



IMPACT OF TECHNOLOGICAL TRANSFORMATION IN AGRICULTURAL SECTOR – AN ECONOMIC ANALYSIS

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Abstract:- Government should introduce of latest technologies in terms of obtaining information and valuable data to be provided to the farmers with case studies and success stories. Provide financial support to farmers in terms of crop pattern enhancement, production process, reduction of wastage and marketing of agro products thereby providing co-operative farming at a macro level Even though the productivity per unit area and the income generation there from are rather high in the case of perishable horticultural crops, lack of adequate marketing infrastructure coupled with unstable price pattern is mainly deterrent to area expansion under these rightly fitting less water budget crops The returns from agricultural production are not directly proportionate to the increments made in terms of inputs and application of technology as per the economic law of diminishing returns. Any enterprising producer will, therefore, attempt to optimize his resource application only to the reasonable extent of deriving high efficiency production against low cost. Lack of policy integration is a major drawback with the Government machinery in accelerating all round growth in all sectors without being detrimental to each other. To cite an incident, the Government of Tamil Nadu have since announced its industrial policy regardless of its implications and interactions that would have a direct bearing on agriculture. The ill- conceived notion seeded in the minds of policy makers that industrial growth alone can accomplish remarkable increase in G.D.P., smacks elitist bias. Government give priority to retrieve the DC land in the area and redistribute the same to the deserved entitled persons and fallow land need to be enriched and distributed to the land less persons



Artificial Intelligence (AI) has started making inroads in agriculture sector. Various organisation in India such as ICRISAT, Microsoft, CropIn, SatSure, DronaMaps among many others have started adoption of AI with agriculture, resulting into better yield and higher income for farmers.



Cultivable land area under organic farming has increased from 11.83 lakh hectare in 2014 to 29.17 lakh hectare in 2020 in the country Modern farms and agricultural operations work far differently than those a few decades ago, primarily due to various technological interventions in the field of technology

In most of the developed countries the use of innovative methodologies in agriculture has a proven track record of increasing productivity which has been measured and replicated. As agriculture in India forms the backbone of providing livelihood for the rural populace it becomes critical to implement sustainable changes using innovative methods. With synchronized effort both from government and other ancillary bodies, the farming community should be made aware and encouraged to adopt innovative methods. As mentioned above, there are some factors which determine the success of adoption of agricultural technology, care should be taken to understand the roadblocks and find methods and means to circumvent the issues at a very nascent stage. New technology can pave way to increased rural employment on one hand, on the other; there is a need to reduce cost, where labor takes the major share of the incurred cost. There needs to be a balance in terms of how we empower the farming community to effectively use technology to ensure that all the required parameters are met resulting in transformation of agriculture into a cost-effective business. The adoption of technology requires adequate incentives for producers. Without clarity on the returns it will be very difficult for the farmers or producers to make any kind of investments. There needs to be single mission statement towards adopting the technology in agriculture and any conflicting ideas and views can counter the much-required confidence among the producers. In addition to improvement or introduction of technology at the farming level, the entire gamut of activities surrounding agriculture should be taken into consideration in order to reap the benefits of the adoption of technology. Building communities and model technologically efficient farms has shown benefits. Also, in India where the geography the landholding sizes and crops are diverse, so one technology fitting all will not be favorable. There should be lot of public-private sector initiatives to take the technology to the farmers. Moreover, the entire end-to-end farming activities should be addressed so as to ensure there is profitability and revenue for all the stakeholders involved. Each of the public sectors, private sector, supporting agencies and NGO's have a role to play in taking the technology to the farming community.

RESEARCH QUESTIONS

- Did the adoption of advanced technology leads to improvement in agricultural productivity?
- Whether the latest technology helped in preserving or enhancing the agricultural sector?
- Is there any transformation in the study area because of the adaptation of innovative technology in agricultural sector?
- Is there any significant improvement in agricultural productivity in the study area because of adaptation of advanced technology?
- Is there any deviation in agricultural credit, employability and socio-economic variance due to introduction of advanced technology?

BACKGROUND OF THE RESEARCH

Agriculture which has gone through lot of transformations has also been subject to various stresses. Constraint of availability of land, water and other natural resources added more to the already declining state of art. Most importantly dereliction in aspects relating to policy changes and natural scarcities multiplied the misfortunes. When the demand for agricultural products both for consumption and agro based industries increased, it's potential to meet up to the growing demand was a big challenge. Soil conservation, water preservation and sustainable agricultural production became the need of the hour concepts. Therefore, this research work is formulated keeping this view in mind the objectives and research questions are framed.

