AN ECONOMIC ANALYSIS OF PRODUCTION AND EXPORT OF FLUE-CURED VIRGINIA (FCV) TOBACCO IN INDIA

Thesis

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By

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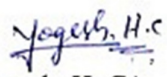

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CERTIFICATE

This is to certify that the thesis entitled **"AN ECONOMIC ANALYSIS OF PRODUCTION AND EXPORT OF FLUE-CURED VIRGINIA (FCV) TOBACCO IN INDIA"**, submitted in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURE** with major in **AGRICULTURAL ECONOMICS** of the College of Post Graduate Studies, G. B. Pant University of Agriculture & Technology, Pantnagar, is a record of bonafide work carried out by **Mr. Yogeh H C, Id. No. 49609** under my supervision and no part of the thesis has been submitted for any other degree or diploma.

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We, the undersigned, members of the Advisory Committee of **Mr. Yogeh H C, Id. No. 49609**, a candidate for the degree of **MASTER OF SCIENCE IN AGRICULTURE** with major in **AGRICULTURAL ECONOMICS** agree that the thesis entitled **"AN ECONOMIC ANALYSIS OF PRODUCTION AND EXPORT OF FLUE-CURED VIRGINIA (FCV) TOBACCO IN INDIA"** may be submitted in partial fulfillment of the requirements for the degree.

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Member

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Introduction

Chapter 1 INTRODUCTION

Tobacco also called as "Golden Leaf" is one of the important commercial crops grown in India and being so, it is vital in the Indian economy. It provides direct and indirect employment to 38 million people, around 70% of whom are in the agricultural sector. The combined tax revenue collected annually from tobacco products was ₹ 21,463 crores and ₹ 6058.13 crores in terms of foreign exchange to the National exchequer, during 2015-16. India has a prominent place in the production of tobacco in the world. India stands second in production of tobacco and third in export of tobacco in the world. Indian tobacco is exported to over 119 countries across the globe **(Tobacco Board, 2016)**. According to the International Encyclopaedia of Social Sciences, tobacco was first used by the Americans. Tobacco was introduced in India by Portuguese in the seventeenth century. The Kaira district of Gujarat State was probably the first to grow tobacco and subsequently its cultivation extended to other parts of the country.

Tobacco is an agricultural product processed from the leaves of plant. Botanically, the tobacco plant belongs to the family Solanacea and genus *Nicotiana*. The genus *Nicotiana* has more than 60 species, of which two are important and commercially cultivated for the production of tobacco viz., *N. tabacum* and *N. rustica.* About 5 to 6 per cent of the total area under tobacco is accounted for *Nicotiana rustica* varieties, whereas, *Nicotiana tabacum* accounts for more than 85 percent of the total area under tobacco. The rustica varieties known as vilayati and calicutti have dwarf plants with round puckered leaves and yellow flowers. The varieties of tabaccum, which are called desi type, have tall plants with long, broad leaves and usually pink flowers. Varieties of rustica species are used to hookah, chewing and snuff purpose only. However, tobacco produced from rustica species is also preferred for cigarette manufacturing due to its superior quality. Tobaccco is also used as a pesticide and in the form of nicotine tartrate, used in some medicines (**CTRI- Central Tobacco Research Institute, Rajahmundry, 2016)**

Unlike in other crops, the ultimate product in tobacco is the leaf that is consumed. Nicotine is the principal alkaloid present in tobacco leaf. Large quantities of

tobacco are consumed for smoking, chewing and snuff. Small quantities are also utilised in manufacture of nicotine sulphate used as insecticide and for pharmaceutical purposes. Tobacco is consumed in one form or the other throughout world and possibly is the most democratic luxury and as such it is rich man's solace and poor man's comfort with the ever changing socio-economic conditions. The trends in tobacco consumption in recent years show more preference towards smoking. As a commercial crop tobacco forms an important item in the Indian export basket. Also, tobacco sustains number of industries with tobacco as raw material like cigarette, bidi industries and masticator products.

World Scenario

Tobacco is cultivated in both tropical and sub-tropical climatic parts of the world. About 124 countries produce tobacco on almost 4.3 million hectares of agricultural land, an area larger than Switzerland. China stands first in production followed by India, Brazil, United States, Indonesia, Malawi, Turkey, Argentina, and Zimbabwe. During 2015-16, production 7.5 million tons of tobacco leaves with a productivity of 2087 kg/ha.

The Asian countries had major share in area and production of the tobacco constituting more than 55 per cent of the world output of tobacco leaves, the major countries being China (42.33 per cent of the world production), India (11.4 per cent), Indonesia (3.4 per cent) etc. African countries like Brazil contributed 10.82 per cent of the total production, while, Malawi 2.02 per cent, and Zimbabwe 1.53 per cent. The USA contributed 4.61 per cent to the total world production. **(FAOSTAT, 2016)**

The productivity of the tobacco was found to be highest in Peru i.e. 17,143.6 kg/ha followed by UAE (13,500.0 kg/ha), Laos (5,820.8 kg/ha), Oman (5000 kg/ha) and Samoa (4,565.2 kg/ha). India ranks 56 in terms of productivity by 1,693.9 kg/ha in the world. In Asian countries, UAE had highest productivity followed by Laos, Oman, Cyprus, Armenia, Azerbaijan and Sri Lanka where, India stood 21st place. **(FAO 2013)** a table is given in Appendix.

Indian Scenario:

Tobacco crop is grown in an area of 0.45 M ha (0.27 per cent of the net cultivated area) producing ~ 650 M kg of tobacco leaf and a productivity of 1693.9

kg/ha. India is the second largest producer after China and the third largest exporter after Brazil and United States. Among the different tobacco types cultivated in India, bidi tobacco forms the biggest chunk (36 per cent), followed by Virginia tobacco (16 per cent), Natu tobacco (9.5 per cent) and Hookah tobacco (7.6 per cent). The production of flue-cured Virginia (FCV) tobacco is about 210 million kg from an area of 0.20 M ha while 450 M kg non-FCV tobacco is produced from an area of 0.25 M ha. In the global scenario, Indian tobacco accounts for 10 per cent of the area and 9 per cent of the total production **(CTRI - Central Tobacco Research Institute, Rajahmundry, 2016).**

India enjoys an edge over the leading tobacco producing countries in terms of low production cost, average farm and export prices. Thus, Indian tobacco is considered as 'value for money'. During the past five years, exports of tobacco and tobacco products increased by 76 per cent and 209 per cent in quantity and value terms, respectively. UK, Germany, Belgium, the erstwhile USSR, South Korea and South Africa were the major importers of Indian FCV tobacco accounting for more than 60 per cent of our exports. At present, Brazil, Zimbabwe, Turkey, China and Indonesia were the competitors to India in the export market.

During 2015-16, India's unmanufactured tobacco (FCV and non-FCV) exports accounted for about 86 per cent of total exports of tobacco and tobacco products in terms of quantity and 71 per cent in terms of value in rupees. Out of the total Indian unmanufactured tobacco exports, FCV tobacco exports constituted 72 per cent in terms of quantity and 81% in terms of value. FCV tobacco exports were in the order of 1,51,670 Metric tons valued ₹ 3,495.81 crores against 1,49,700 Metric tons valued at ₹ 3,201.71 crores during same period last year showing an increase of 1 per cent and 9 per cent in terms of quantity and value, respectively. The unit price realization from the export of tobacco is around ₹ 230.40 per kg.

The distinctive and positive features of Indian tobacco include the lower levels of heavy metals, very low levels of Tobacco Specific Nitrosamines (TSNAs) and pesticide residues compared to the other tobacco producing countries in the world. Further, endowed with varied agro climatic conditions, India has the capacity to produce different types of tobacco ranging from coloury neutral filler to flavourful leaf catering to the needs of a wide variety of customers globally.

FCV Tobacco

Although FCV tobacco production (209.77 million kg) constitutes only about 30 per cent of the total tobacco production of which 151.67 m kg were exported, is of considerable significance. It is mainly grown in the states of Andhra Pradesh and Karnataka. About 55 per cent of the FCV tobacco production in India comes from Andhra Pradesh. East Godavari, West Godavari, Krishna, Guntur, Prakasam, Nellore and Khammam are the important districts growing FCV tobacco in Andhra radish. About 44 per cent of the FCV tobacco is grown in the transitional belt of Karnataka comprising of Mysuru, Hassan and Shimoga districts. **(Tobbaco Board, 2016)**

FCV tobacco is grown under different soil and agro-climatic conditions. They are Traditional Black Soils (TBS), Northern Light Soils (NLS) and Southern Light Soils (SLS) in Andhra Pradesh and Karnataka Light Soils (KLS) in Karnataka. FCV under NLS is grown as an irrigated crop and in black soils under conserved soil moisture, while in KLS it is grown as a rainfed crop. FCV tobacco is marketed during the period October to February in Karnataka while it is from March to July in Andhra Pradesh. Bulk of FCV tobacco in India originates from the black soils of Andhra Pradesh, which is of filler type. The grading pattern being is farm level grades. Light soil tobacco is semi-flavoured, having higher export potential. Plant position grading is followed under light soils, as per the international standard grading pattern.

FCV Tobacco Marketing

FCV tobacco marketing in India was characterised by excess supply over demand resulting in frequent market crisis **(Subba Rao, 1984 and Reddy, 1986).** Earlier FCV tobacco growers used to take their produce to the various purchasing points set up by the individual buyers. The price offered by the trader was almost final in the absence of any other alternate marketing channel. Therefore, it was an imperfect market without any element of competition. Moreover, the traditional marketing system was characterized by delayed payments, under-weighment etc. Studies like **Ramanna *et al.* (1979), Singh (1980), Raju (1986), Prabhu (1986)** have documented the traditional marketing system for FCV tobacco in India.

The Governmental of India established Tobacco Board in the year 1976 in order to protect the interest of the farmers. The Board was required to regulate

production, monitor domestic as well as export trade. Several measures such as market intervention, tobacco leaf purchase voucher system, could not protect the interest of the farmers. Attempts to regulate production also failed in the absence of regulated primary marketing system (Reddy, 1986). Auction sale of FCV tobacco was introduced, under the supervision of the Board, in the year 1984 and 1985 in Karnataka and Andhra Pradesh, respectively. Thus Tobacco Board, a statutory body was entrusted with production, regulation and also as an auctioneer, requiring both growers and traders to sell and buy tobacco statutorily only at the auction platforms. The specific objectives of Tobacco Board's auction system are to regulate production, provide remunerative price to the growers, promote scientific grading, stabilise internal market through minimum floor price (MFP) and to ensure correct weighment and prompt payment. The Tobacco Board has established 21 auction platforms in Andhra Pradesh and 12 in Karnataka for this purpose.

In order to provide remunerative prices to the growers, the government of India announces minimum floor price for F2 grade under black soils and L2 grade of light soil tobacco. Since 1988-89 seasons, the Board has also introduced minimum guaranteed price (MGP), under this system the traders indicate the MGP, which they would be willing to pay to the growers in the ensuring auctions. The MGP is usually higher than MSP. However, it is only a voluntary assurance and does not have any statutory backup.

India's exports valued 1.62 per cent that of the World for the year 2015 and Agricultural exports alone contributed 11.08 per cent of its total exports for the same period. Few studies revealed that some exports of agricultural commodities have shown positive compound annual growth rates while others have negative CAGRs, after the implementation of WTO. In this view, pre and post WTO criteria is considered to estimate whether WTO impacted on FCV tobacco exports, since it is a high value cash and commercial crop (**WTO, 2016).**

1.1 Problem statement

Tobacco Board revises and authorizes the quantity to be produced by the licensed farmers annually, which is 1650 kg/barn for the current year 2016-17 and it was 1740 kg/barn for the previous year. Farmers are not able to earn more due to low productivity as well as low production of good quality leaf. There are three grades in

tobacco viz., bright, medium and low, wherein the share of bright grade tobacco is comparatively less i.e., around 30 per cent against 45 per cent of medium one. Due to less availability of labour, high cost of inputs and poor farm mechanization, resources may not utilize efficiently. Increasing productivity and thereby reducing costs will greatly enhance the competitiveness of tobacco industry both globally as well as in the domestic market. Therefore, the growth in area and production and the performance of productivity needs to be studied.

The fluctuation in the area, production and productivity of FCV tobacco which directly affects standard of living of growers. Fluctuations may due to variation in soil, erratic rainfall, climate, board's production policy etc. in addition to this, resource use efficiency vary from farmer to farmer due to access to and usage of inputs. Since resources are scarce and its inefficient use may leads to fluctuation in production. Since FCV tobacco is high value cash crop therefore, costs of and returns from FCV tobacco needs to be studied so that farmers can able to know its profits, based on this further measures can be taken in order to reap more returns by reducing unnecessary costs involved during its production. Therefore, it becomes essential for the farmer to have knowledge about the production costs. Also, it is necessary to identify the constraints faced by the growers so that essential measures could be adopted to enhance FCV production.

FCV tobacco is highly exportable commodity and its production in the previous years had been fluctuating from year to year. Understanding the destinational changes of tobacco exports will be useful in identifying the potential markets for exploitation in future so that our exports can be increased and possible to make our FCV tobacco competitive in the world market also, unit price realisation can be maximised. In turn, all this contributes to the national economy directly. There is need to focus on productivity, quality and reducing cost of production and increasing the profit to the farmers. There is a great scope for conducting study on production, and export aspects. Since, very few studies have been made on production of FCV tobacco at the national level and its export related to pre and post WTO. Hence, this study is planned with the help of following objectives.

1.2 Objectives

1. To estimate the trend in area, production and productivity of FCV tobacco.
2. To estimate the cost of and returns from FCV tobacco production.
3. To examine the resource use efficiency in FCV tobacco cultivation.
4. To enquire into the nature of export of FCV tobacco.
5. To identify and rank the constraints faced by the FCV tobacco growers.

1.3 Scope of the study

The findings of the study would be more useful to the policy makers, administrators and researchers for their respective purposes. This study will give an evidence of yield performance of FCV tobacco cultivation under a given resource allocation. The outcome of the study will be useful to the farmers to reallocate their resource in FCV tobacco cultivation in order to increase production and thereby income. The findings of the study will be helpful to the policy makers in devising policies to increase FCV tobacco production, which will help farmers to improve their standard of living.

1.4 Limitations of the study

The study has the following limitations:

- The study is restricted to farmers cultivating FCV tobacco residing in Prakasam district of Andhra Pradesh and Mysuru district of Karnataka. Besides, only two blocks have been considered from each district for the study. Hence, the general application of the results may be restricted only to similar socio-economic environment.
- Farmers are not able to provide accurate information regarding cost, return and price in their FCV tobacco cultivation as they have not maintained any proper records. Hence, the information from the memory of the FCV tobacco growers might be subjected to recall basis.
- In some cases, farmers failed to give their opinion categorically. In such situations, further questions were asked and logical conclusions were drawn based on their responses.

- The results cannot be generalized and extended to other districts due to difference in agro climatic conditions, soil conditions, irrigation facilities and labour availability.
- The size of the sample is restricted only to 120. Therefore, the limitations of a restricted sample size are applicable to the present study.

1.5 Plan of thesis

Apart from the introductory chapter, the study is organized into five chapters. Chapter second presents a brief resume of the important work done by the previous research workers in the theme. The descriptions of the study area and its agro-climatic features have been presented in chapter three. Chapter four deals with the methodological details for the fulfillment of the different objectives of the study. The results of the study are presented and discussed in chapter five. Finally the last chapter deals with the summary and conclusions drawn from the present study.

Review of Literature

Chapter 2 REVIEW OF LITERATURE

Review of past works done provides the basic background for formulation of the objectives and selection of appropriate analytical tools for achievement of the same. To facilitate systematic presentation of the literature; studies reviewed have been presented in five separate sections. Section 2.1 deals with studies related to growth in area, production and productivity. Section 2.2 deals with studies on costs and returns. Studies related to resource use efficiency have been presented in section 2.3. Studies related to nature and direction of exports has been reported in section 2.4 and the literatures related to constraints have been reported in last section 2.5.

2.1 Studies related to growth in area, production and productivity

Growth analysis helps in estimating the performance of economic variables, which in turn can be used for forecasting. In addition, it helps to know the factors contributing to the growth or otherwise.

Gopinath *et al.* (1972) estimated growth in area, production and yield of FCV tobacco in Andhra Pradesh for the period 1948-68 using linear functions for average area and production while for yield polynomial of fifth degree were employed by least square method. They reported that production and area growths were 135 per cent and 114 per cent, respectively. Yield grew at only 11 per cent mainly due to expansion of area into marginal land till 1954 and remained stagnant for the remaining period.

