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1.0 Introduction:-

India is basically an agricultural oriented country the role of agriculture is very vast as it is the most important enterprise in Indian economy. Agriculture is a very broad term encompassing all aspects of crop production, livestock farming, fisheries and forestry. Performance of agriculture plays a major role in the progress of the economy. It helps in achieving the developmental goals of eradication of poverty and modernization of society. Agriculture sector is the back bone of the country’s developmental and life line for 70 percent of the population is still dependent on agriculture for their live. Agriculture provides food to the millions of people and raw material to our industries. The development of agriculture seems to hold the key progress to our economy as a whole.

Agriculture has no single and simple origin it was started in different periods. Present day agriculture in India as elsewhere has evolved itself through the ages. The agriculture in India has long been carried out in a traditional manner, hardly using the modern techniques in the developed parts. However during the last three decades special attention has been paid to modernize the agriculture with adoption of different technologies, since the mid-sixties, great change has taken place in agricultural technology. These changes have been designated by the term “green revolution”.
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The term green revolution refers to the renovation of agricultural practices beginning in Mexico in the 1940s. The beginning of the green revolution are often attributed to Norman Borlaug, an American scientist interested in Mexico and developed new disease resistance high yield varieties of wheat. Due to the success of the green revolution in Mexico, its technologies spread worldwide in the 1950 and 1960 in order to continue using green revolution technologies to produce more food for a growing population worldwide. The scholars of various disciplines have attempted to define agricultural technology. The term new or modern technology as “forms of new form inputs practices and services, such as HYV of crops, chemical fertilizers insecticides, herbicides, irrigation, improved form machines and equipment etc.” Modern technology in agriculture comprises the use of HYV’s intensive use of improved implements, more appropriate use of inorganic fertilizers, mechanization and greater use of irrigation facilities. Agro–technical progress is the one that increase the agricultural productivity of both qualitative and quantitative in the same proportion.

The technological change in agriculture means the application of modern technical know-how to the different phases of production. The basic components of new innovation in the field of agriculture may be considered mechanization or wide use of farm machinery tools and implements, improving soil and making it most fit for cultivation, soil conservation, new varieties of seeds, chemical fertilizers, irrigation, pest control and other several methods of raising yield and net returns per hectar. The technological changes result in raising the degree of efficiency and self sufficiency in agriculture and at the same time in the commercialization of agriculture with both high yield per hectar and high productivity per man. In this way technological changes have
tremendous possibilities for solving the current atrophy in agriculture situation (R. K. Lekhi, 1984).

In fact, it is not the entire list of various technologies, which occur in agriculture during the process of agricultural development. Moreover, in the present study the changes that occur in the channels of marketing of agriculture produce and changes that occurred in the processing of agricultural produce have not been considered.

Agricultural technology has a long history. Its process of development was initiated as a long history. In the pre-industrial world, agricultural technology evolved itself through several phases. In the most primitive cultivation, in was connected with a digging stick, which is further followed by fallow system in the later stage. Moreover, pre-industrial civilization was connected with the plough.

Generation of agricultural surplus was the main driving force behind human civilization. At present, agricultural technology requires external impulses from the industrial sector in getting supplies of technological inputs on the one hand and the demand from the sector for agricultural products, on the other.

India is the only country in the world with all types of soils and climatic conditions suitable for growing variety of crop. Therefore various cropping patterns are found in the technical factors are changeable in nature availability of new agricultural input such as high yielding varieties of hybrid seeds, agricultural implements, machinery, chemical fertilizers, pesticides, irrigation technique etc. have brought about changes in the cropping pattern. It is true that there should be change in agriculture for its progress and development. Agricultural production depends on the advanced technology. Consequently, farmers are encouraged to bring more land under high value crops.
order to maximize the output, the farmers have used various modern inputs. The use high yielding varieties of seeds for example is resulted into substantial increase in the level of output

Generally, the agricultural technology consists of different techniques, methods, devices, innovations improved implements, other inputs used by farmers in using these technologies is to enhance agricultural production.

From mid-sixties a great change has taken place in agricultural technology in India. The new agricultural technology consists of bio-chemical and mechanical innovations. As a part of bio-chemical technology, there has been increase in adoption of high yielding varieties for five major cereal crops like wheat, Rice, Maize, Jowar and Bajra etc. and use of chemical fertilizer and pesticides. Further as the part of mechanical technology modern machineries like tractors, harvesters, electric pumps, plant protection equipment etc. have been expanding on an increasing scale.

