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PROBLEMS AND PROSPECTS OF AGRICULTURE IN THE TRIBAL AREAS OF GUJARAT: WITH SPECIAL REFERENCE TO VADODARA DISTRICT

By

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Abstract

Gujarat has shown an outstanding development in agriculture and allied sectors. Especially during the period from 1995-96 to 2015-16 the agricultural production was satisfactory and to some extent a benchmark for the Nation. Though the State has achieved positive growth in cropping pattern in all the districts, the districts with relatively higher share of Schedule Tribe population are lagging behind in agricultural development. An investigation is done in the Chhota Udepur district located in eastern part of the State to ascertain the reasons behind the lower level of agricultural prosperity of tribal regions. The researcher has attempted to find the factors affecting the agricultural land use and human resources for the backwardness in farming and also their interwoven outcomes. The study focuses on the changing scenario of the tribal society and economy within the contemporary dynamics of Indian polity. The study aims at investigating different perspectives of farming in tribal areas and their effects on livelihood in the region. The study takes support of secondary data, primary investigation and case studies.

Introduction:

After Independence, particularly after the introduction of 'Green Revolution' in 1966, land efficiency and agricultural production have increased. This has been made possible by bringing additional areas under cultivation, extension of irrigation facilities and efficient water management, use of HYV seeds and modern techniques of cultivation, use of plant protection techniques, educating the farmers and, development of marketing provisions etcetera. A review of various studies on agricultural development in several states of India reveals that there are regions where agricultural output has increased significantly. There are also regions where the increment in agricultural production is constrained by both environmental and social circumstances. The latter group of regions mostly include the forested, hilly and agriculturally unsuitable areas prominently inhabited by the tribes, who follow subsistence farming.

Social geography of the country presents a clear ecological demarcation between the tribal and non-tribal habitats. While the non-tribal communities of the country are clustered and concentrated in the agriculturally suitable river valleys, flood plains, productive lands and deltas, the tribal communities are settled, clustered and concentrated in the agriculturally unsuitable hilly, forested and dry regions of the country. The traditional tribal economies were

based primarily on hunting, food gathering and animal husbandry. The tribes inhabiting the river valleys of the hills partly depended on rudimentary agriculture i.e. traditional subsistence farming.

A tribe is an indigenous group and can be differentiated from the non-tribal peasant communities on the basis of certain cultural traits and practices, and of livelihood patterns. Due to several developmental projects like construction of railways, roads, dams, establishment of industries, reservation of forests, extension of arable land and alienation from their traditional habitats by non-tribal peasant and business communities and pushed into the prime tribal heartland, the authenticity of tribes' economic and social structures are under threat.

Consequentially, bereft of the age-old natural resource base particularly forests, and in the absence of alternative economic avenue for sustenance, the tribes had to adopt sedentary agriculture as their mainstay livelihood in an ecological setup that is primarily unsuitable for the purpose. Under the circumstances, performance of agriculture in the tribal areas of the country has remained much behind the agricultural performance of the peasant communities of the plain areas. Today, the artefacts produced by the tribes with the use of locally available resources are on the verge of extinction. The tribal economy is losing its dependence on the bounties of their milieu and the tribal society is under dilemma and delusion. It has been found that, dependence on land, as the single resource base, is not economically rewarding enough, and has led the tribal communities towards impoverishment and pauperization.

The Research Problem

Population and society are dynamic factors of a geographical region. The overall development of a region is based upon equitable distribution and sustained growth of the productive resources. Agricultural development is also correlated with the healthy development of a region. The blocks or sub-regions which are highly developed in terms of their social, economic and demographic parameters, can also show significant growth and development in terms of optimum land use and agricultural efficiency. When it comes to agricultural efficiency, we must understand that the tribes in India are not basically from farming-based society. It is expected that wherever agricultural operations in the tribal tracts can yield satisfactory outcomes, characteristics of the peasant society should be inculcated among the tribes. Otherwise, we must seek to create opportunities in other economic pursuits replacing cultivation. The proposed study intends to evaluate agricultural and other economic practices of the tribes in different ecological setups in the study area and tries to propose

modular strategies as alternative resource utilization that could be expected to provide sustainably efficient practices in place of the current practice.