Chengappa (1981) estimated the growth rates in area, production and yield of Indian coffee using the exponential models. The exponential function indicated annual compound growth rates of 5.6 per cent for Arabica and 7.4 per cent for Robusta and a combined growth rate of 6.1 per cent.

Sabur (1986) conducted a study to estimate the growth rates in area, production and productivity of potatoes in Bangladesh. The study showed that during the last two decades the production of potatoes in Bangladesh increased by more than 5 per cent per annum, whereas, the growth in area and productivity were over 3 per cent and 5 per cent per annum, respectively.

Patel (1992) estimated the growth in area, production and yield of tobacco for India, Gujarat and Kheda district for the two sub periods, i.e. 1949-50 to 1965-66 and 1965-66 to 1978-79 and also for the entire period. At the all India level the growth in production during the first sub period was due to increase in both area and productivity. However, during the second sub period which coincides with the post green revolution period in India the area under tobacco has remained stagnant. The increase in production was mainly due to improvement in productivity levels.

Singh (1993) analysed the growth rate in total Indian food grain production during the last 40 years. Total food grain production has increased by 236 per cent with an annual growth rate of 2.74 per cent during the period 1950-51 to 1965-66 (pre-green revolution) and 1966-67 to1989-90 (post-green revolution period).

Mandanna (1998) estimated the growth in area, production and productivity of FCV tobacco, non-FCV tobacco and for total tobacco in India by using linear and exponential functions for the period 1964-65 to 1995-96. The whole period was divided into two sub periods i.e. 1964-65 to 1984-85 (pre-auction) and 1985-86 to 1995-96 (post-auction). He observed that FCV tobacco area registered annual compound growth rate of 4 per cent during the post auction period. An equivalent rate of growth in production too was witnessed in the same period. However, the yield of FCV tobacco during the post auction period was more or less remained stagnant.

Dahiya *et al.* (2001) studied the trend and growth rate of area, production and productivity of fruit crops in Haryana for the period 1991-98. Five equations mainly linear, compound, logarithmic, Cobb-Douglas and exponential were tried for analysis. The annual growth rate for fruit crops under area and production in the state registered a positive growth rate. It was found that cultivation of fruit had good potential and can be economically viable alternative to the existing crop cultivation in Haryana.

Malik *et al.* (2004) studied the trends prevailing in area, production and productivity of onion in India and world. They also analysed the trend of export of onion from India. The result showed, among the onion producing countries, India and China had 21.84 per cent and 16.98 per cent of total area, respectively. China's onion productivity was 20.56 tonnes and that of India was 10.2 tonnes. The growth rates were positive and significant for China, Pakistan, Turkey, India and world during the period 1980 to1990 but there was a decline during 1991-2000 in India and Pakistan.

Sharma (2013) estimated the growth rates in area, production and productivity of food grains in the north-eastern states using the linear, quadratic and exponential functional forms. The study was based on secondary data from 1980-81 to 2011-12. He observed that, the growing of food grain crops was not risky in the north-eastern states as coefficient of variation is lower (< 0.551). The increase in production is due to increase in area as well as interaction of area and productivity of food grain crops in the states.

Ramachandra *et al.* (2013) estimated growth in area, production and productivity of major crops in Karnataka for the period 1982-83 to 2007-08. The data were analyzed by using compound growth rate function. They observed that area under pulses, vegetables, spices, fruits and nuts showed significant positive growth while, cereals showed significant negative growth. The productivity of cereals, pulses and fruits registered significant growth and that of oilseeds recorded moderately significant positive growth. Further, productivity of commercial crops registered non-significant positive growth.

Usha *et al.* (2014) estimated the growth in area, production and productivity of rice, maize, groundnut and cotton in Andhra Pradesh. They worked out the growth rates for two sub-periods, namely, pre-WTO period (1985-86 to 1994-95) and post-WTO period (1995-96 to 2005-2006) as well as for the entire study period. They observed that area under maize increased in both pre and post WTO period while the other crops shown positive growth rates in pre-WTO period and negative growth rates in post-WTO period. They also revealed that production growth rates of rice, maize and cotton shown positive for both pre and post WTO periods while groundnut shown negative growth in the post WTO period. An equivalent rate of growth in yield too was witnessed for the same period as in the production.

2.2 Studies on Costs and Returns

Some of the studies relating to different aspects and crops are presented below.

Singh *et al.* (1982) worked out economics of tobacco production in Kheda district of Gujarat. They found that average cost per hectare was ₹ 5,623.00. It was found highest (₹ 6,407.28) on small farms and the lowest (₹ 5,334.89) on large farms. The higher cost on rental value of land accounted for 22.65 per cent of the total cost,

while manures and fertilizers and marketing costs were 13.85 per cent and 7.60 per cent respectively.

Nagaraj (1990) worked out economics of production of FCV tobacco for the year 1988-89 in Mysore district of Karnataka state. The study was based on primary data collected from 120 farmers by multistage random sampling method. He found that the total cost of production, curing and marketing of FCV tobacco per hectare was higher in case of small farmers (₹ 12,070.92) as compare to large farmers (₹ 10,828.63). Further he concluded that the total cost per hectare was lower in case of large farms due to economies of scale and efficient management of resources. The net return per rupee of investment was relatively high on large farms (₹ 0.71) as compared to small farms (₹ 0.49).

Gupta and Desai (1995) worked out costs of and returns from bidi tobacco, chewing tobacco and hookah tobacco - A comparative study. They found that the highest cost of production was incurred on chewing tobacco (₹ 2,549.5/quintal), while returns were highest from bidi tobacco (₹ 2,847.5/quintal) followed by chewing tobacco (₹ 2,742.9/quintal) and hookah tobacco (₹ 1,702.4/quintal).

Malik and Singh (1999) analyzed the costs of and returns from sugarcane production in Haridwar district of western Uttar Pradesh. Their study revealed that in case of reserve area (< 10 kms from sugar mills) cost A_1, A_2, B_1, B_2, C_1, C_2, gross income from main product and by product were ₹ 21,605, 21,605, 24,724, 33,908, 28,231, 37,415, 45,002 and 4,419, respectively. Further, they reported for far away area (>10 kms from sugar mills) the above costs in the same order were ₹ 21,366, 21,366, 24,498, 33,293, 28,009, 37,062, 42,758, and 4,416, respectively.

Subramanyam and Sudha (2001) reported that cost of processing of one tonne finished ground nut products was around ₹ 11,185 with a total return of ₹ 13,603. The raw material and packing accounted for 71 per cent of the processing cost.

Chachal and Kataria (2005) conducted research on technology adoption and costs of and returns from maize cultivation in Punjab. The total operational costs of hybrid maize was ₹ 8,956.00 per hectare as compared to ₹ 6,427.00 per hectare for local variety and ₹ 8,009.00 per hectare for composite varieties. Human and animal labour cost contributed more than one third of the operational cost. Fertilizer accounted

for 20 per cent of the operational cost in case of hybrid varieties. The estimated average yield of hybrid varieties was 36.26 quintal per hectare. Both gross and net returns in case of hybrid maize amounted to be ₹ 1,9637.48 and ₹ 1,0681.65 per hectare, respectively.

Umesh *et al.* (2005) observed that the establishment cost of cashew plantation was Rs.15,631 per ha in all the varieties studied during the first three years. The maintenance cost per ha from fourth year onwards varied from ₹ 5,881 to ₹ 8,254 for the variety Chintamani –1, ₹ 5640 to ₹ 8254 for Ullal–4, ₹ 5812 to ₹ 7882 for Ullal- 3 and ₹ 5821 to ₹ 7229 in Ullal-1. The net returns from cashew orchard per ha for Chintamani –1 Ullal –4, Ullal-3 and Ullal- 1was ₹ 61,314, ₹ 62,425, ₹ 49,672 and ₹ 34,231, respectively.

Harbans and Sharma (2006) found that the potato crop was most capital and labour intensive due to substantial cost incurred on seed, fertilizer and human labour. Out of the total cost ₹ 74,461 the human labour alone accounted for around 30 per cent followed by seed (18 per cent). As such, the return per rupee of expenditure was 2.51. Further, they suggested that profit from potato crop can be increased by reallocating human labour and fertilizers.

Waheed *et al.* (2006) worked out economics of tobacco production in Swabi district, NWFP. The study was based on primary data collected from 100 farmers by personal interview method. The average total cost of tobacco production was ₹ 24,080.99 per acre. On an average, rent of land for tobacco crop was ₹ 5,000.00 per acre, nursery raising cost per acre was ₹ 1,005.00, tillage cost was ₹ 973.66 per acre, fertilizer and pesticide cost was ₹ 3,771.95 per acre, cultural practices, topping and irrigation cost was ₹ 1,302.73 per acre, and loading barn, curing and marketing cost were ₹ 16,743.44 per acre. The average gross revenue from tobacco was ₹ 53145.77 per acre. While net revenue was ₹ 29,064.78 per acre. The cultivation tobacco in Swabi district was found profitable.

Husssain A. (2013) analysed economics of rice crop cultivation in Swat district of Islamabad, Pakistan during 2010. It was observed that on an average per acre cost for all varieties of rice *viz.,* JP-5, Basmati-385, Sara saila, Swat-1, Dil Rosh-97 and Fakhr-e-malakand became to ₹ 16,208 which included the cost of seed (₹ 273), fertilizers (₹ 655), labour (₹ 6600), transplanting (₹ 1,800), harvesting (₹ 1,200) and

threshing (₹ 1260) in addition to other costs. Fakhr-e-malakand was found to be most profitable variety in terms of total and net returns.

2.3 Studies examining Resource Use Efficiency

Bal *et al*. (1983) employed the Cobb-Douglas production function to examine resource use efficiency, factor share and productivity of various factors in crop cultivation in the central districts of Punjab for the two periods *viz.,* 1972-73 and 1980-81. They reported that elasticities of production (in value terms) of human labour, bullock labour and rental value of land have declined in 1980-81 over 1972-73 and that of irrigation had increased. The average level of use of other factors had increased over the period. Finally they advocated that substitution of human labour with other factors mainly with irrigation, fertilizer and weedicides would increase the returns.

Obare *et al.* (2002) examined resource use efficiency of Kenyan smallholders' agriculture with respect to maize productivity and production strategies. They found out that land size, maize seed price, choice of pure stand maize strategy, total household size and fertilizer price were important determinants of farm decisions on whether farmers use hybrid seed or not. Adoption of a pure stand maize strategy was however found to be dependent on size of land owned and choice of hybrid seed. Considering that fertilizer is an important factor of production and that fertilizer use intensity is, in most instances below the optimal level. Hence, they suggested that intensified use of hybrid seed would be an important strategy to mitigate the low level use of fertilizer with the corresponding effect of increasing yields and productivity.

Kathirvel (2007) conducted research on costs of and returns from banana cultivation in Tamil Nadu with special reference to Karur District. The research was based on primary data collected from 500 respondents by multistage stratified random sampling method. To find out input and output relationship (Returns to scale) the Cobb-Douglas production function had been used. The study revealed that the small farmers had decreasing returns to scale in banana production for variable cost inputs. The medium farmers had increasing returns to scale in banana production for variable cost inputs. The large farmers realized increasing returns to scale in banana production for variable cost inputs. They concluded that agricultural growth strategy of the past has intensified the inter-class inequalities except the imputed value of family labour, the other things like cost of production, overall returns etc., are not favourable to the small farmers.

Singh (2007) conducted a study to examine technical efficiency of wheat cultivation in Haryana. The study revealed that the high degree of technical inefficiency in wheat farming was attributed to the low level of education of farmers, poor extension services and gross distortion in the price of input like agro-chemicals and labour. Further, study also revealed that perceived in-efficiency is due to own decision of farmers. The estimates of technical efficiency indicated that the small size farmers are more efficient than medium and large farmers.

Taru *et al*. (2008) examined resource use efficiency in Groundnut production in Adamawa State of Nigeria. The research was based on primary data collected from 144 farmers by simple random technique. The regression analysis indicated that the Cobb-Douglas function gave the best fit. The MVPs of Labour and Seed had shown greater than unity, indicating that the inputs were under-utilized. The MVPs of fertilizer and agrochemicals have shown less than unity, indicating that the inputs were excessively used.

Kaur *et al.* (2010) conducted a study on technical efficiency of wheat production in different regions in Punjab. The data were analyzed using frontier production function. Their study revealed that the farmers of the central region don't have much scope to increase productivity of wheat through technical efficiency improvement under the existing conditions of input use and technology. In the semi-hilly and south-western regions, the yield of wheat can be improved to the extent of 13 per cent and 15 per cent, respectively through adoption of better practices of technology.

Rajesh (2011) examined the resource use efficiency of Bidi tobacco in Belagavi district of Karnataka state. He found that the elasticity coefficient of human labour, bullock power and seedling cost (at one per cent) were statistically significant and the elasticity coefficient of fertilizer and machinery hours were statistically significant (at five per cent). MVP to MFC ratios were greater than unity for fertilizer, human labour, bullock power and seedling, which showed their underutilization. He concluded that there is a scope for increasing the use of these inputs to increase the gross income.

Karthick *et al.* (2013) conducted a study to examine resource use efficiency of turmeric production in Tamil Nadu. They reported that planting material, nitrogen, potash, harvesting and curing cost, machine hours and irrigation have a positive and significant influence on turmeric yield. Economic efficiency of these variables, except

harvesting and curing cost is more than one, indicating that these resources are being used at sub-optimum levels and turmeric yield can be enhanced by increasing their use

Lokanadha *et al.* (2014) examined resource use efficiency of agricultural input factors with reference to farm size in three revenue mandals of Nellore district of Andhra Pradesh state. Multistage random sampling design was used. To select sample farm households twelve villages were selected from each Mandal and twelve farmers were selected from each village for preparing a sample of 420 farmers. The study revealed that the productivity differences between small and large farms were largely attributable to the existing technology. They also found that the level of output use had a relative significant influence on productivity difference. Large farms were found to have a technological advantage over small farms under irrigated conditions, while the reverse was true under non-irrigated conditions. They concluded that an improvement in technology appropriate for them but also an increase in their access to the modern agricultural inputs.

2.4. Studies on Nature and Direction of Exports

Chand and Tewari (1991) computed the growth of Indian exports and imports of agricultural commodities using an exponential trend equation. The study showed that the growth in agricultural exports and imports was much lower than that of growth in total merchandise's exports and imports.

Murthy and Subrahmanyam (1999) measured the dynamics of changes in the exports of onion from India to different countries with the help of markov chain model. The results showed that Malaysia, United Arab Emirates (UAE) and Singapore were having high probability of retention and would continue to be the major importers in future also. As revealed by the low values of probability of retention, Saudi Arabia and others were unstable importers of Indian onion. They further reported that in the next decade, Sri Lanka and Bangladesh would increase their imports from India though it may come at the cost of UAE.

Balappa and Shivaraya (2000) studied the changes in trade directions of export of selected vegetables using Markov chain analysis. The results revealed that UAE and Malaysia were the loyal markets for Indian onion. In case of potato, Sri Lanka and Nepal were found to be the best trade partner, whereas, Bangladesh and Nepal were the most stable importers of Indian fresh tomatoes.

Nisha (2004) studied the export potential and directions of exports of Indian groundnut. The results of Markov chain indicated that exports were likely to be concentrated in Indonesia and Malaysia. She also studied the size, composition and direction of exports in addition to sanitary and phytosanitary measures stipulated by different countries.

Phuke *et al.* (2004) analysed the export potential of banana in India for period of 1991-92 to 2001-02. At all India level, the highest area and production was recorded in the year 2001-02, whereas, productivity was the highest in 2000-01. The compound growth rate increase in area of the country registered 2.19 per cent per annum during the study period.

Veena (1992) analysed the direction of trade of Indian coffee exports using Markov chain model. She observed that India could not retain its previous market share of USA, Netherlands, Yugoslavia and other importers. However, the actual quantity exported to all these countries had increased which was due to increased quantity of Indian coffee exports. India retained its market share to former West Germany, erstwhile USSR and Italy.

Mahesh (2000) studied the structural changes in exports of Indian tea for the period 1979-80 to 1998-99 by employing the first order Markov model. The probability matrix indicated that the countries like UK, former USSR, Iran, UAE, Saudi Arabia and other importing countries like Germany, Poland and USA could not retain their share of Indian tea imports.