NEED OF THE STUDY

Indian economy is agro-based one. Agriculture in India has been undergoing serious transformation ever since the introduction of Green Revolution. Especially in Tamil Nadu usage of modern techniques has transited agricultural activities in addition to usage of land for cultivation has also undergone significant changes. In this juncture, it is becoming imperative to examine the implications of usage of modern technology and the transformation in the agricultural sector.

OBJECTIVES OF THE STUDY

The overall objective of the study is to analyse the technological transformation and its impact on agricultural sector in Thiruvallur district of Tamil Nadu in economic perspective. The specific objectives are,

- To examine the nature and pattern of agricultural developments in Tamil Nadu in macro aspects.
- To study the agricultural structure and socio-economic conditions of sample farmers in the Thiruvallur District.
- To identify the factors determining the progress of agriculture in the study area.
- To explain the utilization of advanced technology in agricultural activities in the selected areas.
- To investigate the impact of advanced technology towards the transformation of agricultural sector in the selected area.
- To review the relationship between the levels of growth in agricultural output and per worker productivity with the use of modern inputs like irrigation, new seeds, fertilizer, equipment and machinery etc.
- To map out the perceptions of selected farmers on compatibility between usage of advanced technology and the transformation in agricultural sector in the study area.
- To find out the problems, difficulties and constrains faced by the respondents in the study area, and
- To suggest suitable policy measures based on the findings and conclusion of the study.

HYPOTHESES

- **H₀**: There is no significant relationship between utilization of innovative technology and socio-economic conditions of sample respondents in the study area.
- **H₀**: There is negative relationship between the adoption of modern technology and transformation in the agricultural sector.
- **H₀**: There is no correlation between the levels of growth in agricultural output and per worker productivity with the use of modern inputs.
- **H₀**: There is no significant differences in the revenue pattern of the respondents from pre and post utilization of modern equipments, and
- **H₀**: There is adverse relationship between perceptions of the respondents on compatibility of advanced technology and the structural transformation of agriculture.

LIMITATIONS OF THE STUDY

- The outcome of the study can be validated and replicated in other similar topology or geography but cannot be generalized
- The limitation of the study is on the perceived measurement of the producer and not cross checked against any alternative methods of measurement.
- Inhibitions of the respondents in the study are towards sharing details to researcher. Lot of persuasion was required to get the data from the respondents.

The study made on the impact of technological transformation in agricultural sector has tried to study the implications of technology on the cultivation practices as well as productivity. It has also tried to understand the perception of the farmers on the usage of technology in their agricultural practices. The study has attempted to understand the relationship between technology and living standards of people. Through the analysis attempt has been made to prove that there is significant relationship between utilization of technology and socio-economic conditions of the people. The study has also tried to prove the significance between agricultural output and agricultural worker productivity. The analysis also proves that there is a lot of positive perception among the farmers in the usage of adopting innovate advanced technology. It is also interesting to note from the study that there is a considerable difference between revenues from pre and post reform period. But it is also observed from the study that there is also a large hesitation among the farming community over adapting farming as the primary occupation, this may be because of lack of sufficient revenue which the other sectors tend to attract. In today's scenario, there are many corporate with the aid of government and other financial institutions are aiding the agriculture to make it positive and beneficiary like any other sector. What are inevitable is the wrath of nature which can spoil any farmers dream and also the food security of the nation. Therefore, it has been understood from the study that there has to be a predominant technological transformation required to revive this already dying sector.

CROPPING PATTERN

- Crops and vegetables should be increased so as to provide better cropping pattern in the irrigated area.
- Rotation of crops is an important requirement in the area. The farmers need to focus on self-sufficiency with respect to the crops or grains that is being grown thereby reducing the cost of procuring grains for their own need. For example, when producing corn, had they produced food grains they consume along with corn they would have achieved self-sufficiency
- The important use of technology is using the available data to predict optimal crops. The crop model simulation using Decision Support System for Agro technology Transfer (DSSAT) can be used for prediction of the most profitable crops that can be grown so as to maximize land use complemented with crop pattern to achieve better revenue from agriculture
- The area under study shows lots of inconsistency in the period of study. Although paddy is the major crop that is grown in the area, corn is also grown as commercial crops followed by groundnut as an oil seed crop. Similarly, cultivation of pulses has been fluctuating over the years and in the last few years the area under pulse has increased significantly.
- Overall there is very little focus and inconsistent cropping patterns which do not provide the desired result of optimal use of land or correct crops to increase the revenue consistently. The whole scenario looks very haphazard with dominance in paddy and sugarcane cultivation.

