development should be assessed not only by the levels of productivity or trends in agricultural production but also with reference to various physical inputs like irrigation, fertilizers, improved seeds extent of cultivated area.

**M. Shafi (1972)** has given a formula both to determine the productivity of a particular crop with reference to yield per hectare and the area of that crop in the districts in relation to the national level.

**G.P. Mishra (1972)** accepting the importance of technology in the field of agriculture concludes with some debatable findings. According to him the introduction of new technology has accentuated not only the problem of inter respect of income but also in respect of employment and production. The study recommends a policy that would not only accelerate the agricultural growth on one hand but also be able to control prices, wages, taxes and credit on the other. In other words the policy measures of the government should be coherently reformulated.

**R.P. Singh and K.N. Rai (1973)** in their paper attempted to study the impact of rainfall new farm technology and prices on the acreage allocation and agricultural production region (Haryana). The study brings out certain important findings and according to it the rainfall had no significant response to acreage on rice, bajra and wheat. Agriculture was gradually picking up at the cost of traditional cultivation. According to the study the optimum balanced cropping pattern could only be achieved if we take into account the lower and upper limits of prices for all crops having technological break-through.

**M.V. Nadkarni (1973)** studies the role played by the agricultural prices in the process of economic development. The variation in price levels has been explained with the help of regression analysis. The study also recommends implication of policy measures in clear terms.

**Ajit K. Dasgupta (1973)** attempted to study the pattern of growth of employment and output in Indian agriculture vis-à-vis the aggregate growth of
employment and output in the economy. The study which covers a period of fifteen years from 1955-56 to 1970-71 brings out certain important facts and according to it the rate of growth of per capita income in India could certainly be arrested by increasing the productivity of labour in non-farm sector. The prevailing trend in agricultural sector could certainly be reversed by ensuring technological improvements.

Alam (1974) using data for individual tehsil in his study of disparities in development in the Andhra Pradesh employed six indicators for agricultural sector. Two of these related to productivity (agricultural output per agricultural worker per acre) and four to factors in agricultural development (percentage of gross irrigated, canal irrigated and double cropped area).

D. Singh and R.I. Singh (1974) observed that the main reason for the inequality in the field of agriculture in Uttar Pradesh has been unequal utilization of modern inputs. These differences according to the study hamper the pace of development and encourage differences in income and poverty at regional levels.

C.H. Hanumantha Rao (1975) observed that the output of food grain increased at the rate of 2.5 per cent per annum during the decade 1960-61 to 1970-71 against 3.3 per cent recorded during the previous decade of 1949-50 to 1959-60 to 1970-71 was about 2.7 per cent. Similarly, cropped area recorded an increase of 2.1 per cent during the decade 1949-50 to 1959-60.

H. Singh and O.P. Gurani (1975) concludes that there has been a conspicuous in the marginal and average rate of savings over the last decade on both the traditional and modern types of farm technology, according to the analysis, also in raising the capabilities.

Sharma (1976) has suggested that the development of agriculture should be assessed not only by productivity levels but also with reference to input such as fertilizers improved, high yielding varieties of seeds and irrigation.

V.S. Vyas (1977) on the basis of N.S.S data concludes that when agricultural growth was satisfactory the problem of poverty had mitigated. On the other hand, studies on rural poverty indicate that in 1960’s when agricultural production was sharply fluctuating no significant dent was made on the problem of rural poverty.
**P.K. Banerjee (1977)** discusses various issues concerning the economy of small farmers in India, especially their credit problems. The study which is empirical in nature has been duly supported by the theoretical analysis. The empirical portion presents a critical appraisal of Indian economy whereas the theoretical or model part provides new measures for calculating the exact government to plan credit policies in respect of small farmers.

**S.P. Tiwari (1979)** while accepting the importance of balanced growth, aims at studying the disparity in agro-economic structures in different regions on the basis of identified indicators; thereby provide suitable measures for rapid agricultural development. According to the analysis, agricultural production could still be pushed up through the judicious selection of crops and effective irrigation network.

