Chapter X - Conclusion And Suggestion

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The forgoing analysis is an attempt to examine the changing agricultural technology in its spatio-temporal perspective and its impact on agricultural productivity in Indapur Tahasil. The objectives are three fold, namely to observe the physical and demographic elements that have happened changing agricultural technology of the study area to analyze the imbalance in the changing agricultural technology and their effects on agricultural performance and agricultural development. Present chapter commerce’s the conclusions drawn from the analysis made in the earlier chapters. The researcher has arrived at the conclusion from the analysis based on primary as well as secondary data and information called through fieldwork shedual and personal interviews of relevant persons.

The Indapur Tahasil is one of the agriculturally progressive Tahasil of Pune district in Maharashtra is characterized by the variation in physical factors. The Nira and Bhima Rivers and back water of Ujani dam is main water sources of Indapur Tahasil.

Climatically the conditions of temperature and rainfall reliable the region has the grate monsoon climate with three marked seasons. Monsoon influences every aspects of human life. Annual rain is concentrated in the month of June to September and those are more than 80 percent. The average rainfall is 450 mm. to 550 mm. which is lower than the district average and the variation in rainfall across different centers within the Indapur Tahasil. Arability of temperature and sunshine are favorable throughout the year for ripening conditions of crop within the Tahasil.

The different varieties of soils are found in the Tahasil. Light brown shallow soil found in some part of west and North west part, deep black soil are in river flood plains and medium deep black soil are in the rest of the region.
The demographic aspects are also responsible to some extent in influencing the agricultural technology. The Tahasil constitutes one of the densely populated parts of the district. The regional distribution of population is variable. The density of population is 287 persons per Sq. Km. The economic activity of the Tahasil is primarily dependent on agriculture which is supported by the fact that the cultivator and agricultural laborers together constituting 26.77 percent to the total main workers.

Indapur Tahasil has given evidence to increasing use of numerous supplied to boost up agricultural production. These inputs are the important constituent part of green revolution. The present investigation deals with these technological components of agriculture because their basic purpose is to enhance agricultural production. The last decade has shown increasing use of technology in the region to bring about the suitable agricultural productivity. The present research work includes geographical investigation of technologies like irrigation. Farm Implements, Fertilizer, Pesticides, High yielding varieties of seeds, Greenhouses and Cold Storage Technology.

Irrigation technology occurs to be the stimulated factors for the development of agriculture upon which the degree of using other technologies depends largely. The Tahasil has different sources of irrigation. The lift irrigation is a typical form of irrigation technology is mainly confined along the Bhima and Nira rivers and Back water of Ujani dam. Out of the total irrigated area lift irrigation accounts for 27.55 per cent. Rural electrification, heavy electricity subsidies and institutional financing for pump sets and constructions of K.T. weirs on rivers have played an important role in promoting the development of lift irrigation. The micro level studies of lift irrigation indicate that there are positive and negative impacts on cropping pattern and crop productivity. The positive impacts on cropping pattern and negative impacts on agricultural productivity have leading to the development of saline land and water logged area. Presently, the Tahasil has 6617.44 hectare of saline affected land. National Agricultural Development plan (Rashtriya Krushivikasoyjana) tried to increase the soil productivity of saline soil by use the ‘sub-surface drainage system.
The analysis of well irrigation reveals that it is mainly confined to the central-north and western part of the Tahasil. Its accounts for 38.08 percent of the total irrigated area of the region. The last 10 years have witnessed the positive change (2.55 percent) in the well irrigation. The crop wise, village wise and sources wise analysis clearly indicates that the lift irrigation technology has shown high output than the well and hence the farmers receive more benefits.

It is observed that the canal irrigation has received significant importance in the Tahasil. Canal irrigation accounts for about 31.51 per cent of total irrigated area in the region.

The study of tanks reveals that, the dominance of tank is observed in the dry zone. More than 13 tanks is observed in Northwest, central and central south part of the Tahasil. However, its distribution varies from Revenue circle to Revenue circle. A micro level study of tanks reveals that there is an increasing no. of wells, level of water table, causing change in cropping pattern; the irrigated crops have replaced the traditional crops.