LAND UTILIZATION

- Cultivable area needs to be improved through various methods and government incentives. The key is to not only provide better food production but also keep the ecological balance
- The analysis of general land use over the past has shown that the barren and uncultivated land has reduced due to reclaiming of land. The area under nonagricultural use has increased mainly due to conversion of agricultural lands. There has been a gradual decrease in net sown area sown.
- The waste land that is cultivable has increased and the area of net cropped has also gradually declined. Moreover, due to the impact of rapid urbanization, the agricultural lands are converted into commercial places for all nonagricultural purposes for the past few decades. This land use trend has also changed which is not in

the right direction because the decrease in area under age old agriculture will affect the region in many ways.

- The Land Capability Classification Require model, F.A.0 has been used for land evaluation. This model of land evaluation is by predicting optimal crop using statistical model.
- This study has revealed at high-level despite the fact of indiscriminate and over exploitation of land and water resources for developmental activities. The reason for this is the rapid urbanization due to the competing priorities of the area for industrialization and increase in employment options. The policies and incentives should be conducive for practicing sustainable agriculture. Climatological factors like rainfall and temperature have not undergone major changes during the past few decades excepting for the sporadically occurring weather elements which cause crop damage.
- Reclaiming of the encroached land need to executed and distributed to the land less agricultural workers belonging to the impoverished. Women should be encouraged to participate in agriculture

IRRIGATION

- Ground water is the more dependable source in summer thus watershed management works like minor irrigation projects, contour banding to be introduced on the eastern side of the region for conserving water and soil properly. This would be helpful in increasing the water table and bringing additional land under cultivation.
- Construction of check dams near the farms in the coastal region will prevent the salt accumulation in the agricultural land.
- At present the scope for further development of tube wells is very limited. The question now pertains with monitoring and enhancement of the aquifer

rechargeability. The situations are alarming at several places because of the water intrusions and there is an urgent need to conserve and improve the resource.

- It is therefore necessary to desilt ate and reinstate or even increase the capacity of the storage tanks and canals so as to not only to increase the capacity of storage but also to enhance the recharge of the ground aquifer.
- Mismanagement of water resources by not letting out water for irrigation from the major lakes and curbing the willful encroachments into the storage structures triggers indignant responses on the part of farmers. It may, therefore be clear that there is no valid reason for the apparently steep decline in ground water resources which is really attributable to indiscriminately maintained water balance.

SOIL FERTILITY AND CONSUMPTION OF FERTILIZERS

- The fertility status of the soil should be tested before providing the chemical fertilizer to the farms.
- The efforts have to be taken to promote use of bio-chemical fertilizer among the farmers. It will save the fertility of the soil and increase the productivity.
- Soil is the life for plants thus Government should not be permitted to use the fertile soil from the agricultural farms for the brick industry.
- Afforestation is important in this area, so there should be programmes that are dedicated for Massive plantation of trees through social forestry programmes on the fallow land available in the district.

ALTERNATE PRODUCTS AND MARKETS

- The district has a wide scope for milk production thus the cultivation of fodder crops needs to be increased.
- Aqua culture especially the farming of fish is the alternative source for the farmers. so, efforts to be taken for the promotion of fish farming in the coastal region.
- There is a scope for agriculture-based industries, horticulture-based industries, based industries and mineral based industries in the study region.To overall development, besides the agricultural activity agro based activities like dairy, poultry, and house hold industries should be started in the study region. e.g. Agro-produce processing units – decorticating mills, dal mills, Rice mills etc.

➤ Agricultural activities and inclusiveness of all the sections of the societies would diminish the food insecurity

SCOPE FOR FUTURE RESEARCH

- Land use pattern and intensity of innovative cultivation practices need to be explored .
- Land holding pattern of women and agricultural activities need to be explored.
- Technological development and agrarian transformation and its impact on socio-economic conditions of the cultivators need to be explored.

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