Many technological experiments have been conducted for the agricultural development in Gujarat. The Central and State government administrations, NABARD, NGOs, commercial banks and agricultural universities are continuously supporting the development process in the Schedule Areas of the State. Development projects/schemes like *Jyoti Gram* Scheme (24 x 7 electricity), MGNREGA (employment guarantee), *Ujjawala* Yojana (LPG cooking gas distribution) and Sardar Sarovar Project (a multipurpose, inter-state hydel project) are some of the initiatives taken by the State and Central Governments.

However, there are challenges of natural resources like erratic rainfall, limitations of underground natural aquifer, over exploitation of depleting underground water, water logging and salinity ingress. Technological hurdles in agriculture include, poor awareness on fertilizers and pesticides, low seed replacement ratio and unskilled labour-intensive farming practices. Issues such as fragmented or marginal land holdings influence other institutional problems like, accessibility to rural credit, crop loan, Direct Benefit Transfer, insurance etcetera. In addition, ecological issues like wild boar, monkeys, pests and other domestic animals damage the standing crops in the fields.

Finally seasonal inter- and intra-district migration of the Schedule Tribe (ST) farmers from Vadodara district, disturbs the agricultural practices and engrossment towards farming. They lose the connectivity to the land and cannot engage themselves completely and efficiently in the farming process.

The present study examines and analyses the major constraints of the tribal farming at macro and micro levels with generalisations and, contemplates a few solutions which could open the vistas for further research.

Objectives:

This study has set the following objectives for the study:

a) To study the land use changes in the tribal areas of Gujarat.
b) To study the changes in work participation in the tribal areas of the State and the study region.
c) To develop an understanding of the prevailing agricultural practices in the tribal areas of Gujarat, specifically in the study area.
d) Assess the consequences of the current agricultural practices on tribal economy and society.

e) To examine the prospects of ameliorating tribal livelihood.

Hypothesis:

The following hypotheses have been formulated for the study.

I. The dependence of the tribes on their immediate surroundings (geographical milieu) has substantially reduced.

II. Lack of alternative economic avenues and dependence on agriculture has left a large segment of the tribal population impoverished and has compelled them to migrate seasonally to the nearby urban areas in search of employment opportunities.

III. Traditional tribal cultural activities have changed under the influence of urbanization and industrialization.

Study Area:

The present study focuses on Chhota Udepur (presently a separate district, delineated out of Vadodara district in 2013) *taluka* (a sub-district), selected from among the 43 designated Scheduled Area *talukas* spread over 12 districts of the State. These 43 *talukas* have more than 50 per cent Scheduled Tribe (ST) population, and are also known as Integrated Tribal Development Programme (ITDP) and Tribal Sub-Plan (TSP) areas for planning purposes. According to 2011 census, there are twelve *talukas* of Vadodara district, of which, Jetpur Pavi, Chhota Udepur, Kawant and Nasvadi *talukas* are ITDP and TSP areas. These ST areas / talukas have been selected for investigation in this study. Besides, the neighbouring Sankheda *taluka* has also been considered in the study for different parameters.

About Vadodara District:

Vadodara district is located in the eastern part of the state of Gujarat in western India. The district covers an area of 7,794 square kilometres. As of 2011, the district has a population of 4,165,626 of which 49.6 per cent is urban, 50.4 per cent is rural and, 27.6 per cent hail from the ST communities. Vadodara district has a rural ST population of 1,040,599 and urban ST population of 1,09,302 based on census 2011.