Mahadevaiah (2001) constructed the transitional probability matrix for Indian cotton exports for the period I (1981-82 to 1990-91) and period II (1991-92 to 1998-99). He concluded that China was the only stable country among the major importers of Indian cotton reflected by the high probability of retention which increased from 8 per cent in period I to 32 per cent in period II. The major gainers among the importers of Indian cotton in the period II over period I observed as China, Japan, Indonesia and other countries.

Chand *et al.* (2001) studied the temporal changes and growth in the exports of agricultural commodities from 1962-1994. The exponential function was used to compute the growth rates. The growth in export of fruits and vegetables, oilseeds, fish

and fishery products and feeding stuff for animals was remarkable in early nineties as compare to previous decades (1980-90). The export of cereals, sugar and honey were observed to be most volatile in the last two decades. Both total merchandise and agricultural sectors trade were showing deficit since 1962-65 but trade in agricultural sector turned to surplus of $ 1349 million in 1990-94 indicating positive impact of new liberalized trade policies.

Bindu Kumar (2006) examined the changes in pulses economy for pre and post WTO in Karnataka. She observed that exports of redgram had increased considerably after the establishment of WTO. They further reported that UAE, Malaysia and USA were the stable markets for Indian redgram exports, UAE had really been a growing market for Indian redgram exports.

Veer *et al.* (2015) analysed the agriculture export performance for pre and post WTO implementation policies. They estimated the compound annual growth rates for selected agricultural commodities *viz.,* coffee, tea, tobacco, cashew nuts, rice, wheat, sugar, spices, fish and fish products and fruits and vegetables. They observed that export of rice, tobacco, sugar, spices, fruits and vegetables had positive compound annual growth rate while other crops shown negative CAGR, after implementation of WTO.

2.5 Studies on Constraints faced by farmers

Nagaraj (1990) identified the constraints faced by the farmers in production and marketing of FCV tobacco for the year 1988-89 in Mysore district of Karnataka state. He found that cost of fuel wood was very high and lack of credit availability was the major constraints in the production aspect. He also found that none of the sample farmers were aware of 64 grades that are identified by the tobacco Board and considered during auction.

Krissoff *et al.* (1997) conducted a study on barrier to trade in global apple market. They identified higher tariff rate and technical barriers as major constraints to international sale of apple to some markets. Phyto-sanitary protocols related to fire blight, codling moth, apple maggot and other pests also prohibited apple exports to some countries.

Nain *et al.* (2002) reported that the irregularity in the distribution of sugarcane purchase indent, delay in payment of sugarcane to the farmers, delay in unloading, lack

of transportation facilities etc., were the major problems faced by the selected respondents in marketing of sugarcane to the sugar mills.

Alagumani (2005) identified constraints in production of tissue cultured banana and sucker-propagated banana, in Theni district of Tamil Nadu. The study revealed that the constraints in tissue culture banana production were cost of tissue culture plantlets were very higher, and few farmers were also expressed problem of marketing of big size bunches obtained from tissue culture banana.

Nagaraja *et al.* (2006) identified and ranked the most important constraints in production and marketing of potato by using Garrett's technique in Kolar district of Karnataka. They revealed that high cost of seed material and diseases (rank-I) were the major constraint followed by frequent power cut (rank-II), high cost of fertilizers and plant protection chemicals (rank-III), insufficient storage facilities for the produce (rank-VI). Further, they suggested farmers to take up tuber treatment with sufficient time to avoid occurrence of disease, practice of weedicide application to avoid high cost of labour especially during scarcity period and adoption of scientific production technologies and marketing strategies so as to get maximum returns.

Nguyen and Singh (2006) identified the constraints faced by farmers to propose Government's policies regulating to overcome the constraints of rice production promotion and export in India and Vietnam. They surveyed 100 farmers in Punjab and West Bengal states of India and Giang and Vinh Long provinces of Vietnam. They found that the agro-ecological constraints faced by farmers, ranked from more to less serious were related to dependence on monsoon; land/soil problems; environmental pollution; lack of water and small land holdings. Under technical constraints, it was found that diseases (sheath blight, blast, and stem rot); pests; lack of proper varieties; post-harvest technology constraint; storage problems were the most serious constraints perceived by large percentage of respondents. Fertilizer problems; plant protection constraints; weed problems; lack of labours and poor processing were found to be other constraints as perceived by farmers. In case of socio-economic constraints, the study found that poor infrastructures; high cost of inputs; credit problems; low rice price; inadequate inputs and lack of trainings were the most important constraints as perceived by large percentage of farmers.

Vorghees (2008) studied the problems of coconut growers in Tamil Nadu. The study reveals that majority coconut growers faced the marketing as well as production constraints like small size of holdings, decline in proportion of bearing palms, prevalence of root disease, lack of irrigation, use of low productive hybrid varieties etc. Marketing problems like low price for produce, price fluctuation, irregularity in payments, lack of market information, lack of transportation facilities *etc*.

Tripathi *et al.* (2010) reported constraints in organic and inorganic farming. They revealed that the major constraints observed in organic farming were lack of awareness, high input cost, low yield, certification from government and poor market linkages.

Rajesh (2011) identified the constraints faced by the farmers in production and marketing of Bidi tobacco in Belagavi district of Karnataka state. He found that labour scarcity and non-availability of credit were the main constraints, lack of technical information and pests and disease were the other problems in the production of bidi tobacco. He also found that lack of remunerative price and inadequate access to market information were the major constraints in the marketing of bidi tobacco.

Summary comments of the studies reviewed

It is revealed from the literature reviewed above, most of the studies were done in different parts of India and abroad to estimate Growth in area, production and productivity, cost and returns, resource use efficiency, direction of trade etc. it is evident from the studies that till now, have mostly dealt with respect to one state regarding costs and returns, resource-use efficiency. None of the studies has done on both production and exports of tobacco together. None of the studies has done by considering major states as representing a nation. Very few studies have been made on FCV tobacco so far. In this study, an attempt will be made on both Production and exports aspects of FCV tobacco and for production two states have been considered to collect primary data. The results would give an insight into production and export of FCV tobacco.

Profile of the Study Area

Chapter 3 PROFILE OF THE STUDY AREA

The chapter has been organised in two sections. Section 3.1 deals with the geographic, demographic, climatic and agricultural economy of the study area i.e. Prakasam district of Andhra Pradesh. In section 3.2 deals with the geographic, demographic, climatic and agricultural economy of another study area i.e. Mysuru district of Karnataka.

3.1 Geographic, demographic and agricultural features of Prakasam district

3.1.1 Geographical features

The Prakasam district is bounded on east by Bay of Bengal, in the south partly by Nellore and partly by Uddapah Districts, the west by Kurnool district and the north by partly Guntur and partly Mahaboobnagar. The district is situated in a tropical region between 14^0 57' to 16^0 17' Northern latitude and 78^0 43' to 80^0 25' Eastern longitude. The district spreads in an area of 17,626 sq. km. It accounts for 6.41 percentage of the total area of the state and is ranked fourth in terms of size. The area of this district is bigger than the other coastal districts of Andhra Pradesh in extent. The district is having 102 km of coastal line spreading over 10 mandals.

3.1.2 Demographic features

Prakasam district has 10.81 per cent of geographical area and 4 per cent of population of Andhra Pradesh. The growth rate of population in Prakasam district is more as compared to that of Andhra Pradesh. Literacy rate in Andhra Pradesh (67.0) is more as compared to Prakasam district (63.08). the detail picture of demographic features are presented in table 3.1.1.

3.1.3. Administrative divisions

The district is divided into 3 revenue divisions, namely, Kandukur, Markapur and Ongole. These are sub-divided into 56 mandals which consists of 1081 villages and 13 towns. These 13 towns (or urban settlements) in the district include, 1 municipal corporation, 3 municipalities and 4 nagar panchayats. Ongole is the only municipal corporation, Chirala, Kandukur, Markapur are the 3 municipalities and Addanki, Kanigiri, Chimakurthi, Giddalur are the nagar panchayats. The 5 census towns in the district are Cumbum, Chirala (CT), Podili, Vetapalem, Pamur and Singarayakonda.

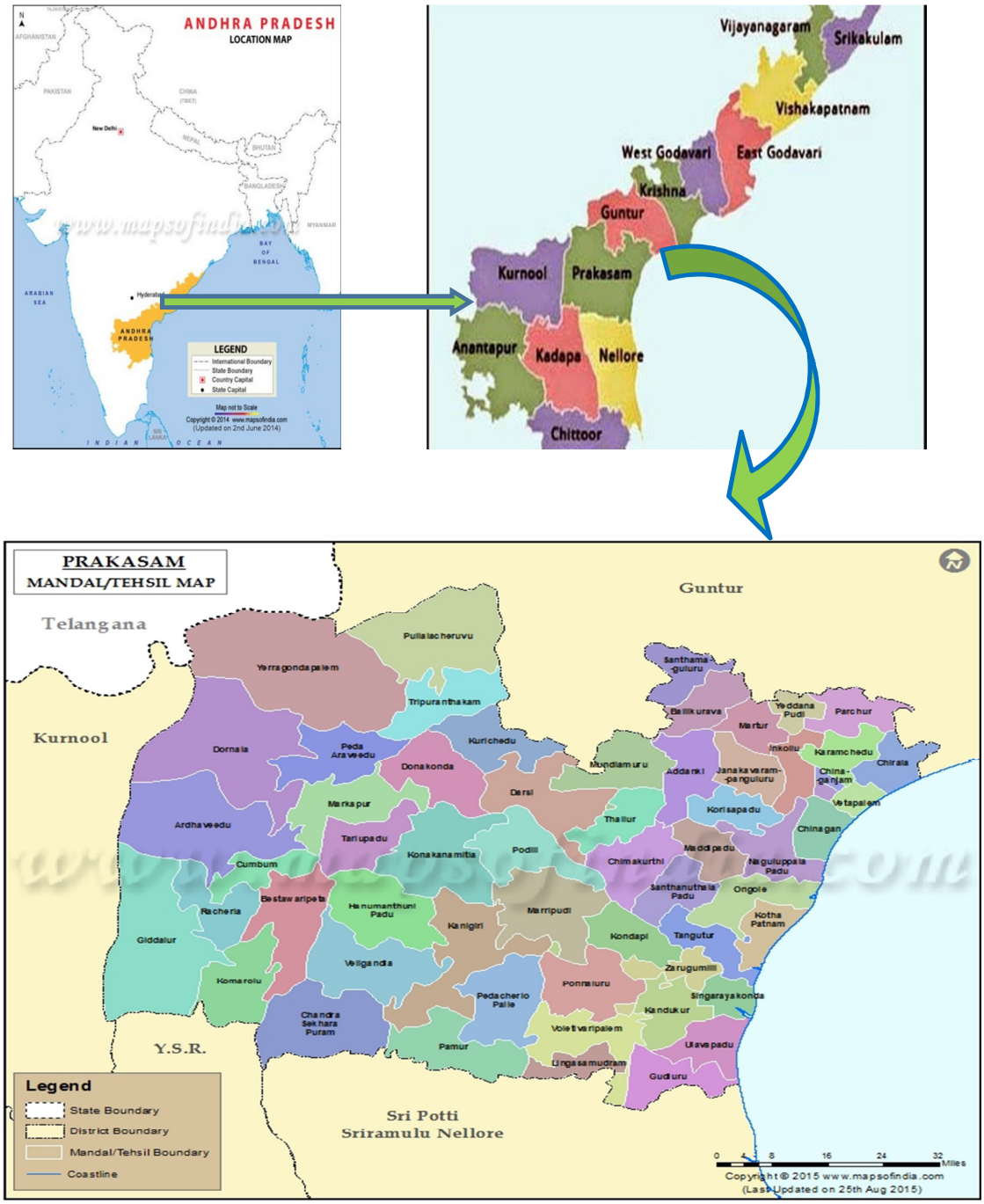


Fig. 3.1 Map of Prakasam district

Table 3.1.1: Demographic features of Prakasam district

Particulars	Unit	Prakasam	Andhra Pradesh
Area	Sq. Km	17,626	1,62,970
Population	lakh	33.97	846.0
Male	lakh	17.14	424.4
Female	lakh	16.82	421.3
Population growth	Per cent	11.05	10.98
Density	No.	193	308
Sex ratio	No.	981	993
Child sex ratio (0-6 age)	No.	932	939
Average literacy	Per cent	63.08	67.02
Male literacy	Per cent	72.92	74.88
Female literacy	Per cent	53.11	59.15

Source: Hand book of Statistics, Prakasam District, 2009-10.

3.1.4 Climate, Soils and Rainfall

i. Climate:

In Prakasam district the sea breeze renders the climate moderate, both in winter and summer especially in the coastal areas of the district. In the non-coastal areas of the district the heat in the summer is severe, especially in the tracts of upland areas.

ii. Soils:

Red loams, Black cotton and Sandy loams cover the major portion of the district. In the total area of the district, 51 per cent of the area is covered by Red soils, 41 per cent of the area is black cotton soils, about 6 per cent of the area is sandy soil and the rest 2 per cent of the area is other type of soil. The black cotton soil redominantly occurs in all the Mandals of Ongole Division except Chirala, Vetapalem and Chinaganjam Mandals. The Red loamy soils predominantly occur in the mandals of Kandukur and Markapur Divisions. The sandy soil is present in vast areas of the Mandals of Chirala, Vetapalem, Chinaganjam and lavapadu.

iii. Rainfall:

The district receives rainfall from the South-West as well as North-East monsoons. The district received lesser rainfall of 750.9 MM when compared to that of the State which is 925.0 MM. Among the total average rainfall in a year 46.93 per cent is received during the South-West monsoon period (June to September) and 42.22 per cent during the North-East Monsoon period (October to December). The district is frequently affected by drought and cyclones. The maximum and minimum normal temperature recorded in the district is 38.20^0c and 19.70^0c, respectively. Generally, the maximum temperature is recorded during the summer months especially in May and June.

3.1.5 Agricultural Economy

Prakasam District is mainly an agricultural district with low level of industrialization and weak service sector. Agricultural economy of the district is discussed with data on selected aspects like (i) land use (ii) irrigation (iii) cropping pattern which are presented for 2009-2010.

a. Land use

The land use pattern in Prakasam district during 2009-2010 are presented in Table. 3.1.2.

Table 3.1.2 Land use pattern in Prakasam district during 2009-10

Sl. No.	Land use	Area (ha)	% of share
1	Forests	401983	26.25
2	Barrron & Cultivated land	158269	8.99
3	Land put to Non- agricultural uses	169701	9.65
4	Culturable waste	69638	3.96
5	Pasture land	58206	3.30
6	Miscellaneous use	10865	0.63
7	Current fallow	113346	6.44
8	Other fallow land	84917	4.83
9	Net sown area	632608	35.95
10	Geographical Area	---	---

Source: Hand book of Statistics, Prakasam District, 2009-10.

The above table depicts highest share of land is devoted to agriculture i.e. 35.95 per cent of total geographical area followed by forest (26.25 per cent). Current fallow of land is meager of 6.44 per cent of total area.

b. Irrigation

Irrigated areas in Prakasam district during 2009-10 is given in Table .3.1.3. This is one of the districts in the State where the extent of the irrigated area to the cultivated area is only 38 per cent. Further this is one of the two districts in the coastal Andhra Region where the canal irrigation is almost negligible. The area irrigated by canals is about 5 per cent of the total irrigated area. With the scanty and unreliable rainfall the dependence on tanks and wells of irrigation, the plight of agricultural is really deplorable.

Table 3.1.3: Irrigation structure in Prakasam district during 2009-10

Sl. No	Land use	Area (ha)
1	Canals	73,946
2	Tanks	32,384
3	Tube wells	83,579
4	Other Sources	1,731
5	Net Irrigated Area	1,48,170
6	Area Irrigated more than once	16,383
7	**Gross irrigated area**	**1,64,553**

Source: Hand book of Statistics, Prakasam District, 2009-10.

c. Cropping Pattern

The cropping pattern of district and the changes in it by 2009- 10 is presented in Table .3.1.4. The percentage of the area under food crops has been found to be 60 per cent of gross cropped area, whereas, the area under non-food crops has been 40 per cent. Jowar, Bajra and other millets are the principle food crops in the district. Paddy occupies about 20 per cent of the cropped area. Among the non-food crops, tobacco claims the pride of the place in the district as it ranks first in the state. The area under tobacco accounts for more than 12 per cent of the cropped area. The important non-food crops grown in the district are tobacco, red gram, sesamum, black gram, green gram and groundnut etc.