**M.S. Bhatia (1979)** while accepting the importance of resource structures or input-mix in the agricultural sector in determining the growth and agricultural output attempts to study the changes in the input-mix over the time. The study which provides basis for future policy decisions for modernization of agriculture, observes that agricultural output can be further pushed up through increasing use of fertilizers and irrigation particularly in states where the use of modern input has remained relatively low.

**Ali Mohammad (1979)** pointed out that the stages of development of agriculture can be measured by two factors of labours and land productivity. It is well accepted that the higher stage of development of agriculture, the greater is the land and labour productivity. Since agricultural development depends on agro-technological determinants like irrigation, fertilizers, high yielding varieties of seeds and agricultural mechanization, it together form a developed kind of agricultural landscape and provide a frame of parameter to measure the level of agricultural development of a region. For agricultural development, the process and diffusion of agricultural innovations must be accelerated and the new farm technology should be made available to the cultivators, so that they understand it easily. A speedy and extensive change could only be brought about technological change and adaptation of innovation and by formulating labour intensive oriented scheme in various sectors.

**C. Mukherjee and A. Vaidyanathan (1980)** in their analysis attempt to study the impact of various inputs on the productivity or per unit yield of cereals. The study reveals that the level of uncertainty in yield reduces as the level of input in agriculture rises.
Nilkantha Rath (1980) examines the performance of agricultural production in India. The analysis shows that agricultural production had undergone a tremendous change during last two and half decades. The study helps in identifying the factors responsible for growth and permits a board judgement about the overall production possibilities in near future.

Singh (1980), while studying agricultural development of Gujarat, has selected 20 variables for two reference points (1960-61 and 1970-71) and categorized them into four types of resources inputs, viz., the land resource input, water resource input and capital resource input. Applying factor analysis technique, he found that agricultural development experience of Gujarat revealed five salient structural characteristics. Two of these are technology variants-traditional and modern; and the other three institutional variants- agrarian structures, land-use pattern and primary sector predominance.

F.S. Bagi (1981) attempts to study the economic contribution of irrigation to crop production in Haryana. The study which includes 119 individual farms for the year 1969-70 concludes that technical efficiency is higher in the irrigated farms. Irrigation sufficiency improves the allocative efficiency of all variable input and the irrigated farms utilise these variables in large quantities.

Noor Mohammad (1981) has emphasized that the use of modern technology for bringing about a change in agricultural output. He pointed out that the technological factors such as fertilizers, High Yielding Varieties of seeds, pesticides and new farm implements are capable of increasing the agricultural productivity.

D. Singh, V.K. Singh and R.K Singh (1981) in their study, based on a sample as 100 farmers selected randomly who use new farm technology from the village of Sikara Block of Jaunpur district of U.P. attempt to study the changes in the level of use of inputs in the selected crops. Analyse the extent of labour use and employment of male-female labour in different agricultural operations under selected crop technologies and analyse the effect of holdings on labour absorptions. The analysis concludes with the remarks that technologies need to be perfected and made remunerative so that more labour employment opportunities can be generated. Spatial attempts for employment of farm-women also need to be made.
According to M. Shafi (1981), the optimum use of land for production depends on to a large extent on the level of technology and the system of farming. In his opinion there are two ways for increasing food production – (i) increasing the area under cultivation and (ii) increasing the output per head. He also points out that one of the major hinderence in the optimal use of land lies in the land tenure system.

M. Shafi (1984), in his study examined the agricultural productivity with special reference to farm powers, human labour, draught animals and machines. It is established that draught animals, which constitute the backbone of Indian agriculture, supply half the energy in Indian agriculture. The distribution of power availability is also not same throughout country.