It is the third most populous district of Gujarat, after Ahmedabad and Surat. The district is bounded by Panch Mahals and Dahod districts to the north, Anand and Kheda districts to the west, Bharuch and Narmada districts to the south. The Mahi River passes through the district. The historical city of Baroda, also known as Vadodara, was the capital of Baroda Residency, one of the princely states of India under Bombay Presidency during

British Rule. In the year 2013, Chhota Udaipur district was carved out of the Vadodara district.

About Chhota Udepur District:

The total area of the district is 3,436 Sq. kms, extending between 21° 51' 36″ and 22° 34' 39″ N latitudes and, 73° 28' 46″ E and 74° 16' 25E longitudes. The district shares its boundaries with the state of Madhya Pradesh in east and south-east, Dahod and Panch Mahals districts in the north, Vadodara district in the south and, Narmada district in south and south-west. Chhota Udepur town in Chhota Udepur *taluka* serves as the district headquarters of this district with six *talukas* under its administration namely, Chhota Udepur, Kawant, Nasvadi, Jetpur Pavi, Sankheda and Bodeli.

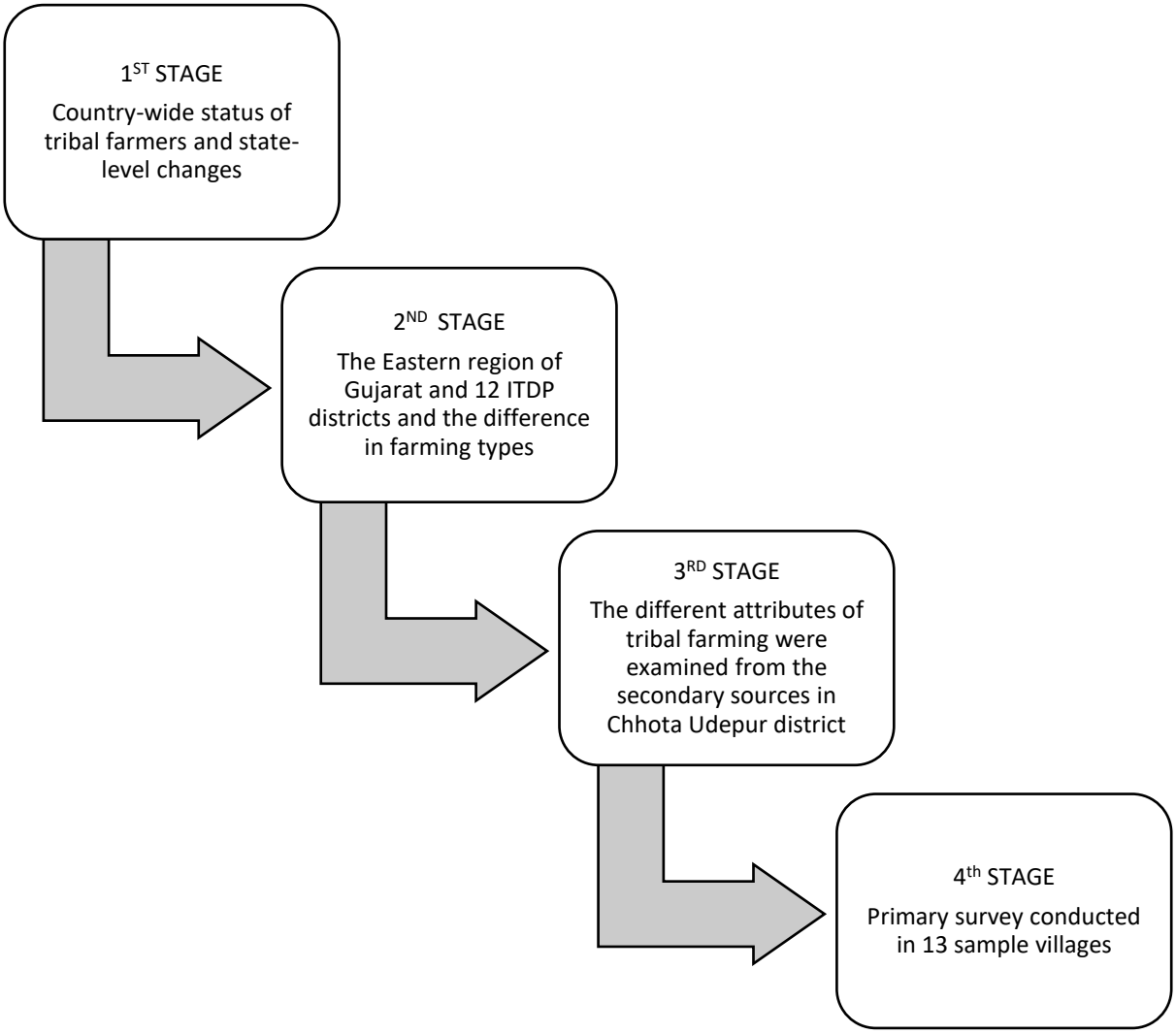
South of Chhota Udepur is mainly constituted by Deccan Trap which was furrowed by the Narmada and the Tapi Rivers. North of the Narmada River is covered by Vindhyan while, south of the Narmada are the broken and dissected Rajpipla hills. Drainage of the Chhota Udepur district corresponds with the terrain characteristics. The river Narmada, is the major river flowing through the district. Orsang River with its two tributaries, Heran and Bharaj Rivers, meets the Narmada River at Chandod. The Orsang river is an important river system draining the Chhota Udepur district. Chhota Udepur has a semi-arid climatic condition with the rainfall period being confined to the middle of June to the middle of October, when the district receives much of its rainfall from the south-west monsoon.