The irrigation methods used in the region differ largely according to the terrain, soil types and climatic conditions. Mostly surface irrigation methods are in practice which includes flood, boarder, furrow, corrugation irrigation. The surface and over head irrigation i.e. drip and sprinkler irrigation methods are the recent technique adopted by farmers in sugarcane and horticultural areas largely. They have little significance in the region.

The study of drip irrigation reveals that the Revenue circles Bawda, NimgaonKetki, Kati and Anthurne have recorded high and moderate area underdrip. The crop wise economy of drip irrigation shows that there is an increase of quality and quantity of crops. Pomegranate and grapevine cultivation is largely depending on drip irrigation and its example showing large intensity in the use of various modern technologies of agriculture. Recently many Horticulturists in central part of the region have devised water storage technology. The transport water is stored in artificially
constructed tanks nearby fruits garden and then supplied by pumps through drip irrigation system during scarcity season. Such technology requires heavy capital, therefore a few rich farmers could adopt these technology small pits have been prepared near fruits garden mostly in grapes garden to store water by which the problems of evaporation is minimized.

In the study region, farmers are used different types of improved implements for the agricultural practices. They are broadly classified under two categories such as power operated and tractor operated implements. However, the study region can be divided into three distinctive zones according to the density of these implements. However, the study region can be divided into three distinctive zones according to the density of these implements per 1000 hectares of cultivated land. The irrigated parts of the region i.e. along the rivers of Nira and Bhima and Back water of Ujani dam have attained sound position in the spatial distribution and temporal increase of modern implements. Moderate and low density and slow change of such implements in the central West, Northwest and central North parts of the Tahasil, due to backwardness of agriculture resulting from physical and socioeconomic constrains.

The study of the growth of tractorisation reveals that the number of tractors has been accelerated from 283 in 2001 to 3970 in 2011. Such this tremendous growth in the number of tractors is due to substantial development of agro-based industries and positive role of co-operatives regarding financial assistance to farmers. Almost all the Revenue circles have recorded upward trends in the growth of tractors. It is also noted that the use of tractor is largely restricted to Rabi season due to uncertainty of rainfall. The study also reveals that there is also favorable impact of tractorisation on the yields of crops.

The analysis of levels of mechanization reveals that there are different levels of mechanization and they are broadly grouped under three categories. Moreover, innovative nature of farmers, awareness among the farmers to adopt new technology, the development of irrigation facilities, role of co-operatives society have all made greater impact on the levels of mechanization. The last ten years have witnessed remarkable
change in the adoption of farm-implements technology especially in emerging horticultural belt of pomegranate and grapevine cultivation of the Tahasil.

If an increasing the agricultural production the requirements of the basic input like seeds. The discussion on channel of distribution of seeds reveals that, there are about 179 agencies to distribute the seeds to the farmers and out of that, there are about 179 agencies to distribute the seeds to the farmers and out of that 162 are private followed by 13 agencies are co-operative and 4 seeds centers of agricultural department.

The spatial pattern of different varieties of selected crops viz. Jowar, Wheat, Maize, Sugarcane, Grapevine, Pomegranate and Banana presents regional imbalances. The farmers prefer the varieties of respective crops which are suitable to existing local environment. The study also reveals to the impact of seed technology on agricultural productivity reveals the fact that High yielding varieties of different crops have led to increase yields per unit of area. Both irrigated and unirrigated crops have shown increase in agricultural productivity as compared with traditional varieties.

In an agricultural production addition of plant nutrients, in the form of fertilizers, constitute is a one of the essential step. It is observed that there is considerable growth in the consumption of fertilizer and there are regional variations in the consumption of fertilizer. High consumption of fertilizers i.e. above 115 Kg. per hectare is observed in Sansar, LoniDeokar, and Indapur and Bhigwan Revenue circles. These Revenue circles have been characterized by perennial water for irrigation black fertile soil, dominance of sugarcane cultivation Location of sugar factories. As a result these Revenue circles possess as high level of fertilizer consumption. The low level of fertilizer consumption i.e. below 75 Kg. per hectare is observed in NimgaonKetki Revenue circle. The lack of irrigation facilities, poor financial conditions of subsistence farmers and too much dependence of agriculture on monsoon rainfall have restricted large scale application of fertilizer consumption.