The physical environment like physiography, Climate, Soil and Water imposes limits on the growth and distribution of plants and animals. The role of man in the cultivation of certain crops in a region is also quite important with the advantage of green agriculture sector. Man by his technological advancement, can ameliorate the physical limits. The cultivation of rice in Punjab, Haryana and Rajasthan testifies this fact, irrigated areas of Punjab and Haryana received benefits of such technology. There was gradual diffusion of agricultural technology in other states of the country. After 1960, in Maharashtra favorable policies of the state Government strengthened co-operative sector, this encouraged the establishment of sugar industry in later period. These agro-industries played important role in the process of diffusion of new technology in agriculture to
obtain maximum yields per unit area. Similarly, the farmers become conversant with these technologies as they intended to increase their production. By this time the proportion of literacy, among the farmers was also increased due to which they learnt modern technology in agriculture. The supply of improved implements, High yielding varieties of seeds, fertilizer and Pesticides were made available by co-operative sectors. Besides more irrigation projects were completed and extension of rural electrification stimulated lift irrigation and fertile flood plains of rivers observed drastic change in crop land use. The financial assistance to farmers to purchase different inputs was made by co-operative banks. Consequently the fruits of these efforts were seen after mid-seventies largely in the state.

The study area covers basins of the river Bhima and its tributaries. Introduction of agricultural technology was initiated in these river basins. The farmers of the study area are aware about the agricultural technology and try to maximize their production. However, there is regional disparity in the distribution of agriculture technology in the region. Geographical investigation of agricultural technology in the present work deals with the spatio-temporal variation, growth trends of different technologies of agriculture adopted by farmers. Because of agricultural geographer’s main concern is with regional variation in the distribution of agricultural entities and the causes of variations(Jasbirsingh,1994).The impact of these technologies on agricultural productivity is also attempted. For this present work, primary data were generated through the field work from the selected sample studies. Map are used for explain spatial aspects of different agricultural phenomena effectively. The study of regional variations
between the regions, distinctions’ in their technology level and understanding of the
dynamics of agricultural development process in the light of these realities.

The geographical investigation of agricultural technology in Indapur Tahasil of Pune
District is undertaken here for following reasons-

1) Apart from the development aspects, the ignorance and negligence on the part of
farmers, towards the use of new technology in agriculture, have given rise to
some problems due to which the production level is adversely affected.
Geographical investigation of such negative impacts on agriculture is necessary in
the present context.

2) The agricultural sector has witnessed drastic changes during the last some years.
The use of agricultural technology has brought about considerable changes in
cropland use along with the upward trend in production level of various crops.
The task of geographer is to examine and analyses these changes which is
attempted in the present work.

3) Recently, the farmers have become alert about new innovations to introduce in
agriculture. Such changing attitude of farmers has led to increase the rate of
adoption of new technology by which agricultural landscape has been favorably
influenced. The role of agricultural geographers is also to assess the impact of
technology on agriculture.

4) Due to the increasing the population, vertical extension of agriculture is inevitable
as horizontal extent has already been ceased in the region. The concern of
agricultural geographer is with the study of the levels of agricultural technology
and its relationship with the levels of agricultural performance. This kind of
approach would be helpful to adopt proper strategy in agricultural planning and development.

1.1 Selection of the Study area:-

The researcher has selected Indapur Tahasil of Pune district for geographical investigation. This selection is based on following consideration-

1) Investigator belongs to Indapur Tahasil hence is familiar with study region.
2) The region has been characterized by the adoption of new technology in agriculture transforming the agricultural landscape.
3) The study region has emerged out recently as one of the progressive agriculture area in Pune District as well as Maharashtra.
4) The region has semi-arid zone area because of rain shadow effect of the Western Ghats. Therefore the region presents heterogeneous characteristics in environmental conditions reflecting in the regional variations in agriculture.
5) There is greater awareness among the farmers mainly of irrigated tracts to modernize the agriculture for maximizing agricultural produce.
6) There is deep rooting impact of technology by which the farmers have adopted new cultivation patterns.
7) The development of Horticulture is an example of modern agriculture leading to increase in farm productivity on limited land resources.
8) It is observed that small and medium sized holding have shifted their cropping pattern from food crops to cash crops with application of new technology.
9) Based on the experience different kinds of technologies have been innovated by the farmers themselves to face adverse conditions.
10) The role of co-operative movements has played vital role in changing the agricultural landscape.
11) Even in the dry areas the efforts are being made by the farmers to use the modern technology to enhance agricultural production of horticultural crops.
12) Development of agro based industries specially sugar factories, industries grow up and provide financial assistance to the farmer of the study area.
13) Significant increase in area under cash crops with increase in facilities of irrigation and modern implements. This creates the adoption of modern agro technology in the region.