According to Singh (1984), increasing the agricultural production is a must and their protection from pests is as important as use of irrigation, high yielding varieties of seeds and fertilizers. He has suggested that the farmers need to be educated about judicious use of fertilizers otherwise boon can turn into bane.

S.K. Sharma and C.K. Jain (1985) in their study analyses the changes in agricultural productivity in Madhya Pradesh with its diversified socio-economic and physical conditions. They used least square regression to analyze the trend while relationship is presented with the help of coefficient of correlation. Trend analysis is based on area, production and yield figure of six major crops. Wide regional disparity in the growth of output of crop has been observed. Attempt has also been made to present spatial as well as temporal variation in yield rates of major crops along with the analysis of their impact on growth of production.

The policies of increasing the fertilizers use as suggested by Desai (1986) should be based upon a strategy which aims both rapidly converting the untrapped potential in to actual use of and continuously raising the economic potential of fertilizer through upward shift in response function.

According to Khare (1987) due to certain inbuilt constraints of a backward area development in certain part could not be spread to the rest of the area. The agricultural development could be co-ordinated with dispersal process through a chain of agro based industries and it is through such a decentralized strategy that one can achieve the balance regional development in the country.
Vasant (1987) suggests that efficient management of developed water resources and supply and application of all other inputs needed for irrigated agriculture can produce sufficient food grains for the over increasing population of India.

Sharma J.L. (1990) examined the inter-state disparities in agricultural growth in India. The main objectives of this study are: to examine the inter-state disparities in agricultural growth and to identify the factors responsible for these disparities. The data for the study was obtained from Statistical Abstract of India, covering the period 1966-67 to 1987-88. The main conclusions of this study are that, size of holding is the basic factor affecting the structure of agriculture and there exists vast disparities across states in India. The States with higher agricultural growth rates having relatively higher average size of holding except Uttar Pradesh, Punjab and Haryana states, the center of agricultural growth in India, have the highest proportion of cultivated area under irrigation.

Thomas and Devi (1990) have done a study in Kerala concludes that the climatic condition in the state as well as farmer’s high expectations towards future prices for the crops have resulted in the increasing trend in acreage of these crops despite the fact there was no significant shift in cropping pattern.

Chaudhury and Aneja (1991) have concluded that the green revolution successes have led to breakthrough in food grains production in Haryana. But the unscientific use of modern technology has resulted in a number of problems. Over exploitation of land and water resources led to deterioration of soil health, created nutritional imbalances and distributed the natural hydrology, particularly in intensively irrigated areas.

Krishna (1992) pointed out in his paper that agricultural development, in true sense, denotes the quality of agricultural system of a region in terms of productivity, diversification and commercialization consistent with desired state of agrarian relation and ecological balance.

Thakur (1992) pointed out that after independence, particularly during the last two decades, there are considerable changes in all most all the parameters of agriculture in India, due to the variation in physical and socio-economic conditions, these changes in agriculture are not uniform all over the country either spatially or temporally.
According to M.R. Khurana (1992) the difference in the levels of agricultural development in a particular districts are largely in terms of differences in irrigation facilities, rural electrification, use of chemical fertilizers, adaptation of high yielding varieties of seeds and so on.

Jha (1994) conducted study on growth and instability in agriculture in post green revolution period. His study proved that the decline in instability in crops, viz., paddy and wheat was brought about with increased area under irrigation over the years. He concluded that with new technology, instability in agricultural income reduced with adequate irrigation facilities and consistent price policy.

S.D. Sawant and C.V. Achuthan (1995) measured growth rates in agriculture across crops and regions in India for the period 1968-69 to 1992-92. They distinguished two sub-periods, viz., (i) 1968-69 to 1981-82 and (ii) 1981-82 to 1991-92. From this they came to the conclusion that there must be an upsurge, a significant one, in the growth of aggregate production and productivity in Indian agriculture and it cannot be attributed merely to a favourable weather. The fact that the role played by yield improvement in inducing higher output growth has been far more important than that of expansion in area indicates that the process of growth has been technologically more dynamic too.