Table 3.1.4 Cropping pattern followed in Prakasam district

Sl. No.	Land use	Area (ha)	% share
1	Rice	1,31,391	19.78
2	Redgram	68,336	10.29
3	Balckgram	8,815	1.33
4	Greengram	3,150	0.47
5	Groundnut	9,574	1.44
6	Sesamum	4,053	0.61
7	Sugarcane	--	-
8	Tobacco	81,738	12.30
9	Coconut	--	--

Source: Hand book of Statistics, Prakasam District, 2009-10.

d. Livestock

Livestock status in Prakasam district for the year has been presented in table 3.1.5. The below table indicates that buffaloes population has been found to be more as compared to cattle. Total poultry population found to be 14,01,908.

Table 3.1.5: Livestock status in Prakasam district during 2008-09

Sl. No.	Particulars	Number
1	Cattle	1,15,082
2	Buffaloes	13,18,406
3	Sheep	14,94,985
4	Goats	4,36,582
5	Horses and ponies	15+
6	Others	--
7	Total livestock	--
8	Total poultry	14,01,908

Source: bureau of Economics and Statistics, Hyderabad.

3.2 Geographic, demographic and agricultural features of Mysuru district

Mysore District is situated in the southern part of the Deccan Peninsula and it forms the southernmost district of Karnataka State of the Indian Union. Prior to 1973, Mysore was the name by which Karnataka State was known. Mysore city is now the headquarters of the district and the revenue division of the same name. It is known as one of the ***garden cities*** in India. It is also known throughout the world for the pomp and gaiety of its traditional ***Dasara*** festival.

3.2.1 General features of Mysuru

The total geographical area of the district is 6,854 km^2 being sixth in rank among the districts in the State in its size. The district lies between 11^o 30' N and 12^o 50' N Latitudes and 75^o 45' E and 77^o 45' E Longitudes. It is bounded on the north by Hassan, Mandya and Bangalore districts and on the south by Chamarajanagara district (from 1997) and Kannur district of Kerala State. On the east also, it is bounded by Chamarajanagara district and on the west by Kodagu district, besides Wynad district of Kerala State (Figure 3.2.1). Physiographically, the region in which the district is situated may be classified as partly *maidan* (plains) and partly semi-*maidan* of the Mysore plateau.

Table 3.2.1: General features of Mysore

Sl. No.	Particulars	Unit	Year
			(2015-16)
1.	Total geographical area	Sq. Km	6854
2.	Revenue administrative block	No.	7
3.	Educational block	No.	9
4.	Number of villages	No.	1216
5	Statutory towns	No.	11
6.	Gram Panchayat	No.	235
7.	Taluk Panchayat	No.	7

Source : District at a Glance, Mysore 2014-15.

Mysore district consists of seven revenue taluks, namely, H.D. Kote, Hunsur, K.R. Nagar, Nanjangud, Periyapatna, T. Narasipura and Mysore (Urban and Rural). For administrative purposes, Mysore district is divided into two sub- divisions, which are Hunsur and Mysore and the district has 1,216 villages, 11 statutory towns, 235 grama panchayats. There are 7 revenue administrative blocks and 9 educational blocks. Mysore block is divided into two educational blocks, namely, Mysore Urban and Mysore Rural. Apart from the above, the district has 9 municipalities, 1 City Corporation (Mysore), 7 taluk panchayats, 46 Zilla Panchayat Constituencies, 1 Parliamentary Constituency and 11 assembly constituencies.

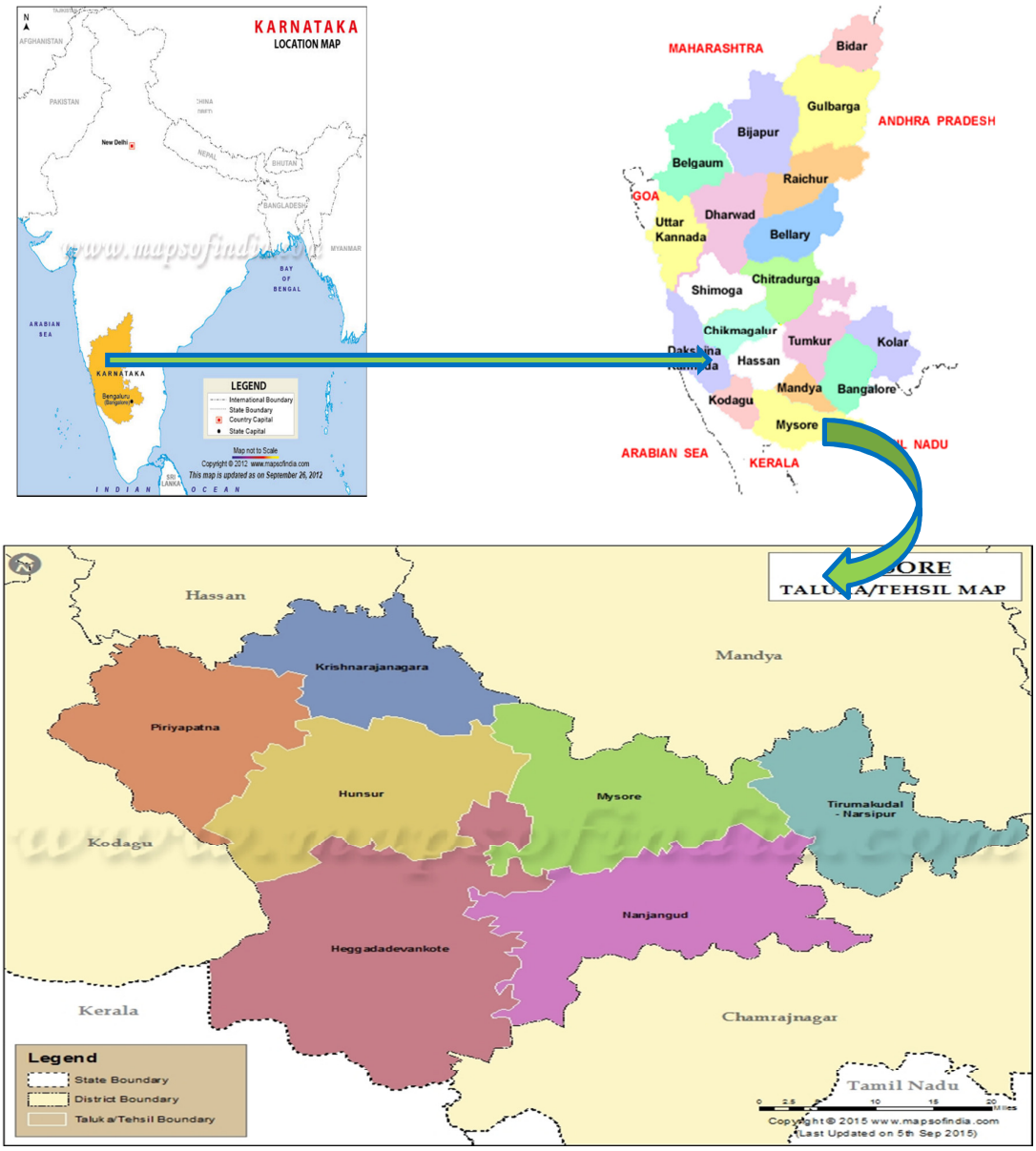


Fig. 3.2 Map of Mysore District

3.2.2 Demographic features

As reported in the table 3.2.2 Mysore district has 4.90 per cent of Karnataka's population and growing at the rate of 13.63 per cent per annum which is lower than the state (15.60). Mysore district has 3.2 per cent Karnataka's geographical area. Sex ratio of the district (985) is quite higher than the state (973). Literacy rate is found to be 72.79 per cent.

It can be concluded that Prakasam district is larger in terms of area than Mysore. Hence more populated than Mysore district. Though, Prakasam district is larger, Mysore district have edge over Prakasam district from the rest of the parameters.

Table 3.2.2: Demographic features of Mysore district

Particulars	**Unit**	**Mysore**	**Karnataka**
Area	Sq. Km	6,307	1,91,791
Population	lakh	30.01	611
Male	lakh	15.11	3309.66
Female	lakh	14.89	301.28
Population growth	Per cent	13.63	15.60
Density	No.	476	319
Sex ratio	No.	985	973
Child sex ratio (0-6 age)	No.	961	948
Average literacy	Per cent	72.79	75.36
Male literacy	Per cent	78.46	82.47
Female literacy	Per cent	67.06	68.08

Source: population census 2011

3.2.3. Climate and Rainfall

The climate of the district is tropical and is greatly influenced by the two seasons, namely, the southwest monsoon and northeast monsoon. In regard to temperatures, there are mild temperatures during the months of December-March, but starting in April, the temperatures increase gradually to reach a peak in May and begin to decrease only after the end of the southwest monsoon, in September. The climate is

salubrious for nearly 5 months because of the elevations, but is generally hot the rest of the year.

Table 3.2.3: Rainfall in Mysore district

(mm/year)

Taluk	Year	
	1989-90	2014-15
H.D. Kote	832	989
Hunsur	739	1028
K.R. Nagar	800	890
Mysore	784	827
Nanjangud	670	599
Periyapatna T.	830	1046
Narasipura	712	832

Source: District at a Glance, Mysore 2014-15.

Table 3.2.3. below reveals taluk-wise distribution of rainfall in the district of Mysore. H.D. Kote, Hunsur and Periyapatna taluks are cool and moist during winter and rainy seasons and these taluks are in the *semi-malnad* region of the State. The remaining taluks are comparatively dry (except along the riverine tracts) during the year. The highest actual rainfall during 2014-15 was recorded in Periyapatna taluk with 1,046 mm and the lowest actual rainfall in Nanjangud taluk with 599 mm.

3.2.4. Soils

The soils of the district can be broadly classified as the laterite, red loam, sandy loam, red clay and black cotton soils. Laterite soil occurs mostly in the western parts of the district while the red loam is found in the northwest. The two account for nearly half the area of the district. Black cotton soil is mostly found in the northeastern parts of the district. Red sandy loam soils are derived from granites and gneisses. The western taluks of Periyapatna, H.D. Kote and Hunsur are covered with hilly terrain and contain red, shallow gravelly soils. In the taluks of T. Narasipura and Nanjangud, there is deep red loam, occasionally interspersed with the black soils. The red soils are

shallow to deep, well-drained and do not contain lime nodules. The black soils are 1 to 5 metres in bases with good water holding capacity for a longer time.

3.2.5. Land Utilization

The pattern of land utilization is an important indicator of land development in any district. The pattern of land use suggests the extent of availability of land for cultivation, land under forests, permanent pastures and cultivable wastes.

Table 3.2.4: Land Utilization Pattern in Mysore District

Sl. No.	Land use	Area ha (2015-16)	% age of area
1.	Forest area	62851	9.30
2.	Culturable waste land	21460	3.17
3.	Current fallows	41864	6.18
4.	Fallow land other than current fallows	37054	5.47
5.	Barren and unculturable land	45812	6.77
6.	Land under non-agricultural uses	67028	10.00
7.	Permanent pasture and other grazing land	55256	8.17
8.	Land under miscellaneous, tree crop and groves not included in net sown area	6871	1.00
9.	Net sown area	338186	50.00

***Source**: District at Glance, Mysore 2014-15.*

Land use classification is primarily based on whether or not a particular area is cultivated, grassed or forested. Its main purpose is to show the distribution in detail, of existing land according to its actual use and also how a particular piece of land is potentially utilized.

The land is classified into a nine-fold classification according to use. They are: the forests, land put to non-agricultural uses, barren and uncultivable lands, permanent pastures and other grazing lands, land under miscellaneous tree crops and groves not included in the net area sown, cultural wastes, fallow lands other than current fallows,

current fallow and net area sown. Table 3.2.4 shows that a large part of the land is devoted to net area sown. But 1.05 per cent of land is occupied by miscellaneous tree crops and groves.

3.2.6. Irrigation

A total of 1,59,230 hectares is the net area irrigated in Mysore district. The main rivers of Kabini, Cauvery and Harangi supply water for agriculture in the district. Among them, the Cauvery flows through K.R. Nagar and T. Narasipura taluks, Kabini flows through H.D. Kote, Nanjanagud and T. Narasipura taluks and join the Cauvery. The minor irrigation systems such as the tanks, wells and bore wells have played a crucial role in the development of irrigation facilities to promote and enhance agricultural production in the district. The details of sources of irrigation are presented in the following Table 3.1.5.

Table 3.2.5. Various sources of irrigation

(in hectare)

Sl .No.	**2009-10**	**2014-15**
Canal	108790	108702
Tank	20710	20780
Well	19900	19167
Bore well	9385	10223
Others	353	358
Total	159138	159230

Source: *District at Glance, Mysore 2014-15*

Table 3.2.5. reveals that the land under canal irrigation in the district has decreased from 108790 ha to 108,702 ha in 2009-10 and 2014-15, respectively. The area under tank irrigation in the district has increased from 20710 ha to 20,780 ha in 2009-10 to 2014-15, respectively. On the other, well irrigation in the district has decreased from 19900 ha to 19167 ha during the same period, the bore well irrigation has increased from 9385 ha to 10,223 ha and other irrigation in the district has however decreased from 353 ha to 358 ha in 2009-10 and 2014-15, respectively.

3.2.7. Landholdings

The size of landholdings determines the stage of agricultural development. Large number of small holdings is a sign of economic backwardness. The cost of cultivation per hectare is high when the size of holding is small and marginal due to the non-availability of the advantages of large-scale production. The details of land holdings in the district are presented in Table 3.1.6.

Table 3.2.6: Pattern of land holdings in Mysore District

Sl. No.	Size class	No. of holdings	Area operated in ha
1.	Marginal Farmers (below 1 ha)	244,595 (65.92)	104372 (28.93)
2.	Small Farmers (1 to 2 ha)	85021 (25.91)	117879 (32.67)
3.	Semi-medium Farmers (2 to 4 ha)	32857 (8.86)	85925 (23.81)
4.	Medium Farmers (4 to 10 ha)	8012 (2.16)	43507 (12.06)
	Large farmers (10 ha and above)	557 (0.15)	9141 (2.53)
5.	Total Farmers	371042 (100)	360824 (100)

Source: *District at Glance, Mysore 2014-15.*

Note: Figures in parantheses indicate percent to total

3.2.8 Cropping pattern

Agriculture is the predominant occupation of people in Mysore district. Of the total geographical area of 676382 ha. in the district, about 342852 ha. is cultivable area. Cropping pattern followed in Mysore district have been given in table 3.2.7.

As shown in the table 3.2.7 rice is the principal food crop grown in the district. Tobacco occupies around 16.7 per cent of gross cropped area in the district followed by ragi (13.71 per cent), cotton (11.44 per cent) and maize (5.36 per cent). Horsegram, cowpea and jowar are the other important crops taken up by the farmers in Mysore district during 2014-15.

Table 3.2.7: Cropping pattern followed in Mysore district

Sl. No.	Crops	Area (ha)	% of share
1	Rice	1,05,592	23.03
2	Jowar	11,690	2.55
3	**Ragi**	**62,883**	**13.71**
4	**Maize**	**24,598**	**5.36**
5	Tur	3,176	0.69
6	Horsegram	32,485	7.08
7	Blackgram	8,104	1.76
8	Greengram	5,656	1.23
9	Cowpea	26,178	5.71
10	Avare	15,298	3.33
11	Ground nut	9,698	2.11
12	Sesamum	7,773	1.69
13	Sunflower	2,177	0.47
14	Castor	3,852	0.84
15	Niger	1618	0.35
16	Mustard	5	0.001
17	Soybean	85	0.01
18	Cotton	52,476	11.44
19	Sugarcane	8,451	1.84
20	**Tobacco**	**76,548**	**16.7**
Total of all crops		**4,58,343**	**100**

Source: *District at Glance, Mysore 2014-15.*

Methodology

Chapter 4 METHODOLOGY

This chapter details the methodological details employed to achieve the objectives set for the study. It has three components viz., type of data used and its sources, sampling design and analytical tools used.

4.1 Data and its sources

Both primary and secondary data were used in the study. Primary data were collected by personally interviewing the sample farmers with the help of pre-tested schedule specifically designed for the purpose. Secondary data were collected from various published and un-published reports, Journals, Official record of government, Agricultural office, Tobacco Board and CTRI (Central Tobacco Research Institute, Rajahmundry). Time-series data on area, production, productivity and export were collected from 1975 to 2016.