A micro level study of positive impact of Fertilizer reveals that there has been considerable increase in the yield of crops per unit area by applying proper proportion of
fertilizers which may eliminate deficiency of nutrients. In the case of sugarcane cultivation, there are miss concepts about the use of the fertilizer among the farmers. The high doses of fertilizers, irrespective of standard requirement of sugarcane have led to gradual decline in the crop productivity such study at micro level indicates that there has been considerable decrease in the yields.

The bio- fertilizers have been least used at the practical level in IndapurTahasil. Partly due to lack of awareness among, the farmers has to use bio-fertilizers. In general, it is observed that, the prices of fertilizers have been increased every year.

The study of channel distribution of fertilizer reveals that, there are about 334 fertilizer agencies in the Tahasil. Out of them 310 are private and 24 are co-operative agencies. The distribution of these agencies in the region is uneven. The high number of agencies (above 40) is located in the Revenue circles of Indapur, Sansar, Bawda and Anthurne which is known for dominance of sugarcane and Horticultural cultivation require more fertilizer.

The role of pesticides is most significant among various agro chemicals in the sense that these act as protective umbrella for other inputs. It is observed that there are some regional variations in the consumption of pesticides. The high consumption is observed in Indapur, Sansar, and Anthurne which require more proportion of pesticides.

Recently IndapurTahasil is an emerging part of the district of Pune in state of Maharashtra. In IndapurTahasil 9 green house are recorded from 2001 to 2011, large amount of capital investment has become major constraint to common farmers to adopt this technology. The last ten years (2001-2011) have witnessed the growth in the number of greenhouse from 1 to 9 respectively. The regional pattern shows uneven distribution of greenhouses. More concentration of greenhouses are observed in Anthurne Revenue circle. Anthurne Revenue circle is progressive part due to its extensive grape cultivation and innovative nature of farmers. There are no any greenhouses are observed in Bhigwan, LoniDeokar, Kati, Bawda and Sansar Revenue circles due to the farmers are unknown about such technology and more interest regarding sugarcane cultivation.
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The analysis of crop economy gives an idea regarding the net returns received to farmers from the given a real unit. Further comparative analysis of the net returns of the same crops viz. chilly (capsicum) both from greenhouse and outside on mulching paper is an important indicator for understanding the important role played by improved technology. The net returns of greenhouse owner are nearly two to three times more than the farmers practicing on mulching field farming of the same crop from given unit. Thus in the forgoing analysis greenhouse technology of farming that can be proved to be beneficial. If correct information and proper scientific knowledge is given to farmers the region offers good expectation regarding by greenhouse technology.

Recently introduction of cold storage technology is an important step of modern agriculture of IndapurTahasil. Cold storage technology requires heavy capital outlay individual cannot afford such venture. There is only one cold storage in IndapurTahasil. Maharashtra State Agricultural and marketing Board established such technology in IndapurTahasil for storing Banana and pomegranate. It is established in 9th Dec 2007 with average capacity of 100 MT. The name of such technology in IndapurTahasil is Fruits and vegetables export Facility center

The IndapurTahasil has emerged out recently as pomegranate and Banana growing zone at the present situation pomegranate and Banana is exported in Europe and Iran country respectively by this cold storage center of IndapurTahasil.

The study of level of agricultural technology reveals that the high and moderate level of agricultural technology is having high and moderate intensity of irrigation, substantial income from sugarcane and grapevine farming with forward looking attitude of farmers. Low technology are confined where the less intensity of irrigation, poor economic condition of farmers, less amount of rainfall, rigid topography etc. are observed.