Bhalla and Singh (1997) have done a study on recent developments in Indian agriculture (a state level analysis). It reveals that there was a marked acceleration in the growth rate of agricultural output in India during 1980-83 to 1992-95 as compared to that in the earlier periods and that agricultural growth had become regionally much more diversified.

Gangwar (1997) pointed out that since, the mid 1960’s there have been rapid increase in agricultural production in India as a result of diffusion of package of improved cultural practices involving high yielding varieties of seeds, use of fertilizers, irrigation, application of pesticides and farm mechanization.

C.B. Singh and A.S. Sirohi (1997) in their paper on comparative study of the productivity of crops for the periods of post and pre-green revolution remark that the difference in productivity in most of the crops was found to be statistically significant. The study recommends the expansion of irrigational network in order to eliminate regional disparity in food grains.
Swaminathan (1999) concluded that before the mid 1960’s, increase in foodgrain output in the country was attributed mostly to the growth of the cultivated area and the extension of irrigation, since, then, the new farming system symbolized by high yielding varieties of seeds, use of agro-chemical and mechanization had the powerful impact on the food sector of the country.

Pochanna, K (2000) in his study observed a positive relation between yield growth and instability in Punjab, Haryana, Andhra Pradesh, Karnataka, Orissa and West Bengal. He concluded that the use of fertilizers and extension of irrigation are important factors not only to yield growth but also to reduce the fluctuations and ensure stability in the yield growth.

Singh J. and Dhillon (2000) stated that agriculture modernization implies technological as well as organization improvement. Therefore modernization is a process where there are increasing modern inputs in farming and maximizing yield levels. This shows a variation over space through time.

Majid Husain (2002) stated that “Green Revolution” is a term coined to describe the emergence and diffusion of new seed of cereals. The new cereals were the product of research work and concentrated plant breeding with the objective of creating high yielding varieties of rice, like -8 (miracle rice), at the International rice research Institute, Philippines in the 1960s. The increase in yield from the new seed has been spectacular. In some cases the yield of HYV is more than double the yield of traditional varieties.

Modern agriculture is highly dependent on irrigation. Even the use of HYV and fertilizers are directly related with the extent of irrigation. It raises the crop productivity even without the use of HYV’s. (Sharma, S.K. 2003)

Suresh Phule and Abhijeet Bodade (2003) stated that Marathwada with western Maharashtra in the sense of agricultural development it is supposed to be very low developed due to lack of irrigational facilities. The farmers are choosing the verity of crop combination in their fields.

Singh J. (2005) used the approach to determine the levels of mechanization of India. The approach to determine the levels of mechanization of India Along with the modern technology which should be utilized in agriculture the market and transport facilities and connectivity is sufficient in the tehsil.
Bhalla, G.S. (2007) in his book “Indian Agriculture since Independence” examines the relative performance of Indian agriculture both during the plan period and post-reform period as well as the role of agriculture in the development of Indian economy. He also underlines the various causes of deceleration of agriculture in the post-reform period and makes policy suggestions for regeneration of Indian agriculture.

Chand et al (2007) listed main factors that are responsible for slow growth of Indian agriculture. They are of the opinion that a) decline in the area under cultivation which seems to be a result of expanding urbanization and industrialization, b) deteriorating the terms of trade for agriculture, c) stagnant crop intensity, d) poor progress of irrigation and fertilizer, e) decline in supply of electricity to agriculture and finally slowdown in diversification.

P. V. Patil, Arun B. Patil and C.U. Mane (2008) explained that the agricultural has always occupied an important place in Indian economy. Per person the proportion of cultivable land has been decreased considerably during the recent past. The increase in crop production is a must in India Since the areal spread of crop land has almost reached to its saturation limit. Agricultural productivity is a measure of overall performance of a region which is useful in planning the developmental programmes in rural areas.