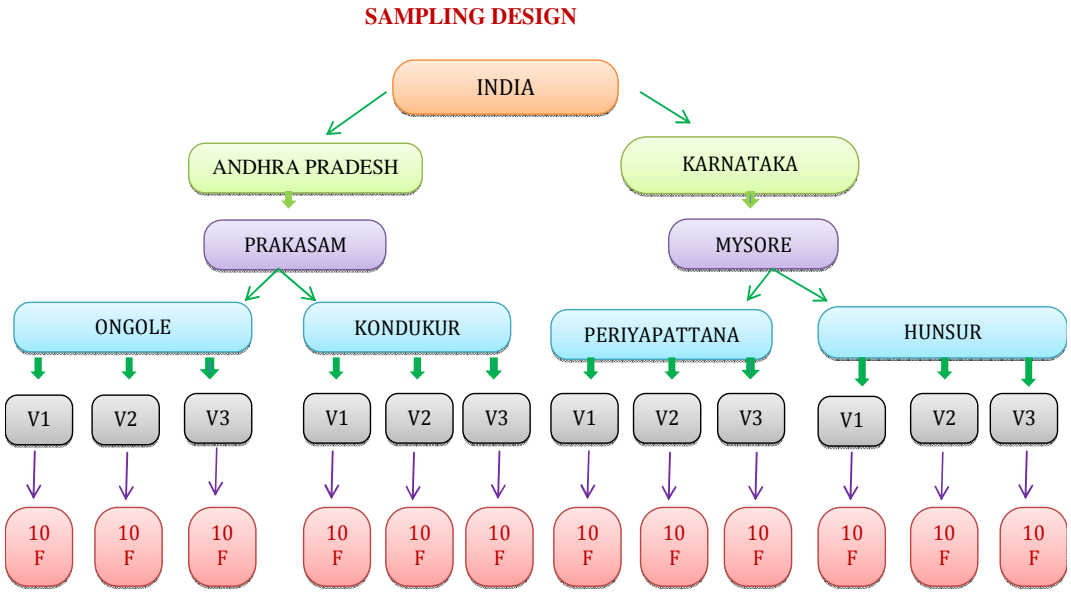
4.2 Sampling design

To conduct the proposed study, two states producing maximum production of FCV tobacco in the country were selected purposively. One district was selected purposively from each state which the production is Maximum. Thereafter, two blocks were selected randomly from each selected district. In the next step, three villages were selected randomly from each block, wherein tobacco is being produced. From the selected villages a list of farmers cultivating tobacco was prepared and 10 farmers were selected randomly from each village. Thus, a total 120 farmers were selected for collection of primary data.

Table 4.1 Chart on sampling design

State	District	Block	Village	No. of respondents
Andhra Pradesh	Prakasam	Ongole	Tangutur	10
			Shivapuram	10
			T. Naidupalem	10
		Kondukur	Peridepi	10
			Anakarlapudi	10
			Mupparajupalem	10
Karnataka	Mysuru	Periyapattana	Kampalapura	10
			Bettadapura	10
			Makod	10
		Hunsur	Kattemalavadi	10
			Thattekere	10
			Uhigowdanahalli	10
Total	**02**	**04**	**12**	**120**

Flow diagram of sampling design



A total sample of 120 farmers

4.3 Analytical framework

4.3.1 To estimate the growth in area, production and productivity of FCV tobacco, exponential growth function has been used.

To achieve this, the time-series data on area, production and productivity of FCV tobacco were divided into pre and post WTO periods and overall period as follows:

1. Period I, i.e. 1974-75 to 1994-95 (pre WTO)
2. Period II, i.e. 1995-96 to 2015-16 (post WTO)
3. Overall period (1974-75 to 2015-16) i.e. pooling of the above two periods

The pre and post WTO criteria has been considered to estimate whether WTO ompacted on tobacco's growth in area, production, productivity and exports, since it is a high value cash and commercial crop.

Compound growth rate

Compound growth rate is worked out to examine the tendency of variable to increase, decrease or stagnant over a period of time. Growth in area, production and productivity of FCV tobacco is computed by dividing time-series data into pre WTO, post WTO and overall period (i.e. pooling the both the data).

In the present study, compound growth rates of area, production and productivity of FCV tobacco for major states and for the country on both FCV and total tobacco are estimated.

There are many alternative forms of growth functions which have been developed and used by researchers, viz., linear, exponential or log-linear, modified exponential, Gompertz, cobb-Douglas, etc.

Dandekar (1980) observed that '…. The change in agricultural output in a year would depend upon the output in the preceding year….., then not 'Y' but 'log Y' should be supposed to follow such functions over time….., Some other studies have also pointed out the superiority of log-linear equation over the other forms, in case of agricultural data in particular. In this study, therefore, log-linear form was estimated to find out the growth rates.

The mathematical form of log-linear function (also known as exponential function) is as follows:

$$Y_t = a\, e^{bt} \qquad \ldots(1)$$

Where,

Yt = Dependent variable for which growth rate was estimated (area, production and productivity of FCV tobacco in year 't').

a = Intercept

b = Regression coefficient

t = Year which takes values 1, 2, …, n.

The log transformation of this function is as follows

$$\log Y_t = \log a + bt \qquad \ldots(2)$$

Differentiating it with reference to 't'

$$[(1/Y_t).\ (dY_t/dt)] = b$$

$$\text{Or } dY_t/dt = b\, Y_t \qquad \ldots(3)$$

This form of the function presents a constant growth rate over time, a characteristic which made its use more popular among the researchers.

The formula for calculating CAGR from the log-linear equation can be derived as follows:

Let 'Y_o' be the value of the variable under study in the base year, 'Y_t' be the value of the variable in time 't' and 'r' be the value of CAGR (compound annual growth rate).

Using the compounding formula, we get,

$$Y_t = Y_0\,(1 + r)^t \qquad \ldots(4)$$

Log transformation of above is :

$$\text{Log } Y_t = \log Y_0 = t \log (1 + r)$$

Assuming $\log Y_o = \log A$ and $\log (1 + r) = b$, the same expression could be put as:

$$\text{Log } Y_t = \log A + bt \qquad \ldots(5)$$

This is same as the log-linear form of the exponential function. From this log-linear form, CAGR can be worked out as follows by differentiating it with reference to 't'

$$d (\log Y_t) / dt = b \quad ...(6)$$

But the estimate of 'b' in the log-linear function is in semi log term.

Therefore, to convert it into original form of Y_t, following transformation is done:

Since, $b = \log (1 + r)$

Antilog (b) = 1 + r

r = (antilog b) – 1

CAGR in percentage = [(antilog b) – 1] X 100 …(7)

4.3.2 To attain the second objective, CACP cost concepts are used.

In the present study information were collected pertaining to FCV tobacco production for the year 2015 – 16.

4.3.2.1. Cost of and returns returns from FCV tobacco cultivation

To estimate the costs of and returns from FCV tobacco cultivation, CACP (Commission for Agricultural Costs and Prices) cost concepts were used. The total cost is classified into operational cost, material cost and other costs. Operational cost includes cost on owned and hired human labour, owned and hired bullock power and owned and hired machine power. The material cost includes cost on seeds/seedlings, manures and fertilizers, irrigation, firewood and plant protection chemicals. Other cost includes land revenue, depreciation on farm buildings, interest on the value of working and fixed capital and rental value of owned land.

The cost concepts, in brief, are Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2, Cost C_2* and Cost C_3. The different cost items that are included under each cost concept are detailed below.

Cost A_1 = it includes the value of

- Casual hired labour
- Owned and hired bullock labour

- Owned and hired machine power
- Seeds/seedlings
- Manures and fertilizers
- Plant protection chemicals
- Irrigation charges
- Interest on working capital
- Depreciation
- Land revenue
- Firewood
- Tray and coco peat
- Miscellaneous expenses

Cost A_2 = Cost A_1 + Rent paid for leased in land, if any

Cost B_1 = Cost A_1 + Interest on value of owned capital assets excluding land

Cost B_2 = Cost B_1 + Rental value of owned land less land revenue + rent paid for leased in land

Cost C_1 = Cost B_1 + Imputed value of family labour

Cost C_2 = Cost B_2 + Imputed value of family labour

Cost C_2^* = Cost C_2 is estimated by taking into account statutory minimum wage rate or actual Wage rate, whichever is higher

Cost C_3 = Cost C_2^* + 10% of Cost C_2^* on account of managerial function performed by the farmer

4.3.2.2. Costs

The costs were analysed in terms of operational costs, material costs and other costs.

4.3.2.2.1 Operational costs

It includes costs of owned and hired human labour, owned and hired bullock power and owned and hired machine power.

Human labour: Actual days worked were recorded separately for male and female. In addition, owned and hired labour was also recorded separately. Based on wages for men and women whether paid in cash or in kind or in combination of both were computed in rupee equivalents. The average wage rates in the study area during the reference year (2015-16) were ₹ 300 per man day and ₹ 200 per women day.

Bullock labour: Bullock labour is bullock pair days both owned and hired was charged at the prevailing average rates ₹ 500 in Andhra Pradesh and ₹ 400 in Karnataka per day of eight hours of work.

Machine power: Machine power both owned and hired was charged at the prevailing average rates ₹ 600/ hr in the study area.

4.3.2.2.2 Material costs

It includes cost of seeds/seedlings, manures and fertilizers, irrigation, plant protection chemicals and firewood.

Seed: The cost of seed has been computed at the price charged by the Tobacco board i.e. ₹ 50 for a packet of 50 gms.

FYM: Majority of the respondents had not purchased farm yard manure. They have used manure of their own farm. It was charged at ₹ 600 per cart load which was the average price paid by the respondents who have purchased.

Fertilizers and Plant Protection chemicals: The cost of fertilizers and plant protection chemicals have been computed at the actual price paid by the respondents including transportation cost as reported by them.

Irrigation charges: Irrigation charges have been taken as the actual amount paid for irrigating the crops

Firewood: it has been computed at the prevailing market price.

4.3.2.2.3. Other costs

It includes cost of land revenue, depreciation on farm buildings, interest on the value of working and fixed capital, tray and coco peat and rental value of owned land.

Rental value: The rental value of the land is charged at the rate paid by some of the respondents to raise FCV tobacco crops for six months. i.e. ₹ 12,500 per hectare. In

case of barn, average value of the land occupied by a16' X 20' barn was ₹ 1875 in Andhra Pradesh and 13' X 13' barn was ₹ 1250 in Karnataka was computed.

Land revenue: It has been charged at the rates levied by the government.

Tray and coco peat: it is computed as charged by the Tobacco Board.

Depreciation: It is calculated by straight line method i.e. by dividing the original cost less junk value of the implement by its expected life years. In this study depreciation on tractor, bullock cart has not been worked out to include in the cost, since their values are imputed at prevailing market price. This has been done to avoid escalating of costs. Annual depreciation on barn has been added in the cost.

Interest on working capital: It has been calculated for cash expenditure on seeds, fertilizer, Plant Protection chemicals and for miscellaneous expenditure. Interest on working capital has been calculated at the rate of 7 per cent per annum for half of the crop period to add in cost of FCV tobacco cultivation while, in curing cost expenditure on firewood and miscellaneous expenses this interest is worked out for period of 3 months i.e. curing period. While working out interest, family human labour have been excluded.

Interest on the value of fixed assets: It is calculated at the rate of 10 per cent per annum on the value of fixed assets. After calculating the total interest, it has been apportioned in proportion to the area under the crop. In case of barn, interest for one year is added as this is especially used for curing purpose.

4.3.2.3 Returns

Gross returns have been obtained by the product of average price and quantity of cured FCV tobacco leaves produced. Net returns were estimated by taking the difference from gross return and i^{th} cost. The functional form of gross return and net return is as follows:

$$GR = P_L * Q_L \quad ...(8)$$

$$NR_i = GR - C_i \quad ...(9)$$

Where,

GR = Gross return in ₹/ha

P_L = average price of cured FCV tobacco leaf (₹/kg)

Q_L = quantity produced of cured tobacco leaf (kg/ha)

NR_i = net return over i^{th} cost concept ₹/ha

C_i = i^{th} cost concept (i =A_1, A_2, ……C_3)

Apart from CACP cost concepts farm business income, family labour income, owned farm income and farm investment income / intensive income have also been worked out as follows, **(Subbareddy *et al*., 2011)**

Farm business income =

Gross income – Cost A_1 …(10)

Family labour income =

Gross income – Cost B_2 …(11)

Net income =

Gross income – Cost C_i …(12)

Owned farm business income =

Gross income – Cost A_2 …(13)

Farm investment income =

Farm business income – Wages of family labour …(14)

4.3.3 Resource use efficiency

To achieve the third objective, i.e. to examine the Resource use efficiency of factor inputs applied in tobacco cultivation, Marginal value product (MVP) of each input is compared with Marginal Input Cost (MFC) of factors.

Equality of MVP_i to the MIC of input 'i' indicates the optimum resource use of a particular input. Deviation of MVP_i to the MIC of input 'i' indicates the degree of resource-use efficiency.

The criterion for determining optimality of resource use is

$MVP_i/MFC_i > 1$ underutilization of resource

$MVPi/MFC_i = 1$ optimal use of resource

$MVP_i/MFC_i < 1$ excess use of resources

Where,

MVP_i = Marginal value product of i^{th} input in ₹

MFC_i = marginal factor cost of i^{th} input in ₹

Marginal value product of i^{th} factor input has been estimated as follows:

$$MVP_i = MPP_i * P_y \quad ...(15)$$

Where,

MVP_i = Marginal value product of i^{th} input in ₹

MPP_i = Marginal physical product of i^{th} factor input

P_y = average price of cured tobacco leaf (₹/kg)

Marginal physical product of i^{th} factor input has been estimated as follows:

$$MPP_i = APP_i * e_i \quad ...(16)$$

Where,

MPP_i = Marginal physical product of i^{th} factor input

APP_i = Average physical product of i^{th} factor input

e_i = output elasticity coefficient of i^{th} factor input

Average physical product of i^{th} factor input has been estimated as follows:

$$APP_i = Y/ X_i \quad ...(17)$$

Where,

Y = geometric mean level of output (kg/ha)

X_i = geometric mean level of i^{th} input per hectare

i = 1…….6 (independent variables i.e. inputs used)

Cobb-Douglas form of production function as specified below was used as the analytical tool for FCV tobacco. The functional form, as below, is estimated for the data of AP, Karnataka and on pooled data

$$Y = A\ X_1^{b1}\ X_2^{b2}\ X_3^{b3}\ X_4^{b4}\ X_5^{b5}\ X_6^{b6}\ X_7^{b7}\ e^U \quad ...(18)$$

Where,

Y = per farm estimated yield of cured FCV tobacco leaves in kgs

X_1 = per farm area under FCV tobacco

X_2 = per farm human labour in man days

X_3 = per farm bullock power in pair days

X_4 = per farm value of machine power in rupees

X_5 = per farm value of fertilisers in rupees

X_6 = per farm value of plant protection chemicals in rupees

X_7 = per farm value of seedlings per hectare in rupees

U = Error term

A = Constant term and

$b_{1,.....,}b_7$ = output elasticity of respective resource

Simple zero-order correlation matrices were worked out on observations of Andhra Pradesh, Karnataka and pooled one for per farm production function of FCV tobacco (Appendix …) and it was observed that in all the cases, there existed a high level of correlation ($r>0.70$) between explanatory variables. The presence of multicollinearity leads to unbiased estimation of the coefficients. Hence, the variables were transformed on per hectare basis as area under the crop was found to be highly correlated with all the independent variables. Thus, by this transformation size effect was removed. The transformed production function (per hectare basis) appeared as follows here noting point that in order to work out per hectare human labour in man days, total number of women (family and hired) has been taken separately and then converted into productive mandays by using the below formula

3 women days = 2 man days

$$Y = A\, X_1^{b1}\ X_2^{b2}\ X_3^{b3}\, X_4^{b4}\ X_5^{b5}\ X_6^{b6}\ e^{U} \qquad ...(19)$$

Where,

Y = per hectare estimated yield of cured FCV tobacco leaves in kgs

X_1 = per hectare human labour in man days

X_2 = per hectare bullock power in pair days

X_3 = per hectare value of machine power in rupees

X_4 = per hectare value of fertilisers in rupees

X_5 = per hectare value of plant protection chemicals in rupees

X_6 = per hectare value of seedlings per hectare in rupees

U = Error term

A = Constant term and

b_1,.....,b_6 = output elasticity of respective resource

The zero order correlation matrices worked out of the above transformed data indicated that the multicollinearity had been eliminated to a great extent (Appendix IV to VII).