14) The study of agricultural technology of the present area has not been attempted by the geographers so far.

All these considerations have motivated the researcher to undertake a geographical inquiry of Indapur Tahasil of district Pune focusing the attention on agricultural modernization resulted from agricultural technology.

1.2 Study Area:-

The Indapur Tahasil is one of the Tahasil in Pune district of Maharashtra state. (Fig.1.1). The Tahasil is located between 18°07’ to 18°12’ North latitude and 75°02’ to 75°3’ East longitude occupying 1478 Km² area of South-eastern Pune District. The Tahasil comprises of eight revenue circles viz. Indapur, Loni Deokar, Bhigwan, NimgaonKetki, Kati, Bawda, Anthurne and Sansar. The Indapur Tahasil is surrounded by Back water of Ujani dam in North side, Daund Tahasil on the North west; Bhima river basin and Madha Tahasil of Solapur district is on east side, South side is demarcated by Nira river basin Malshiras Tahasil of Solapur and Phaltan Tahasil of Satara district. The region is drained by Bhima on North and East side, Back water of Ujani dam in North east side and the Nira River in South side. The study region manifest that the region has typical monsoon climate with three marked seasons. The annual rainfall is 450 to 550 mm. in the study region. The medium black and deep black soil appears within study region.

The population of the study region has 424029 and the density of population is 287 persons per Sq. Km. which varies regionally. (2011 Census)

1.3 Objectives:-

The present work incorporates the following objectives –

1) To study and analyze the spatio-temporal changes in technological components of agriculture and in what volume these changes have taken place.
2) To assess the positive and negative impacts of different technologies on agriculture in the region.

Fig-1.1
3) To highlight the regional variations in agricultural development.

4) To examine and analyze the role of modern and sophisticated technologies to the form of Greenhouse and cold storage technology in the region.

5) To assess the regional imbalances in the level of agricultural performance and levels of agriculture technology.

1.4 Data Base And Methodology:-

The present research work following methods are used during research work-

The present research work is based on primary and secondary sources of data. The primary data is collected through, intensive field work with the help of schedules, interviews and discussions with the farmers, other relevant persons and authorities. The secondary data collected through Tahasil office, circle office, sugar factories of study area, RTO office etc.

Revenue Block or circle is considered as a real unit of the present work. Wherever the data is not available at block level regarding crop wise per hectar fertilizer consumption, crop wise productivity, operation wise and season wise tractor use, crop wise HYV’s etc. The author has generated the same through sampling techniques. The region comprises 144 villages out of which 14 villages are selected (10 percent) roughly from each revenue block, with the help of stratified random sampling technique.

Schedules are prepared to collect data and information regarding agricultural technology lick irrigation HYV’s of seeds, improved implements, fertilizer and pesticide consumption etc.

The period of present investigation is considered from 2001 to 2011. Though the adoption of agricultural technology in India started from mid-sixties onwards. The collected data from different sources were processed and represented by employing different statistical and quantitative techniques lick intensity, composite index,
Quotient and impact analysis have been made wherever necessary. The details regarding the various methods and techniques have been discussed at appropriate place in the text.

The stratified random sampling method (10 per cent sampling) is adopted for the selection of the villages besides this, to make the study precise and meaningful, the investigator carried out micro level analysis and undertook case studies and sample studies in the region. Thus micro level studies were undertaken to substantiate generalizations in the text. The investigator has also attempted frequent discussions with the farmers and relevant authorities.

This method too, proved the best in strengthening and confirming the collected information. The composite index is used for the levels of mechanization of agriculture. Jasbir Singh method of weight composite level of Agricultural Performance has been employed.

Cartographic techniques have been used for presentation of the data. Some of the distributional maps have also been prepared using appropriate cartographic techniques available in the GIS packing. The analysis and integration of multivariate and multi data may be carried out and presented using GIS technique. The vector based GIS technique like Gram ++, has been used for the same. The village boundary map is used to understand micro level spatial variation within the Tahasil. The contour map has also been prepared with the help of raster image of topo sheets. All the results are presented in the form of graphs, tables and maps etc.