Bruinsma (2009) pointed out that food supplies have to be geared to meet the challenges of increasing global population, changes in income, and the resultant changes in diet.

Dharam Das Vishwakarma (2009) - He mentioned that, the agricultural development in a country like India is crucial to its economy both for output its and to meet the basic needs of the people and for the employment and income it provides to the bulk of her work force. In spite of the diminishing of share of GDP from agriculture over the decades, the economy has whole continues to vitally hing on agriculture.

Nizamuddin Khan, Md. A. H. Rahaman and Nooruzzaman (2009) observed that, the present study revealed that the spatial distribution of variables and agricultural development is not any form in the study region. It provides very significant information about the level of agricultural development in Murshidabad district. The study also highlights the impact of locational and spatial input for the agricultural development planning of Murshidabad district.
Rajkumar Moharker and Dr. J.P. Jagtap (2009) - They said that, the farmers are growing numerous crops in the field rather than single crops. Crops are generally grown in combination in any region and these crops have its relative position in terms of crop combination. The distributional pattern of crops in any region is an outcome of predominance of certain crops. This is in term of emergence of typical crop combination.

According to (Rathod et.al, 2009) agricultural production is influenced by physical, socio-economic, technological and organization factor, an endeavour is made her to study the crop combination region in yavatmal district the crop data has been computed with the help of Doi’s methods of crop combination. The study region covers 13582 sq.km (4.4%) of the state and a population of the 2077144 (2.63%) of the state in 1991 census Yavatmal district.

Darku, Malla and Tran (2010) suggested that agricultural productivity is the key driver for the well-being of the farmers, the agro based industry and mankind at large. It is linked to food security, prices and poverty alleviation in the developing countries.

Subrata Kumar Ray (2010) in his book “Agricultural Growth in India” examine the development of agriculture of India which is characterized by the process of crop diversification or changes in cropping pattern over time. The change has been associated with the increasing transformation of agriculture from subsistence to commercial farming.

Utpaljoyti Sharma and Manshi Chakravarty (2010) write that the agricultural is considered one of the major contributing sectors to the economy not only of rural areas but also of whole country. The livelihoods of majority of rural communities manly rely on agricultural to meet their subsistence needs. The farmers of our country are always producing huge quantities of various crops, yet our agricultural production is not still secured for alarmingly increasing population. Agricultural production system depends on climatic factors of locality. The unpredicted climate changes directly affect the environment and more resources the change in the climate particularly the rise in global temperature and change in rainfall pattern.
Kannan, E. and Sundaram, S. (2011) in their paper entitled “Analysis of Trends in India’s Agricultural Growth” discusses the trends and patterns in agricultural growth at the national and sub-national level in India. There is a marked shift from the cultivation of food grains to commercial crops. Among food grains, the area under coarse cereals declined by 13.3 per cent between 1970-71 and 2007-08. Similarly, the performance of pulses in terms of area and output was not impressive during the study period. The use of technological inventions in the cultivation of other crops was also not so conspicuous in pulses. Nevertheless, the increase in crop yield has been a major factor for accelerating production in the country since the late 1960s. The use of modern varieties, irrigation and fertilizers were important factors that ensured higher growth in crop production. However, technological and institutional support for a few crops like rice and wheat brought significant changes in crop area and output composition in some regions. The results of crop output growth model indicate that the enhanced capital formation, better irrigation facilities, normal rainfall and improved fertilizer consumption helped to improve crop output in the country.