To achieve the set objectives, the study has relied upon the secondary information available in the census reports of 2001 and 2011 Census and other Government reports, as well as primary information generated by the scholar from the sample villages of five predominantly tribal *talukas* namely, Chhota Udepur, Kawant, Nasvadi and Jetpur Pavi, and one non-tribal *taluka*, namely Sankheda.

Methodology:

To establish the population parameter and to substantiate secondary data with primary findings multi stage cluster sampling method has been adopted in the study. Cluster method is used as the population is large and scattered throughout the eastern part of the State, and it is also cost effective. In cluster analysis grouping of objects is done which have common characteristics. From the secondary data, it is evident that most of the tribal communities are predominantly farmers in the State. With respect to the temporal analysis conducted for the

years 1995 to 2015, the main concern of the research has been the changes in the farming practices amongst the tribes. More than one variable is used for grouping thus, the methods of primary investigation can be called as divisive polythetic clustering. The primary focus of the research is on changes in land use and work participation.



Steps to Choose Sample Villages:

- Multi-stage sampling also taken into consideration to accommodate sub-population in the spatial frame.
- In the initial stage the background was from the country wide status of farming amongst tribal people to state level changes.
- In the second stage, difference in farming in eastern part of the Gujarat state and 12 ITDP districts.

- In third stage, different attributes of agriculture in the *talukas* of Chhota Udepur district were examined from the secondary sources.
- Finally, 13 villages from 6 *talukas* of the Chhota Udepur district have been selected to examine the parameters of the research.
- To make the tribal feel free to respond along with multi-stage cluster sampling, non-probability convenience sampling method has also been applied. The easily available members of the selected households in the study villages have been approached to get the information.

Tools and Techniques:

The proceedings of the study "Problems and Prospects of the Agriculture in the Tribal Areas of Gujarat: With Special Reference to Vadodara" have been examined with secondary and primary sources of data. Different statistical techniques, cartographic methods and satellite maps have been used at different units of analysis like state, district, *taluka* and village.