Estimation procedure:

The ordinary least squares (OLS) method has been used for estimating the parameters associated with different independent variables. The estimable form of the transformed function is formally expressed as;

$$\text{Ln } Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + U \quad \ldots(20)$$

The function can be expressed in the linear form as

$$Y = a + b_1 X1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + U \quad \ldots(21)$$

Where,

$y = \ln Y$; $xj = \ln X_j$ for j = 1 to 6; $a = \ln a$

4.3.4 To enquire into the nature of export of FCV tobacco, the analysis is carried out in two parts.

In first part to examine the trend in export of FCV tobacco, compound annual growth rate (CAGR) has been estimated, while in second part i.e. to examine the destinational changes in the export of FCV tobacco Markov chain analysis has been done.

4.3.4.1 Growth in export of FCV tobacco: to examine the growth in export of unmanufactured tobacco exponential growth function has been used as discussed in the first objective. Compound annual growth rate (CAGR) has been estimated for pre WTO and post WTO and over all period separately.

Here, noting point that growth in export of FCV tobacco was estimated for unmanufactured tobacco (FCV and non-FCV) because, there is no separate data available for FCV tobacco. Since, share of FCV tobacco in the total exports is around 85 per cent, it was considered to be meaningful to go ahead.

4.3.4.2 To examine the pattern of export destination of FCV tobacco, Markov chain analysis was done

Markov Chain Analysis

Annual export data on region-wise for the period 2010-11 to 2015-16 has been used to analyse the direction of trade and changing pattern of exports of FCV tobacco.

The trade directions of exports have been analysed by using the **first order Markov chain approach**. Central to Markov chain analysis by the estimation of the transitional probability matrix P. The elements Pij of the matrix P indicates the probability that export will switch from country 'i' to country 'j' with the passage of time. The diagonal elements of the matrix measure the probability that the export share of a country is retained. Hence, an examination of the diagonal elements indicates the loyalty of an importing country to a particular country's exports. In the context of the current application, structural changes will be treated as a random process with selected seven importing regional countries. The average exports to a particular regional country is considered to be a random variable which depends only on the past exports to that regional country, which can be denoted algebraically as

$$E_{jt} = \sum_{i=1}^{r} E_{it-1} * P_{ij} + e_{jt} \qquad \ldots(22)$$

Where,

E_{jt} = Exports from India to jth country during the year 't'.

E_{it-1} = Exports to ith country during the period t-1.

P_{ij} = Probability that the exports will shift from i^{th} country to j^{th} country.

e_{jt} = The error term which is statistically independent of E_{it-1}.

t = Number of years considered for the analysis

r = Number of importing countries

The transitional probabilities Pij which can be arranged in a (c * r) matrix have the following properties.

$O \leq P_{ij} \leq 1$

$\sum_{i=1}^{n} P_{ij} = 1 \; for \; all \; i$

4.3.5 To identify the constraints faced by the sample farmers in the production of FCV tobacco Garrett's ranking technique has been used.

Garrett's ranking technique

Garret's ranking technique has been used to analyse the constraints in production of FCV tobacco. The sample farmers were asked to rank the given constraints in FCV tobacco production.

Following constraints were put before the respondents to rank.

1. Inadequate and untimely rainfall
2. Non-adoption of improved method of nursery
3. Not aware of recommended package of practices
4. Scarcity of labour
5. Inadequate availability of finances
6. Attack of pest and diseases
7. High cost of firewood
8. Non-contact with extension agency

Ranks given by the farmers were converted to the per cent position by using the following formula which was again converted to scores by referring to table given by Garrett and Woodworth. Refer for mean scores Appendix ( )

Percent position = $100(R_{ij} - 0.5)/N_j$ …(23)

Where,

R_{ij} = Rank given for i^{th} constraint by j^{th} respondent

N_j = Number of constraint ranked by j^{th} respondent

Results and Discussion

Chapter 5 RESULTS AND DISCUSSION

In the present chapter findings of the study are presented and discussed. The chapter is divided into six sections. The first section deals with the socio-economic status of sample farms along with cultural practices followed in FCV tobacco production.. The second section deals with to examine growth in the area, production and productivity of FCV tobacco for two major states as well as in India. Section three is devoted to estimate the costs of and returns from FCV tobacco production. In section four resource use efficiency in FCV tobacco cultivation are examined and discussed. The nature of and destinational changes in export of FCV tobacco are enquired and discussed in section five of this chapter. While in the last section, the constraints faced by the FCV tobacco growers are identified and ranked accordingly.

To examine the socio-economic status of sample farmers is not the objective of this study but to get a brief idea about sample farmers regarding age, education, landholding, cropping pattern and cultural practices followed in two states are presented and discussed in section 5.1.

5.1 Socio-economic status of FCV tobacco growers

The analysis of socio-economic status may furnish a base for further planning and development of agriculture. The standard of living of the people depends upon their socio-economic status. Under this section socio-economic status of sample farms has been discussed which includes age, educational status, family composition, size of landholding, number of livestock, machinery and equipment and cropping pattern followed.

5.1.1 Age-wise distribution of sample farmers

The age of an individual has a great impact on their participation in any economic activity. Table 5.1.1 shows age-wise distribution of sample farmers. It is evident from the table that on an average 43.33 per cent of the sample farmers have been in the age group of 35-50 years on overall basis, 37.50 per cent of sample farmers comes under the age group of more than 50 years and only 19.16 per cent of the sample farmers have been in the age group of less than 35 years. Further, average age of

farmers on overall basis has found to be 46.91 years. For Andhra Pradesh and Karnataka, average age is 47.28 and 46.55 years, respectively. It has been observed that the farmers who are engaged in farming in Andhra Pradesh are comparatively aged old over Karnataka farmers.

Table 5.1.1: Age-wise distribution of sample farmers

State	Age group (years)				
	Less than 35	35 - 50	More than 50	Total	Average age
Andhra Pradesh	12 (20.00)	25 (41.66)	23 (38.33)	60 (100)	47.28
Karnataka	11 (18.33)	27 (45.00)	22 (36.66)	60 (100)	46.55
Overall	23 (19.16)	52 (43.33)	45 (37.50)	120 (100)	46.91

Note: Figures in parentheses indicate percentage of respective total

5.1.2 Educational status of sample farmers

Table 5.1.2 indicates the educational status of sample farmers in the study area. It is evident from the table that on overall basis 17.50 per cent of sample farmers had completed only Intermediate education.

Table 5.1.2: Educational status of sample farmers

State	Qualification					
	Illiterate	Primary	secondary	Matriculate	Intermediate	Degree
Andhra Pradesh	10 (16.66)	07 (11.66)	10 (16.66)	14 (23.33)	13 (21.66)	06 (10.00)
Karnataka	17 (28.33)	10 (16.66)	09 (15.00)	11 (18.33)	08 (13.33)	05 (8.33)
Overall	27 (22.5)	17 (14.16)	19 (15.83)	25 (20.83)	21 (17.50)	11 (9.16)

Note: Figures in parentheses indicate percentage of respective total

While, 22.5 per cent of sample farmers are found to be Illiterate and only 9.16 per cent of farmers were graduates. Further, it is observed that maximum numbers of Illiterate are found in Karnataka. Thus, Andhra Pradesh farmers have been educationally superior over Karnataka in the study area.

5.1.3 Family composition of sample farmers

Table 5.1.3 reports the family composition of sample farm households, the result reveals that average size of family on overall basis is 4.79, composed of male, female and children as 1.6, 1.40 and 1.79, respectively. The average size of family members of Andhra Pradesh and Karnataka are 4.31 and 5.30, respectively. Further, it reveals that study area of Karnataka have been more populated as compared to Andhra Pradesh.

Table 5.1.3: Family composition of sample farmers

State	Male	Female	Children	Average family size
Andhra Pradesh	1.45 (33.64)	1.31 (30.39)	1.55 (35.96)	4.31 (100)
Karnataka	1.75 (33.01)	1.50 (28.30)	2.03 (38.30)	5.28 (100)
Overall	1.60 (33.33)	1.40 (29.27)	1.79 (37.29)	4.79 (100)

Note: Figures in parentheses indicate percentage of respective values

5.1.4 Distribution of operational land holdings of sample farmers

The operational land holding of sample farmers is depicted in the Table 5.1.4. It is evident from the table that average operational land holding for overall farmers is 3.40 ha. Whereas, 3.16 ha owned land has been brought under plough on overall basis. Further, it is observed that no single farmer of Andhra Pradesh took land on leased-in, where on an average 0.48 ha land has been cultivated by taking on lease in Karnataka. Also, Andhra Pradesh's farmers owned a land twice than that of Karnataka farmers, it shows Andhra farmers are richer over Karnataka.

Table 5.1.4: Distribution of operational land holdings of sample farmers

(ha/farm)

State	Owned			Leased in			Grand total
	Rainfed	Irrigated	Total	Rainfed	Irrigated	Total	
Andhra Pradesh	3.68	0.66	4.35	0.00	0.00	0.00	4.35
Karnataka	1.57	0.40	1.97	0.48	0.00	0.48	2.46
Overall	3.41	0.53	3.16	0.24	0.00	0.24	3.40

5.1.5 Distribution of livestock on sample farms

Table 5.1.5 presents the livestock population reared by sample farms in the study area. Farmers of locality in Andhra Pradesh only one fourth of bullock pair have been found, whereas, in Karnataka on an average around one pair of bullock per farm, it shows Andhra farmers are hiring more for the requirement of the same in farm. On an average 0.66 Milch cow is available per farm in Andhra Pradesh against 1.05 in Karnataka.

Table 5.1.5: Distribution of livestock on sample farms

(Number/farm)

Particulars	State		Overall
	Andhra Pradesh	Karnataka	
Bullock pair	0.26 (4.76)	0.96 (15.11)	0.61 (10.33)
Milch cow	0.66 (12.08)	1.05 (16.53)	0.85 (14.40)
Buffalo	0.76 (13.91)	0.11 (1.73)	0.43 (7.28)
Sheep	1.30 (23.80)	1.36 (21.41)	1.33 (22.54)
Goat	0.30 (5.49)	0.90 (14.17)	0.60 (10.16)
Poultry	2.16 (39.56)	1.95 (30.70)	2.05 (34.74)
Total	5.44 (100)	6.33 (100)	5.87 (100)

Note: Figures in parentheses indicate percentage of respective total

More number of Buffalo (0.76) is found in sample households of Andhra Pradesh. On an average 2.16 poultry is available in Andhra whereas, 1.95 in Karnataka. Since, all the livestock are reared mainly for their family need. On overall basis 5.90 numbers of livestock is available per farm. Further, per farm livestock population of Karnataka is more as compared to Andhra Pradesh.

5.1.6 Distribution of farm machineries and equipment on sample farms

Table 5.1.6 presents the average number of farm tools and equipment with the sample farmers. Since, farm heads in Karnataka themselves are engaged in farm activity, water availability and study area comes under semi-transitional region, obviously it tends to own more tools and equipment. Karnataka's farmers have edge over Andhra Pradesh with all the equipment except tractor.

Table 5.1.6: Distribution of farm machineries and equipment on sample farms

(Number/farm)

Particulars	State		Overall
	Andhra Pradesh	Karnataka	
Tractor	0.43	0.25	0.34
Bullock cart	0.16	0.71	0.43
Iron plough	1.80	2.05	1.92
Blade harrow	0.80	1.15	0.97
Spade	2.46	2.71	2.58
Hand sprayer	0.80	1.11	0.95
Sickle	2.26	2.5	2.38
Bore well	0.36	0.58	0.47

5.1.7 Cropping pattern followed by the sample farmers

Cropping pattern occupies a prominent place in the economic level of farmers. The following table 5.1.7 presents the cropping pattern followed by sample farmers.

Table 5.1.7 Cropping pattern followed by sample farmers

(per farm)

Sl No.	Particulars	State				Overall	
		Andhra Pradesh		Karnataka			
	District	Prakasam		Mysore			
		Area (ha)	%	Area (ha)	%	Area (ha)	%
I	**Kharif**						
1	Rice	0.05	0.61	0.09	1.91	0.14	1.08
2	Maize	-	-	0.11	2.33	0.11	0.85
3	Ragi	-	-	0.05	1.06	0.05	0.38
4	Green gram	1.3	15.95	-	-	1.3	10.10
5	Black gram	1.6	19.63	-	-	1.6	12.44
6	Chilli	0.3	3.68	0.03	0.63	0.33	2.56
7	Sunhemp	0.55	6.74	-	-	0.55	4.27
8	Tobacco	-	-	1.99	42.25	1.99	15.47
9	Cotton	-	-	0.14	2.97	0.14	1.08
	Sub Total	3.80	46.63	2.41	51.16	6.21	48.28
II	**Rabi**						
1	Rice	0.08	0.98	-	-	0.08	0.62
2	Maize	-	-	1.7	36.09	1.7	13.21
3	Bengal gram	0.65	7.97	-	-	0.65	5.05
4	Black gram	0.27	3.31	-	-	0.27	2.09
5	Field Bean	-	-	0.48	10.19	0.48	3.73
6	Chilli	0.07	0.85	-	-	0.07	0.54
7	Tomato	-	-	0.03	0.63	0.03	0.23
8	Knol-khol	-	-	0.04	0.84	0.04	0.31
9	Tobacco	3.28	40.24	-	-	3.28	25.50
	Sub Total	4.35	53.37	2.25	47.7	6.6	51.32
III	**Zaid**						
	Ginger	-	-	0.05	1.06	0.05	0.38
	Sub Total	-	-	0.05	1.06	0.05	0.38
	Gross Cropped area	8.15	100	4.71	100	12.86	100
	Net cropped area	**4.35**		**2.46**		**6.81**	
	CI	**187.35**		**191.46**		**188.84**	

The above table 5.1.7 presents the cash crop (FCV tobacco) formed a major chunk of the cropping system as 40 per cent in Andhra Pradesh and 42 per cent in Karnataka of their gross cropped area. The very distinguishing thing from the above table is that FCV tobacco has been taken up during rabi season in Andhra Pradesh and kharif season in Karnataka. The cropping intensity has been found more in Karnataka than in Andhra Pradesh. Apart from FCV tobacco, black gram and green gram are the next important crop in Andhra Pradesh while, maize and ragi in Karnataka.

5.1.8 Cultural practices followed by FCV tobacco growers in Andhra Pradesh and Karnataka

Soil: Soil is one of the greatest elements which are basis of all cosmic creation (Earth, Water, Fire, Air and Aether). It is found that Prakasam district predominated by Black cotton soil followed by Red soil and sandy soil while Red to sandy loamy soil in Mysuru district of Karnataka. Hence, the region of Prakasam, Nellore etc. districts are called Traditional Black Soils (TBS) in Andhra Pradesh and region of Mysuru, Hassan are called Karnataka Light Soils (KLS) in Karnataka.

Nursery: The production of strong healthy seedlings is probably the most important single factor in successful tobacco production. It is often said seedbeds are the foundation of the crop".

No single FCV tobacco farmer has been following nursery raising in Prakasam district of Andhra Pradesh but they used to buy seedling from the nursery growers. Almost all the farmers in Karnataka follow their own nursery.

Seedbeds are prepared in the third week of September in Andhra Pradesh, whereas, in the first week of May in Karnataka. Selecting the nursery area due care is taken, the site chosen for seedbeds should preferably left fallow for few months. Due care is taken that previous crop should not have been a member of the family 'Solanaceae'. The nursery site is also changed every year otherwise before taking next nursery rabbing (burning of soil) is followed with the help of dry leaves of coconut, maize etc. Beds are then raised 10-15 cm above the surface and 3 feet X 30 feet of 3 beds were prepared for 1 ha of tobacco area.

Sowing: Two packets 50 gm each have been used to cultivate tobacco in one hectare area. Seeds are mixed with well fine sand (about 500 gm) and the mixture is evenly

broadcasted over the seedbed. Usually mixture is broadcasted early in the morning as there is no strong wind at that time. N:P:K (17:17:17) or DAP is used at the time of sowing. Thereafter, seedbeds are covered by Paddy straw and watered twice a day. In the initial 12 days water is applied thrice a day like 10 am, 1 pm and 4 pm. Delay of watering for a few hours will affects seedling a lot.