R. Malini (2011): According to R. Malini, the agricultural development is an index of our country’s progress because it is the largest sector and the lifeline of Indian economy. The development of all other sectors depends upon the development of agricultural sector because it provides food, raw material and employment opportunity of two-thirds of the population. But agricultural in India has always been a risky business in comparison to the industrial sector. As a result, the Indian farmer is not able to make the maximum use of his time, labor and productive capacity of his land due to risks, such as inconsistent monsoon, low level of productivity, technological backwardness and inadequate financial facilities. The most important problem that requires immediate attention is the perils present in the agriculture field. The agriculturist cannot carry on his business without facing the perils in the agricultural activity. Especially, they cannot bear all the losses that arise due to the perils involved in agricultural activity. The loss may be heavy or of recurring nature. Hence farmers should depend upon bank or other insurance corporation to share their loss. In this phenomenon, availability of agriculture insurance at reasonable terms might be the right strategy for speedy agricultural development and improvement of the standard of farmers.
Along with the modern technology which should be utilized in agriculture the market and transport facilities plays also vital role in the development of agriculture. The supply of electricity and connectivity to each settlement through road networking is sufficient in the Tehsil, but the facilities regarding agro services center, agricultural market and cold storages are inadequate in study area (Gatade, 2012).

N.N. Firake and et.al (2012) revealed that the drip irrigation scheduled daily at 0.60 per cent evaporation and the soluble fertilizers applied weekly at 80 per cent of recommended dose to Gerbera under polyhouse conditions resulted into maximum benefit: cost ratio of 1.59 over other treatments under study.

Sunil Kumar and et.al (2012), found that long term effect of organic materials. Along with fertilizers increased the soil organic carbon, saturated hydraulic conductivity, available N.P.K. grain and straw yield of wheat and decreased the soil bulk density, soluble salt, concentration and PH. long term integrated nutrient management by applying organic manures and inorganic fertilizers has potential for improving the soil physical and chemical fertility status for increasing the crop yield for sustainable agriculture.

According to Dr. Ratnadeep Bane and Prof. H. N. Kamble (2012), Modern age is the age of advancement in several fields of human activity. Modern agricultural implements are relatively better than the farmer ones in respect of comparative high returns from the given file. The scientific methodology in spite of its increased inputs has the effects of increased output giving desired margin of profit to the farmers. HYV’s of cotton could have been a sole reason for its extinction from the “kanam” (cotton) region of Gujarat.

Hement Pednekar and prof. B.B. Rahane (2012) mentioned that, the agricultural practices and topology are best represented by crops in any regions. The principle crops tended to concentrate according to their requirement of physical environment. In this study an attempt has been made to analysis the agricultural land use pattern at micro level in Thane district. This study is based on secondary data collected from village revenue records.

S. H. Siddiqui and et. al (2014) shows the concentration pattern of eight major crops in Malda district of West Bengal. It is found that the degree of crop concentration varies from one part to another in the district. The spatial variation in
the degree of crop concentration area is found to be the result of different interactions such as physiographic, socio-economic and technological factors and farmers’ personal decisions.

S. H. Siddiqui and et. al (2015) studied the impact of social disparities on agricultural development in West Bengal by calculating composite Z score of 24 variables (12 for social disparities and 12 agricultural development). The study reveals that the districts which are lying in the central part of the region give an impression of being in a higher side of the scale of development. The north-central districts show backwardness in the light of all variables.

S. H. Siddiqui and et. al (2016) studied the pattern of crop diversification in West Bengal by using Gibbs-Martin’s index of crop diversification. The study reveals that crop diversification has taken place largely in favour of boro rice, potato, sugarcane, jute and oilseeds. The diversification seems to have taken place in favour of high value crops which provide higher relative return to the cultivators.

S. H. Siddiqui and et. al (2016) calculated agricultural productivity by using Yang’s Crop Yield index method for the year 2010-11. The study revealed that the high level agricultural productivity found in the south-central part of the study region because of assured irrigation, fertile soil, high consumption of fertilizer and better use if agricultural technology.

N. Aktar (2016) studied the role of technological factors on the development of agriculture in West Bengal. He highlighted that those districts have high level of technological also have high level of agricultural development and vice-versa. He also pointed out that the central and south-central parts of the region are agriculturally more developed than other parts of the state.
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