1.5 Limitations Of The Study:-

There are some limitations noticed while collecting data. Some of the major limitations are as follow:

1) Illiterate farmers are not maintained their expenditure record.
2) More privies data are not available at microlevel i.e. - at Talathi office because Talathi officers are exchange every three to four years. So privies rescored are not maintained properly.
3) The researcher in such a situation is restricted his enquiry only to the objective of his study.

1.6 Literature:-

Agriculture is one of the important activities of the region under study. Therefore some experts in different disciplines have already selected the theme of agricultural technology and related things in their research topic for M.phil as well as Ph.D degree.

Dhillon S.S. (2005) carried out a valuable work on agricultural geography. They have tried to assess the levels of mechanization in India and also worked on critical review of green revolution. Desai D.K. (1966) worked out the technological change and its diffusion in agriculture. Bhalla G.S. (1974) deals with the transformation of technology and agricultural development in India.


According to Chakravarti A.K. (1973) the high yielding variety program is the key element in starting in green revolution and the successful adoption of the high yielding seeds depends on judicious combination and use of chemical fertilizers, the application of pesticides and adequate supply of irrigation water. 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.

Pawar C.T. (1981) attempted the impact of irrigation in upper Krishna basin in Maharashtra. S. Shrinivasulu and N. Nagabhushanam (1998), attempted to assess the ground water resources of two villages in Chittoor District in Andrapradesh. Raj V.T. (1982), has defined the term new or modern technology as “forms of new farm inputs, practices and services, such as HYV of crops, chemical fertilizers, insecticide4s, herbicides, irrigation, improved farm machines and equipments etc.” Jugle V.B. (1987)
has explained that agro-technical progress is the one that increases the agricultural productivity of both qualitative and quantitative in the same proportion.

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 Tahasil.

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, lick -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.Schluter M. (1971) deals with differential rates of adoption of the new seed verities in India.

HangaragiS.S. (2011) concluded that cropping pattern of the district has not changed significantly in spite of population growth. In the present scenario needs to strengthen the irrigation facilities, soil and moisture conservation, adoption of bio-technology, a forestation, changing in the cropping pattern, agronomic practices, livestock development, rural communications, development of medium, small and marginal farmers and agricultural laborers and setting up agro-based industries. The dry land development program, sericulture and small scale industries at village level should be setup through the various programs of agricultural development.

Suresh Phule and AbhijeetBodade (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.

According to (D.K.Majumdar, 2004), water is the basic need of plants for metabolic and production processes within. A crop is grown in different land situations, soil types, climatic conditions, seasons and water supply situations. Besides, crops differ in their structures and habits. Their water requirements thus vary widely. Various methods are adapted to irrigate crops and the main aim is to store water in the effective
root zone. Uniformly in maximum quantity possible ensuring water losses to the minimum. Different methods are classified by majumdar. These are surface irrigation, subsurface or sub irrigation, overhead or sprinkler irrigation, drip irrigation.

The impact of irrigation may be visualized from the angle of transformation in agriculture. The productivity of land is induced in modern subsector and cropping intensity also rises whereas productivity remains low in the traditional subsector and cropping intensity remain quite low in the traditional subsector and cropping intensity remains quite low. Increase in land productivity depends on the intensity of machination. The intensity of machination can be defined as quantum of application of modern inputs such as seeds (HYV), chemical fertilizers, pesticides, pumps and tractors per unit area. The optimum application of these inputs may vary from region to region in India (Neel Mani P. Verma, 1993).

SeshagiriRao (1986) also works on the comparative study on New Agricultural Technology in wet and upland Village in west Godavari District-Andhrapradesh. He stated that the new agricultural technology spearheaded by high yielding varieties in 1966 received a favorable and positive response from the farmers in crop production activities in west Godavari District after 1970-71, there was a marked increase in the paddy production in this district, because of increase in the area under paddy in certain pockets. He observed that, the area of paddy steadily increased from 5.40 lack acres in 1969-70 to 6.82 lack acres in 1978-79, i.e. 26.25 percent increase during the decade. The area under high yielding paddy increased from a nominal 11.6 percent of total area under paddy in 1969-70 to 71.7 percent in 1978-79. He also tries to identify the constrains and to farmers in relation to the adoption of recommended agricultural practices in the wet and upland village of west Godavari District, Andhrapradesh. He also concluded that the relationship between most of the economic factors and adoption of New Agricultural technology were positive, with some exceptions, size of holding was an important factor in the adoption behavior of the farmers. Farmers wining more than 7.5 acres reveled sufficiently higher rate of adoption as compared with the smaller farmers who own less than 2.5 acres.