Variety: About 93 per cent of the sample farmers in Andhra Pradesh are using 'Siri' and the rest is by 'Hema' a hybrid variety. 'Kanchan' occupied 85 per cent and CH3 (11 per cent) and FCH222 (4 per cent) in Karnataka. The verities being followed in Karnataka are suitable for light soil hence, these varieties are not cultivated in Andhra Pradesh but 'Kanchan' is grown in Northern Light Soils (NLS) region of Andhra Pradesh.

Tray nursery: Type of raising seedlings individually using tray where Coco peat or vermi-compost used as media and these trays are placed under shadow. Advantage of tray nursery is that seedlings become quite resistant to Pest and Disease and mortality rate decreased significantly. Thirty days after sowing, seedlings are pulled out from seedbed and transferred to trays.

Since no nursery practice followed in Andhra Pradesh hence, no tray nursery has been observed. About 86 per cent of sample farmers in Karnataka follows tray nursery. Seedlings are sprayed twice with Ridomil and Bavistin to control black rot and root nodule. After 20 days seedlings will be ready for transplanting.

Transplanting: FCV Tobacco is grown as rabi crop in Andhra Pradesh. Due to the lack of rain and dry spell about a month delayed transplanting was done in the study year i.e. 2015-16. Around 85 per cent of sample farmers were transplanted before November. In Karnataka FCV tobacco is grown as kharif crop. Around 85% of sample farmers were transplanted before June and the rest were transplanted lately. While transplanting, 'flat planting' is followed in Andhra Pradesh where 'flat planting followed by ridging' in Karnataka.

Spacing: 75 X 50 cm spacing is practiced in Andhra Pradesh and around 23,500 to 24,500 seedlings per hectare are used, while, 100 X 60 cm spacing is practiced in Karnataka and around 17000 to 18000 seedlings per hectare are used.

Manure: Green gram and Sun hemp are grown for green menuring and majority of farmers are not used FYM in Andhra Pradesh. In Karnataka too FYM has not been used by majority of farmers and also green menuring crops are not grown.

Fertilizer: Before transplanting means while making line all the fertilizers were put (plant row- plough furrow) in Andhra Pradesh. While 10- 12 after transplanting fertilizer is applied for each plant (Dollop method) in Karnataka.

For 1.4 ha (per license holder) 7:8:3 bags of Ammonium Sulphate, SSP and SOP has been used in Andhra Pradesh and 6:2:6 bags of Ammonium Sulphate, DAP and SOP has been used in Karnataka for 1.2 ha of tobacco area, respectively. In order to increase burning quality of leaf especially SOP is used in tobacco hence, MOP is not used in tobacco as like in other crops.

Intercultural operation: Two times, 20 days and 40 days after transplanting with twine harrow and blade harrow are done in Andhra Pradesh. 20-25 days and 40 days after transplanting, ploughing followed by ridging (Since row width is more) is followed in Karnataka.

Weeding: Weeding operations are carried simultaneously on the day of intercultural operation. Weeding is done manually, apart from weeding providing support to the plant by moving soil towards plant on both sides of the row is done in both Andhra Pradesh and Karnataka.

Irrigation: FCV tobacco is grown on conserved soil moisture condition and in required condition farmers using surface water through purchasing it from a quite long distance in Andhra Pradesh. In Karnataka FCV tobacco is grown in rainfed condition and required irrigation using ground water.

Plant Protection Chemicals: P.P. Chemicals are sprayed in between 35 – 50 days after transplanting. Proclaim and Phyton-T as insecticides are used in Andhra Pradesh and these are sprayed after mixing them. In Karnataka Phyton-T and Confidor as insecticide and Starthene as fungicide are used. In Karnataka chemicals are sprayed by mixing all in order to save labour.

Topping: Topping is removal of terminal bud just before the emergence of flower head which is followed in both the states.

Desuckering: After topping, the auxillary buds grow and put forth shoots known as suckers. Removal of these suckers is called desuckering. Advantage of topping and desuckering is, it diverts energy and nutrients from flowers to the leaves for increasing their size and final leaf yield besides improvement in quality. This practice is followed in both the states.

These two operations have been done simultaneously and for desuckering, chemical called 'Suckericides' is used by the farmers, where is distributed by the Tobacco board itself. This operation carried on 70-75 days after transplanting.

Harvesting: The signs of maturity and the method of harvest differ with the type of tobacco, essentially, there are two methods to harvest: priming and stalk cut method. Priming is practiced in FCV tobacco whereas, stalk cut method followed in Cigar, cheroot, chewing bidi and hookah tobacco.

Priming: Generally, lower leaves mature first followed by upper leaves in regular ascending order. Harvesting is done by removing a few leaves as and when they mature is known as priming. An average of 6-7 harvestings was found in both Andhra Pradesh and Karnataka.

Curing: Curing is a slow process of starvation phenomenon to produce dried leaf of suitable physical and chemical property attained by various regimes of ventilation, temperature and humidity control. It takes around 100 -120 hrs to complete curing of one barn (constructed building for curing) of leaf. In Andhra Pradesh Barn size is 16 X 20 feet where, 13' X 13' feet in Karnataka. Curing schedule suggested for curing of FCV tobacco.

Stages	**No. of hours**	**Temp range (^{o}F)**	**Humidity (%)**
Yellowing	30 – 40	90 – 100	81 – 92
Colour fixing	12 – 15	100 – 125	70 – 75
Lamina drying	20 – 30	125 – 140	70 – 75
Midrib drying	30 - 40	140 -155	70 - 75

After curing, the barn are kept open to bring the leaf into pliable condition. They are then unloaded, bulked and sorted out.

Grading: After curing of all the leaves are completely harvested, leaves are graded by sorting leaves into uniform lots according to body, color and degree of blemish or damage. It is graded as Bright, Medium and Low and it is done manually usually by women labour.

Packing: Cured, dried leaves are packed with the help of teared gunny bag, one piece on the top and the other on below. There is a box type structure wherein leaves are put and pressed strongly thereafter, tied both the teared gunny bag by twine. Photograph has been given.

Here one noting point is that all the leaves are not packed once, depending upon the market and turn of a license holder to the market it is packed otherwise, leaves are stored in a bulk in storehouse.

Marketing: Tobacco board opens in the first week of March and closed in the month of July in Andhra Pradesh. Marketing of leaves is done on cluster basis and every farmer is informed on their turn and quantity to bring through field assistants. Sale of leaves is done by e-auctioning with the presence of Auction superintendent officer from the Board, both exporters and manufacturers have been invited for buying.

There are 64 grades in FCV tobacco of which 15- 20 grades are observed in majority. Few grades are below:

BRIGHT	**Avg. Price (Rs.)**	**MEDIUM**	**Avg. Price (Rs.)**	**LOW**	**Avg. Price (Rs.)**
L2L	172	TG	135	BPL	78
L2O	170	TMG	120		
X2L	165	NDG	110		
X4L	150				

The average per kg price realized by Karnataka farmers is Rs. 15-20 higher than that of Andhra Pradesh for the same grades of tobacco. In Andhra Pradesh cured FCV leaves are generally in the ratio of 30:50:20 of Bright, Medium and Low grades, respectively, has been found. While in Karnataka in the ratio of 35:45:20 of Bright, Medium and Low grades, respectively has been found.

Quantity limit per license holder:

Year	**Andhra Pradesh**		**Karnataka**	
2015-16	**Area (ha)**	**Quantity (kg)**	**Area (ha)**	**Quantity (kg)**
	1.40	3200	1.20	1740

Fine on excess quantity:

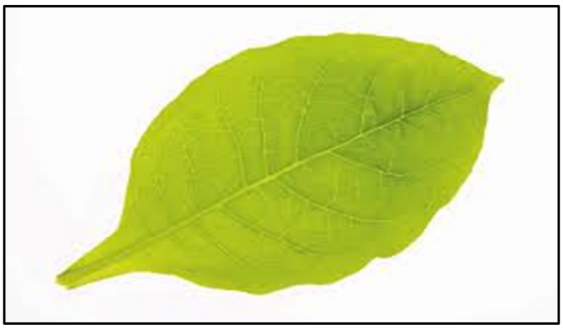
Year	**Andhra Pradesh**		**Karnataka**	
	Extra fee (Rs./kg)	Additional charges (% of sale proceeds)	Extra fee (Rs./kg)	Additional charges (% of sale proceeds)
2015-16	**Up to 10% quota authorized**		**Up to 10% quota authorized**	
	2.0	7.5	2.0	7.5
	More than 10% quota authorized		**More than 10% quota authorized**	
	2.0	15	2.0	15

Payment: Payment is done within 15 days after sale of produce. The amount is directly transferred to farmers' account after deducting their dues.

The summary of crop production practice followed by FCV tobacco growers of Andhra Pradesh and Karnataka is also presented in the tabular form in the Table 5.1.8

Plate 5.1 Detailed Picture of FCV tobacco

a) Seed counts (16000/gm)



b) Green leaf

c) Transplanted seedlings

d) Initial stage

e) Matured plant

f) Inside Barn

g) After Curing

h) Cured Leaf

i) Manufactured Product

j) **Barn in Karnataka**

k) **Barn in Andhra Pradesh**

Table 5.1.8 Crop production practice followed by FCV tobacco growers in Andhra Pradesh and Karnataka

Particulars	State	
	Andhra Pradesh	**Karnataka**
	District	
	Prakasam	**Mysore**
Season	Rabi	Kharif
Soil	Black cotton	Red to loamy
Nursery	Majorly absent	Followed
Time of nursery	2nd week of September	1st week of May
Seed	120 gm/ha	100gm/ha
Variety	Siri, Hema	Kanchan, CH3 and FCH222
Tray farming for - nursery raising	Not followed	Followed
Green manure	Green gram, Sun hemp	Majority not used
Date of planting	Mid October to Last November	Ist week of May to Mid June
Spacing	75 cm x 50 cm	100 cm x 60 cm
Planting method	Flat planting	Flat planting followed by ridging
Method of fertilization	Plant row-plough furrow	Dollop method
Fertilizer dose	50:50:50	60:40:120
Irrigation	Crop is grown on conserved soil moisture	Grown on S-W monsoon condition
Intercultural operations	20 and 40 days after planting	25 and 40 days after planting
P. P. Chemicals	Proclaim, Phyton-T	Phyton-T, Confidor, Starthene
Topping	At first flower opening	Bud topping
desuckering	Suckericides	suckericides
Harvesting	Priming mature leaves	Priming mature leaves
Curing	Flue-curing	Flue-curing
Grading	Farm grading as bright, medium and low	Farm grading as bright, medium and low

5.2 Growth in area, production and productivity of FCV tobacco

Time series data on area, production and productivity of FCV and total tobacco for the period 1974-75 to 2015-16 are used to estimate the trend and growth. The growth rates are also estimated for two separate periods. Period one extending from 1974-75 to 1994-95 characterizing the pre WTO period. The second period from is 1995-96 corresponding with the post WTO period.

Growth in area, production and productivity of FCV tobacco have been estimated for the two major producing states also *viz.,* Andhra Pradesh and Karnataka, its results are presented in table 5.2.1 and 5.2.2 and discussed below. Whereas, the India level growth in area, production and productivity estimated for FCV and total tobacco is presented in table 5.2.3 and discussed below. Similarly, fig.5.1 through fig.5.15 depicts the actual and fitted observation of respective variable.

5.2.1 Growth in area, production and productivity of FCV tobacco for major states

In India FCV tobacco grown in Andhra Pradesh, Karnataka, Maharashtra and Odisha, out of which Andhra Pradesh has a share 55 per cent of total FCV tobacco followed by Karnataka (44 per cent). Maharashtra and Odisha together comprises meager share i.e. less than 1 per cent of total FCV tobacco production, **(Tobacco Board, 2016).** Since Andhra Pradesh and Karnataka together have 99 per cent share in FCV tobacco Production. In view of this fact understanding growth in area, production and productivity would be meaningful and helpful to call for policy for the benefit of farmers on one hand and nation's economy on the other.

Growth in area, production and productivity of FCV tobacco in Andhra Pradesh and Karnataka are attempted separately to gain insight into the comparative growth performance of major tobacco growing states.

Pre WTO period (1975-95)

As depicted in table 5.2.1 the compound annual growth in area under total tobacco for the corresponding period (pre WTO) in Karnataka had grown at a rate of 1.68 per cent per annum. The production grown at a rate of 3.34 per cent per annum and productivity shown 1.61 per cent growth per annum. But no change in area and production in Andhra Pradesh has been observed both remained stagnant as it can be

seen from fig. 5.1 and fig. 5.2. Further, for the corresponding period productivity in Andhra Pradesh had grown at 2.52 per cent per annum and it can be seen from fig. 5.3. the table indicate the productivity of FCV tobacco grew at higher CAGR in AP than that of Karnataka state during Pre WTO period.

Table 5.2.1 Growth in Area, Production and Productivity of total tobacco in Andhra Pradesh and Karnataka during pre WTO period (1975- 1995)

Variable	State	Initial year observation	End year observation	Constant	Trend coefficient	R^2	CAGR
Area('000 ha)	Andhra Pradesh	177	171	5.286	-0.010 (0.007)	0.11	---
	Karnataka	36	57	3.688	0.016* (0.003)	0.51	1.68
Production (M. kgs)	Andhra Pradesh	159	217.4	5.061	0.014 (0.008)	0.13	---
	Karnataka	19	51.5	3.185	0.032* (0.005)	0.65	3.34
Productivity (kg/ha)	Andhra Pradesh	900	1271	6.689	0.024* (0.002)	0.81	2.52
	Karnataka	541	903	6.422	0.016* (0.004)	0.46	1.61

Note: Figures in parentheses are standard errors of the estimates

*Indicates significance at 5% level

Post WTO period (1996 - 2016)

As presented in the table 5.2.2 the compound annual growth in area under FCV tobacco for the corresponding period in Andhra Pradesh was remained stagnant while that in Karnataka had grown at a rate of 2.74 per cent per annum as it can be seen from fig. 5.4 also. The production grew at a rate of 4.25 per cent per annum and productivity by 1.46 per cent per annum. Though area in Andhra Pradesh had shown stagnation, while, production and productivity showed a significant growth by 1.48 and 2.08 per cent per annum, respectively. The changes in production and productivity in AP and

KA are graphically presented in fig. 5.5 and fig. 5.6, respectively. The growths in AP and KA are less than the national growth for the corresponding period. FCV tobacco produced in Karnataka continued to get a higher price compared to prices in Andhra Pradesh from the inception of auction marketing, was, probably be the main reason for increase in area under FCV tobacco in Karnataka. The other reason was the absence of a suitable alternate cash crop to substitute for FCV tobacco.

Area under FCV tobacco in Andhra Pradesh remained stagnant during both the periods while, that grew in Karnataka in both the periods.

Table 5.2.2 Growth in Area, Production and Productivity of FCV tobacco in Andhra Pradesh and Karnataka during post WTO period (1995-96 to 2015-16)

Variable	State	Initial year observation	End year observation	Constant	Trend coefficient	R^2	CAGR
Area('000 ha)	Andhra Pradesh	115.5	70.12	4.833	-0.005 (0.006)	0.03	---
	Karnataka	69.5	75.83	4.026	0.027* (0.007)	0.37	2.74
Production (M. kgs)	Andhra Pradesh	135	126.34	4.894	0.014* (0.005)	0.27	1.48
	Karnataka	56	83.43	3.899	0.041* (0.007)	0.64	4.25
Productivity (kg/ha)	Andhra Pradesh	1173	1801.10	6.971	0.020* (0.003)	0.69	2.08
	Karnataka	805	1100	6.780	0.001* (0.004)	0.31	1.46

Note: Figures in parentheses are standard errors of the estimates

*Indicates significance at 5% level

5.2.3 Growth in Area, Production and Productivity of FCV and total tobacco in India

The growth in area, production and productivity of FCV tobacco and total tobacco for the three periods is presented in Table 5.2.3.