Statistical Techniques:

Both inferential and descriptive statistics have been used for the calculation and analysis of the secondary as well as primary data. Descriptive statistical tools are utilized for the summarization of the data as diagrams, graphs and different measures to show central tendency and dispersion. Inferential statistics has been used for prediction and to reach conclusions about the population from the sample.

a) Secondary data was used for ranking by Kendall's Rank Co-efficient method**.** The spatial variations in physical output from land are the result of combinations of natural environment and human activities. Kendall (1939) developed a method of determining agricultural efficiency based on output per unit area and devised a system of Ranking Coefficient. According to Kendall's method, the sum of the ranks is to be divided by the number of crops. In addition, the report uses Linear regression and Correlation Coefficient.

b) Statistical techniques used for primary data: t test is used to compare the means of two groups**.** In hypothesis testing t testing determines the similarity or differences between two groups of population. It is a parametric test of difference. Mostly two-

tailed tests have been executed with the help of z test and Chi-Square test for hypotheses.

c) Data Representation.

Lorenz Curve - The Lorenz curve is a way of showing the distribution of income. It was developed by Max O. Lorenz in 1905 for representing inequality of the wealth distribution.

Cartographic Methods:

For graphic representation of the data, different cartographic techniques have been applied. Thematic representations of variables with further sub-division are shown by Choropleth maps drawn with the help of Arc GIS 10.3. Along with the Choropleth maps, various other diagrams are also used such as pie-graphs, bar diagrams, line graphs for showcasing data in every possible way.

Rapid Rural Appraisal (RRA):

The RRA method was used in this study to closely interact with the local communities particularly women, to seek ground level information directly from them, to develop understanding about various issues pertaining to their life and livelihood, and to learn from them. The exercise was conducted with a purpose of involving particularly the female segment of the target population and gather indigenous knowledge. The process brings out finer nuances of the socio-economic scenario through free and frank discussion, where the participants express their experiences about their way of living.

Use of Computer Software**:**

The study used software's like PSPP for data processing and statistical analysis, QGIS/Arc GIS for mapping and Microsoft excel for data entry, tabulation and data analysis along with statistical techniques.

Organisation of The Study:

The study is arranged in eight chapters. To understand the objectives and conclude with tested hypothesis these chapters are being classified in different segments. Major findings and conclusions of the chapters in this thesis are as under;

Chapter One includes description of research problem, objectives and hypotheses of the study. An attempt has also been made in the chapter to understand the perceptions and conceptions of the research problem by reviewing some of the recent and relevant National and International level literatures. Methods of acquiring data, its analysis, representation and testing of the proposed hypotheses have also explained in this chapter. This chapter concludes with the following chapter's design and limitation of the study.

The **second chapter** explains the physical background of the study area.

Findings:

- Indigenous people usually maintain a strong attachment to particular geographical locations and ancestral territorial origins.
- The scheme of regionalization of Gujarat by the 1991 Census into two meso-regions has been adopted in the present research. The tribal belt of Gujarat corresponds broadly with Eastern Hilly Region. The twelve eastern districts that are partly or fully covered by the Eastern Hilly Region form the tribal belt of the State, and have been considered in the present research.
- For the purpose of the present research, it is intended to generate and analyse data at two levels: at secondary level, the Twelve Integrated Tribal Development Project (ITDP) districts; at primary level, the six tribal *talukas* of Vadodara/Chhota Udepur district.
- With average elevation of 300 metres, the eastern and north-eastern parts of the State are differentiated by their hilly topography and forested tracts.
- The north eastern part of the tribal region has semi-arid climate while the south-eastern part receives more rainfall and is relatively more humid.
- There is a close correspondence between pattern of rainfall and vegetation.
- Alluvial, black and local hilly soils with mixed texture are the major soil types in the tribal region.
- The Narmada, Tapi and Sabarmati Rivers are the three major river systems contributing significantly for the fertility of the alluvial soils. Other important river basins are of the Orsang, Heran, Mahi and Sukhi River basins.

Third chapter includes descriptive analysis of socio-economic status of tribal occupation pattern in the twelve districts of the tribal region of Gujarat. The livelihood parameters of the 12 predominantly tribal districts of eastern Gujarat have been assessed in the chapter.