Nagaraj R. (1983) studied the determinants of fertilizer use in Indian agriculture. Horst M (1977) discussed the negative impact of fertilizer application on crop yield and

Dr. Padmaja Saxsena worked on “The Impact of fertilizer subsidy on Indian agriculture” She concluded that the fertilizer consumption increased sharply in most part of country after 1983, on account of stable fertilizer prices till 1991: He stated that the increased fertilizer consumption led to increase in yielding levels the answer is in the affirmative. Wheat and paddy yield which absorb a major proportion of total NPK. Consumption in the country show maximum improvements and therefore improvement in production levels. The long term fertilizer experiment (1971 to 1989) discussed in their work. The growing importance of adequate and balanced NPK use to get the maximum crop yield. In India, the NPK dosage is not only highly inadequate in most part of the country. It is also skewed in favor of Nitrogen (N). This is the reason for the existing large gap between actual and potential yields levels, even in irrigated areas using Hyv seeds. Time series data on crop wise NPK levels is not available, but input surveys conducted once in five years record NPK consumption pattern on farm size group wise and crop wise basis. The 1986-87 input survey data reveal that approximate 50-60 percent of the actually recommended doses of N: P: K were used on most crop by a majority of farmers in each state. The NPK consumption levels were close too and even higher than the recommended dosage in irrigated areas of agriculturally developed states mainly in case of wheat and rice crops.

Datye V.S work on the “Spatial Analysis of Agricultural Land use in Poona District”. He concluded that in the hilly tracts and dry areas farmers are by and large conservative in their attitudes towards adoption of new techniques. He also stated that the input output structures of the crops grown in different parts of the district bring out the importance of irrigation, the size of holding and the economic strength of farmers. The inputs for the crops grown with irrigation are two times that for the same crops grown in drier parts. The inputs in case of vegetables and fruits are comparatively higher. For these crops the fertilizers and manures account for about 25 to 33 percent of total input and irrigation charges vary between 5 to 20 percent of total inputs.
Singh J. (1972 and 1984) has devised a new technique for measurements of agricultural efficiency in Haryana further Singh (1990) calculate the agricultural performance of India. The selected indicators approach has been use by Dutt and SenGupata (1969) for assessing the agricultural development of the west Bengal. Further Singh J (1994) use the approach to determined the level of mechanization of India.

The literature on agricultural technology is available to some extent. There are few geographical investigations on agricultural technology. Moreover, the geographers have not paid attention to study the agricultural technology. The present work is, therefore, undertaken by the author to understand the regional variations of agricultural technology.

1.7 Organization of Research work:-

The present research work entitled “Changing Agricultural Technology in IndapurTahasil of Pune district Maharashtra: A geographical Analysis” has been divided into Ten chapters, each distinctively highlighting various points having bearing on the different aspect of the study.

The opening introductory chapter is devoted to the discussion of agriculture and agricultural technology. In this chapter, problem, objectives, data base and methodology explained.

The second chapter deals with the review of literature. The third chapter deals with the profile of the study region. The chapter focusing attention mainly on historical background of region mainly on Historical background of region, Location, site and situation, physiographic and demographic profile of the region.

The fourth chapter deals with the irrigation technology, spatial distribution of irrigation, intensity of irrigation, crop economy and impact of irrigation; case study for impact analysis have been undertaken at micro level. The new methods of irrigation technology also studied.
The fifth chapter presents a discussion on farm implements technology consisting of spatial distributional pattern and changing the nature of various improved implements. The level of mechanization has also been attempted in this chapter.

The sixth chapter deals with the seed technology consisting the distributional channel of seeds, spatial distributional channel of seeds, spatial distributional pattern of different varieties of selected crops and impact of HYVs of seeds on agricultural productivity.

The chapter seventh describes the fertilizer and pesticides technology, for the impact analysis of fertilizer on agricultural production, sample studies have been attempted at micro-level. The distributional channels of fertilizer are also discussed.

The chapter eight deals with the greenhouse Technology and cold storage technology. The study has consisting the spatial distribution of greenhouses and comparative analysis of crop, in greenhouse and outside on mulching paper. The chapter also deals with the study of cold storage technology.

The chapter ninth describes the levels of agricultural technology, levels of agricultural performance and levels of agricultural development. The relationship between agricultural technology and agricultural performance is also discussed.

The Last Chapter deals with the conclusions and suggestions.
References


Government of India – District Census Hand Book, Pune.


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