The discussion of the levels of agricultural performance reveals that the high level of agricultural performance i.e. above 120 per cent are confined in Indapur, Sansar and Anthurne Revenue circles having assured supply of water, dominance of sugarcane,
grapevine and pomegranate cultivation. The moderate changes i.e. 60 to 120 percentages is observed in Bhigwan, NimgaonKetki, Kati and Bawda Revenue circles due to endowed with the relative development of irrigation, role of agro based industries, expansion of pomegranate cultivation, awareness about the new farm technology has leads to the observed moderate technology. Low level of performance i.e. below 60 percent is observed in Lonideokar Revenue circle due to poor reliability of rainfall seasonal nature of wells, inadequate water supply, undulating topography, moderate level of technology leads to be low level of performances with agricultural technology.

The study also indicated the level of agricultural technology and performance related to each other. The relationship between to such aspects reveals that there are nine zones observed in the region. The Revenue circles namely Sansar has shown high level of agricultural technology and performance due to the more proportion of sugarcane, role of sugar factory, farmers attitude towards the use of modern technology etc. The moderate technology and performance observed in Bhigwan and Bawda Revenue circles due to sugar factory provides different technologies at subsidized rate viz. Drip sets, tractors, fertilizers, high yielding varieties of seeds etc. So farmers are well aware about the use of new farm technology leading moderate level of technology and performance. Low level of technology and performance observed in Kati Revenue circle, due to the less amount of rainfall, seasonal nature of well irrigation, inadequate water sources, poor financial condition of subsistence’s farmers as a result low level of agricultural technology and performance.

The study of the levels of agricultural development reveals that the high and moderate level of agricultural development is confined to the areas having assured supply of water. The dominance of grapevine pomegranate and sugarcane farming, social awareness among the farmers, co-operative movement, role of sugar industries have played significant role for the development of agricultural level which is observed in the Revenue circles of Sansar, Indapur, Anthurne, Bawda, Lonideokar and Kati. The remaining Revenue circles have
low development of agriculture due to frequent drought conditions, scanty water supply, dependence on rainfall etc.

The spatial analysis of agricultural technology reveals the fact that there is an expensive tract of ‘weaker zone’ of unfavorable environmental conditions in the central part of the region. This region has been deprived of the advantages of agricultural technology. The attention has to be paid to overcome the problems by adopting favorable measures in planning during the years to come especially through the development of irrigation facilities.

The intra regional disparities in agricultural technology have led to regional imbalances and the intensity of which may be minimized by removing the constraints by the introduction and to extend of agricultural technology. The present need of the Tahasil is to adopt appropriate agricultural technology which may suit to existing physical and socioeconomic set up. There is urgent need to control excessive use of water and high doses of fertilizers in the irrigated tracts of the Tahasil which along with Rivers and Back water of Ujani dam. More over the recent need of the region is to provide more subsidies for the drip set due to this more farmers purchase such technology and save more water and besides this increase irrigated area of the region. There is need to cover small as well as medium farmers in this respect and efforts be made to educate them regarding the merits of modern agricultural technology.

**SUGGESTATION**

In the Indapur Tahasil, there is scope to develop agriculture on extensive commercial scale. Some of the suggestions to improve the situation and solve various problems faced by farmers are given as below:

1) Increase in the area under Drip irrigation. The areas under Drip irrigation need to increase due to constant drought like condition prevailing in the Tahasil since last 3-4 years.
2) Introduction of attractive and affordable group farming schemes for small and marginal farmers giving those Tractors and other farm implements in subsidies rates.

3) The subsidies given for digging wells and doing pipe lines should be directly credited in the bank account of the farmers, to reduce the corruption in the system.

4) Custom hiring projects should be encouraged in the Tahasil to reduce the cost of cultivation.

5) Increase in the number of cold storage and encouraging the investment in this project to increase the shelf life of the fruits like banana and pomegranates whose productions in increasing in Tahasil.

6) Constant counseling on water conservation should be conducted by the agriculture department and MahtmaPhulekrishividyapith, RahurisKrishvigyan Kendra to the farmer.