Findings:

- The socio-economic condition of the ST population and their households have changed during 2001-2011 census decade. But the gap between the ST and other social groups have widened in terms of literacy, health, income and female work participation rate.
- Fragmented land holdings and poor management of irrigation do not encourage farm mechanization.
- Cropping pattern have, by and large remained unaltered during the last few decades and mono cropping leads to less crop diversity.
- Periodic seasonal migration develops less involvement with settled agriculture among farmers in tribal areas.
- Importantly there is lack of awareness about different government schemes and programmes resulting in continued rural migration.

Chapter four deals with *taluka*-wise cropping pattern in the Chhota Udepur district. Due to physiographic differences, availability of irrigation facility varies across the *talukas*. The irrigated water has brought changes in crop production in tribal and non-tribal regions of Chhota Udepur district.

Findings:

- Forest cover has decreased during 2001 to 2011.
- Single crop production with less crop diversity is resulting in land degradation.
- Farming in the distant hilly region is not suitable for agriculture.
- Degraded soil fertility is deteriorating the crop yield over time.
- Water intensive crops are leading to water logging and poor quality of irrigated water.
- Circular migration of the tribal farmers is more of transhumance than sedentary livelihood directing to less time for farming.

Chapter five describes characteristics of tribal labour and their participation ratio. Withdrawal of female workers as main workers is an outcome of additional income generation from the periodic migration of marginal farmers.

- There is inequality in the female work participation scenario even in tribal regions.
- Periodic movement out of villages by farmers hamper farm income attainment.
- Poor soil quality with low nitrogen content along with less uses of organic manure make the soil more unproductive.
- Large landholders are facing the challenge of scarcity of farm labour due to shortage and high wage rates.

In **chapter six,** findings from the field survey are described along with testing of hypothesis. This particular segment of the study analyses spatial pattern of tribal farming and its characteristics. To understand the factors behind the cropping pattern of the district certain independent variables have been chosen such as land size, irrigation system prevailing in the villages, farm inputs, and work participation, and were the prime focus in the structured schedule. Relation between different variables and outcome has been examined and hypotheses have been tested.

Findings:

- Other than cultivation as the main occupation, agricultural wage labour has emerged as subsidiary work for the tribal communities in all the *talukas*.
- Social structure of the ST households in Chhota Udepur district are much influenced by the inter- and intra-district mobility.
- Over all, female literacy rate and female work participation rate are increasing but the rate of increase is not at par with each other. Female literacy rate is increasing faster than female work participation rate.
- Periodic migration sways tribal livelihood from vicinity of the of the forest to urban areas.
- Chi-square test shows that there is a strong relation between *taluka*-wise increase or decrease of percentage share of households with increase or decrease of land holding size.
- Lorenz curve established that there is an inequality in the expenditure on farm inputs and this inequality widens for Chhota Udepur, Kawant and Jetpur Pavi *talukas*.

- Null hypothesis has been accepted for *taluka*-wise increase or decrease in the percentage share of households with increase or decrease of land holding size.

Gap is observed between programme implementation and execution in the tribal districts of Gujarat. Considering different government schemes designed for the growth and enhancement of tribal livelihood, the advantages and facilities have remained on paper only. Traditional intermediaries are still taking advantage of farmers' ignorance in the sphere of hiring and purchasing agricultural products.

Chapter 7 deals with the observed gaps in the facilities offered and the benefits appropriated by marginal farmers or agricultural labourers.

Findings:

- There is a need to look into issues regarding land alienation of tribals by the State or local administration for developmental purposes.
- The developmental projects or infrastructural schemes specifically related to forestry must be executed with sustainable perspectives.
- Vulnerable areas, especially eastern hilly region and the river basins of the Narmada and the Orsang Rivers must be identified, demarcated and managed to assure sustainable implementation development projects.
- Seasonal migration of farmers affects farming with regards to yield and economic development. In the long run, unsustainable crop production and farming methods can lead to disastrous consequences.
- Direct Benefit Transfer and APMC are two necessary initiatives taken by the State government. However, there should be a check or control over intermediaries who control and manipulate the circumstances in their own favour at the cost of the tribal farmers.
- The need of the hour is to increase awareness on seed replacement, creation of markets for small land holders and, selection of crops and crop combinations which can fetch more returns.
- Future prospects of tribal farming in the district should include proper planning by observing the spatial and temporal changes of agriculture in the country in general and the Gujarat state in particular.

The **eighth chapter** summarises mainly with the note of conclusions and suggestions. The researcher considers the present work as a humble attempt to unravel some of the finer nuances of agriculture in the tribal areas of Gujarat in particular and of the country in general. There are many other significant research arenas with regard to agriculture in the otherwise agriculturally unsuitable areas of Gujarat and the country as a whole, which await serious research investigation. The study has reached the following conclusion in the final analysis.

Conclusion:

The study comprehends the equation between land holding and farmers in the tribal region of Gujarat. Consistent transformation of tribal livelihood in terms of income, infrastructure, urbanisation, literacy and education, input management and control, introduction of regulated market for crops and most significantly work participation scenario, could provide appropriate solutions to the problems faced by the tribes. Major concern for farmers in tribal area are, marginalisation of land holding, lack of agricultural surplus and resultant insufficient income generation.

Tribal culture as well as tribal farming, both are intrinsically interwoven with the geography, particularly the physical base of the habitat. Apart from physical background of the tribal farming, there are many socio-economic conditions which influence the tribal economy. The socio-economic condition of schedule tribes and their households have changed during 2001-2011. But there is a gap between the tribes and other social groups. Small landholding, over uses of chemical fertilizers, lack of crop diversity along with seasonal migration enhances problems of tribal farming.

Tribal farmers need hands-on training and awareness workshops for farm inputs. For that a comprehensive input management programme the best option could be adoption of area/milieu specific approach in tribal area development planning. Every step towards development of tribes and their farming practices must be organised and executed jointly by state, local and *panchayat* administration with scientists, programme planners and NGOs.

The researcher expects success in solving the problems of the tribes through the adoption of a holistic approach involving parameters of Geography, Regional Planning, Rural Development, Agricultural Science, Economics and Sociology. Based on the findings and conclusion of the study the following suggestions have been made.

Suggestions:

- The ability to improve the scope of agricultural development in tribal districts is not only limited to administrators and planners, but also lies in the hands of farmers/labourers themselves, whose awareness regarding the prospects and the modalities to achieve prospects need to be enhanced through concerted efforts.
- The process of formulating schemes during planning activities must be carried out by keeping livelihood of smaller size land owning farmers in consideration.
- There should be well developed connectivity between rural and urban agriculture markets. This will help farmers to diversify, start dairy farming and horticulture that can be accessed within reasonable time and with least cost incurred.
- The physical resource base of the tribal regions pertaining to soil, groundwater and agro-climate regions must considered while selecting crops and water management techniques to facilitate rational and appropriate food crop and/or commercial crop cultivation.
- Skill development and entrepreneurship workshops should be conducted from time to time to facilitate the development of new and innovative income generative activities, in addition to benefits received from MGNREGA.
- Internet availability and connectivity in the backward *talukas* of the District must be improved to enable the farmers take advantage of on-line resources. This will help farmers meet and discuss online important issues and find their solutions. This can be made possible if local administration steps forward to assume responsibility for the improvement of agriculture in tribal regions.

Limitations of the Study:

To fulfil the objectives of this study, getting data from both secondary and primary sources posed major hurdles. Specially, secondary data at micro level are generally not available. To overcome the hurdle, the researcher had to depend on predicted data. During the primary investigation, tribal farmers were less responsive due to lack of understanding and sometimes not able to provide estimate of farm inputs. Periodic migration and consequential detachment from the farming processes have adversely affected the understanding of the tribal farmers regarding the latter. They are not able to recapitulate what number of inputs they have used in the rainy season at the end of the year. With great difficulty and persuasions, the researcher could generate relevant primary information during the field survey.