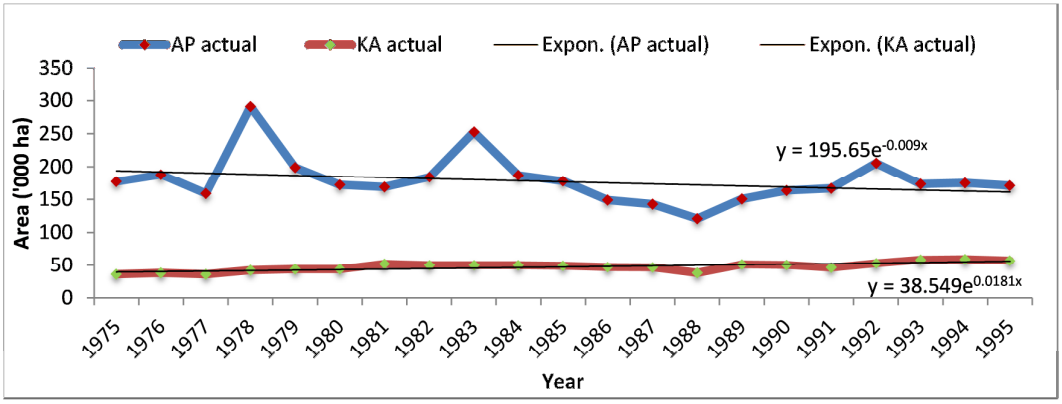


Fig 5.1 Trend in area of Total tobacco in AP & Karnataka during pre WTO period (1975-95)

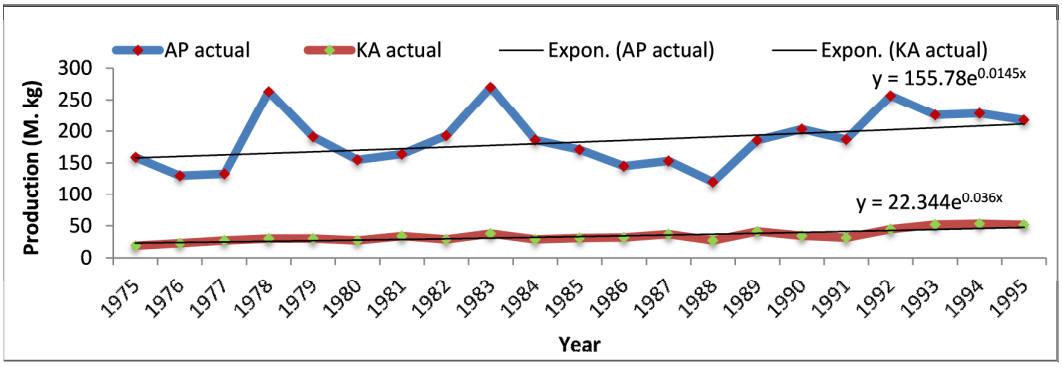


Fig 5.2 Trend in production of Total tobacco in AP & Karnataka during pre WTO period (1975-95)

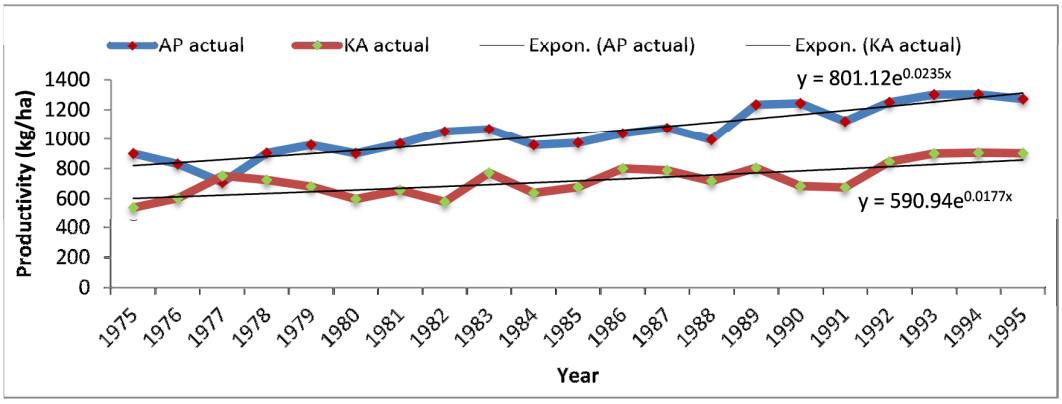


Fig 5.3 Trend in productivity of Total tobacco in AP & Karnataka during pre WTO period (1975-95)

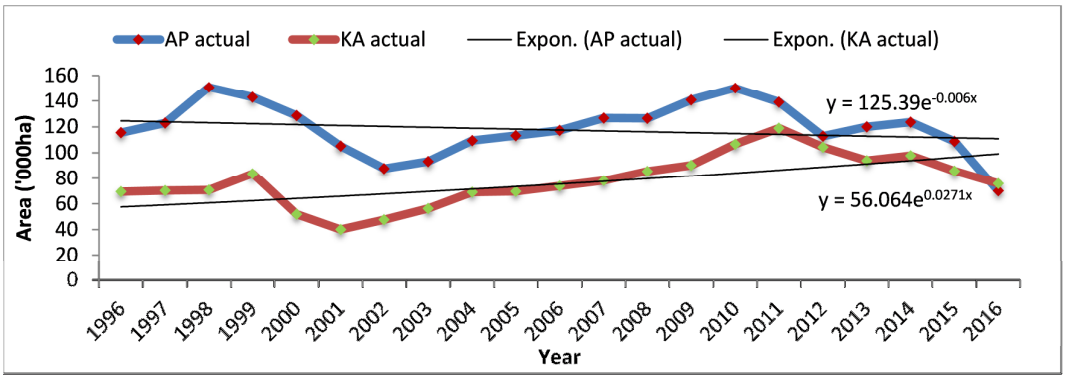


Fig 5.4 Trend in area of FCV tobacco in AP & Karnataka during post WTO period (1996-2016)

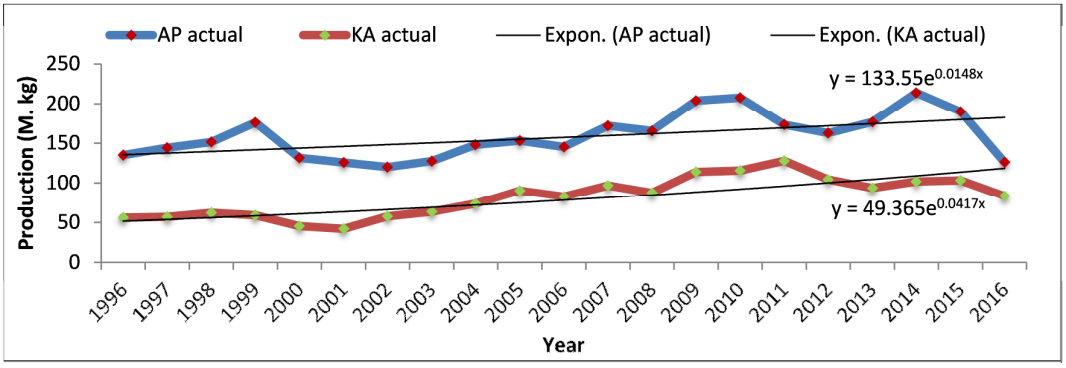


Fig 5.5Trend in production of FCV tobacco in AP & Karnataka during post WTO period (1996-16)

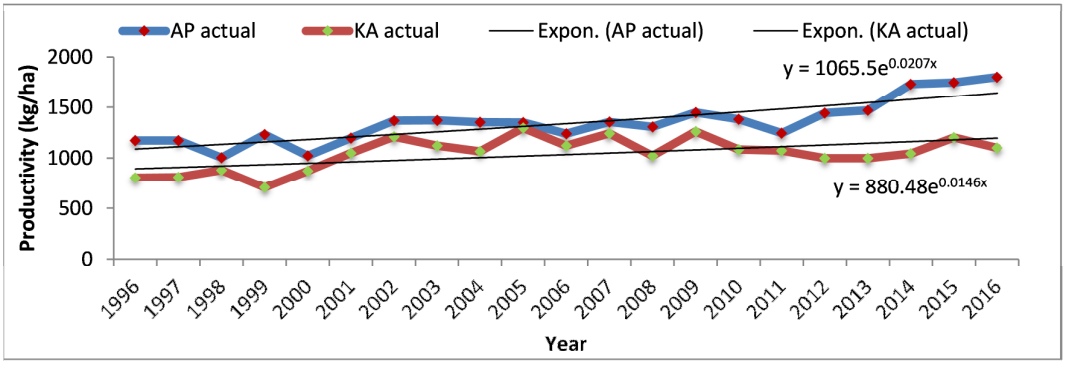


Fig 5.6 Trend in productivity of FCV tobacco in AP & Karnataka during post WTO period (1996-16)

Table 5.2.3 Growth in Area, Production and Productivity of FCV and total tobacco during 1975- 2016 in India

Variable	Type of tobacco	Period	Initial Year Observation	Final Year Observation	Constant	Trend coefficient	R^2	CAGR
Area ('000 ha)	FCV	Pre WTO	213	106.3	5.229	-0.028* (0.0078)	0.40	-2.76
		Post WTO	124	198	4.825	0.031* (0.01238)	0.25	3.20
		Overall	213	198	4.843	0.009* (0.0433)	0.10	0.95
	Total	Pre WTO	381	380	6.074	-0.004 (0.0036)	0.08	---
		Post WTO	390	440	5.907	0.008 (0.0054)	0.10	--
		Overall	381	440	6.021	-0.005 (0.0016)	0.02	---
Production (M. kgs)	FCV	Pre WTO	163	110	4.906	-0.009 (0.0097)	0.05	---
		Post WTO	127	288	4.830	0.048* (0.0125)	0.43	4.93
		Overall	163	288	4.545	0.024* (0.0045)	0.43	2.51
	Total	Pre WTO	363	570	5.987	0.017* (0.0044)	0.44	1.74
		Post WTO	540	750	6.173	0.019* (0.0061)	0.35	1.98
		Overall	363	750	6.021	0.012* (0.0019)	0.49	1.22
Productivity (kg/ha)	FCV	Pre WTO	765	1033	6.584	0.018* (0.0036)	0.56	1.84
		Post WTO	1023	1454	6.816	0.021* (0.0064)	0.36	2.15
		Overall	765	1454	6.607	0.014* (0.0018)	0.59	1.45
	Total	Pre WTO	954	1486	6.824	0.021* (0.0015)	0.91	2.20
		Post WTO	1356	1704	7.168	0.011* (0.0022)	0.58	1.19
		Overall	954	1704	6.910	0.012* (0.0008)	0.84	1.26

Note: Figures in parentheses are standard errors of the estimates

*Indicates significance at 5% level

Pre WTO period (1975-95)

As shown in the table 5.2.3 the compound annual growth in area under FCV tobacco for the corresponding period shown a negative compound growth rate of 2.76 per cent per annum and area under total tobacco which is found stagnant for the same period as it can be seen in fig. 5.7. Production of FCV tobacco remained stagnant, whereas, total tobacco grew at CAGR of 1.74 and which can also be seen in fig. 5.8. Productivity of FCV tobacco had grown at CAGR of 1.84 while total tobacco grew at CAGR of 2.20 and the change in productivity is also shown through graph in fig 5.9.

Post WTO period (1996 - 2016)

Higher price realization for FCV tobacco when compared to its competing crops, growers has a tendency to cultivate tobacco illegally. As a result, the production of FCV and total tobacco registered a high growth rate of 4.93 and 1.98 per cent per annum during the post WTO period, respectively and it is graphically presented in fig. 5.11. Area under FCV tobacco had grown at CAGR of 3.20 per cent, whereas, total tobacco remained stagnant. Productivity of FCV tobacco had grown at CAGR of 2.15 per cent, whereas, total tobacco grew at CAGR of 1.19 per cent. Changes in area, production and productivity during this period are shown in graphically in fig. 5.10 through 5.12 and it is presented in fig. 5.12.

Overall period (1975 – 2016)

Further, the analysis has revealed that during overall period area under FCV tobacco has increased by 0.95 per cent per annum. But the total area under all types of tobacco has remained stagnant as it can be seen from fig. 5.13. Further, a record of additional 5 lakh hectares of land was brought under cultivation in case of tobacco between 1977-78 to 1982-83. The increase in total tobacco production was mainly due to contribution from FCV tobacco which had grown 4.93 per cent per annum. The productivity with respect to FCV tobacco has also revealed a significant CAGR of 1.45 and it is graphically presented in fig. 5.15.

In the graph, it is observed that the area and production has been found to be maximum during the year 2010-11 for both FCV and total tobacco, while, productivity has been found to be maximum during the year 2015-16, this is due to advancement in

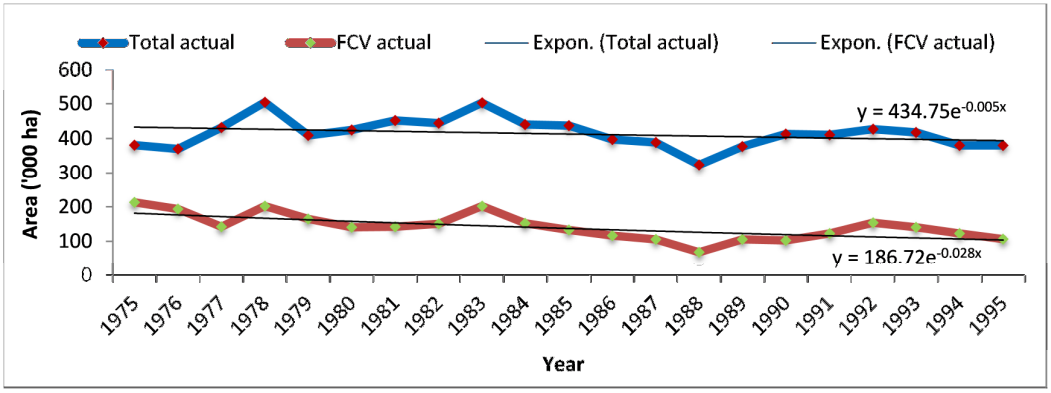


Fig 5.7 Trend in area of Total and FCV tobacco during pre WTO period (1975-95)

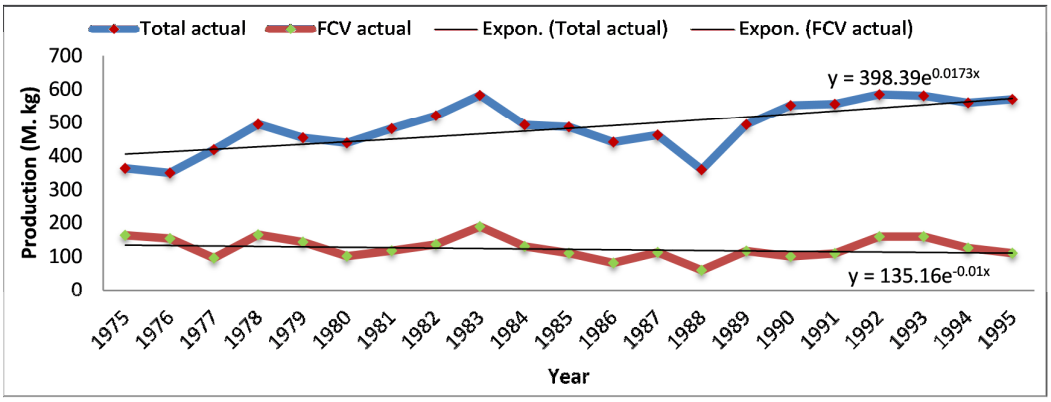


Fig 5.8 Trend in production of Total and FCV tobacco during pre WTO period (1975-95)

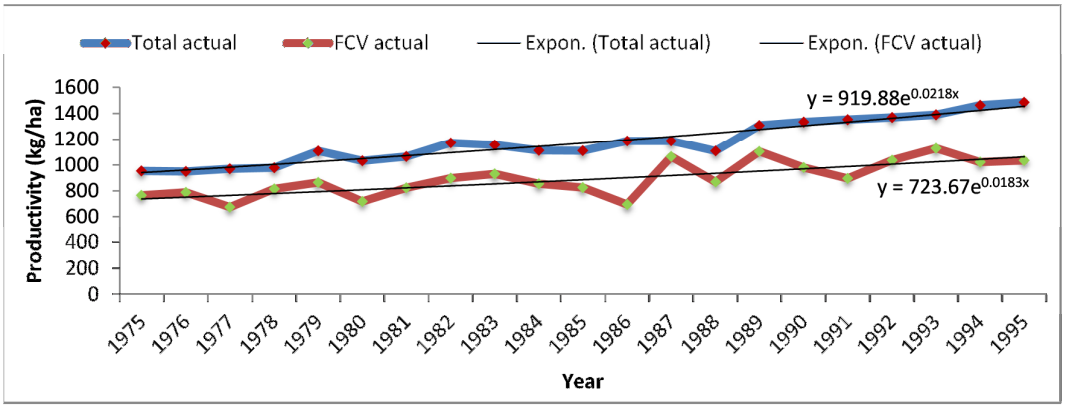


Fig 5.9 Trend in productivity of Total and FCV tobacco during pre WTO period (1975-95)

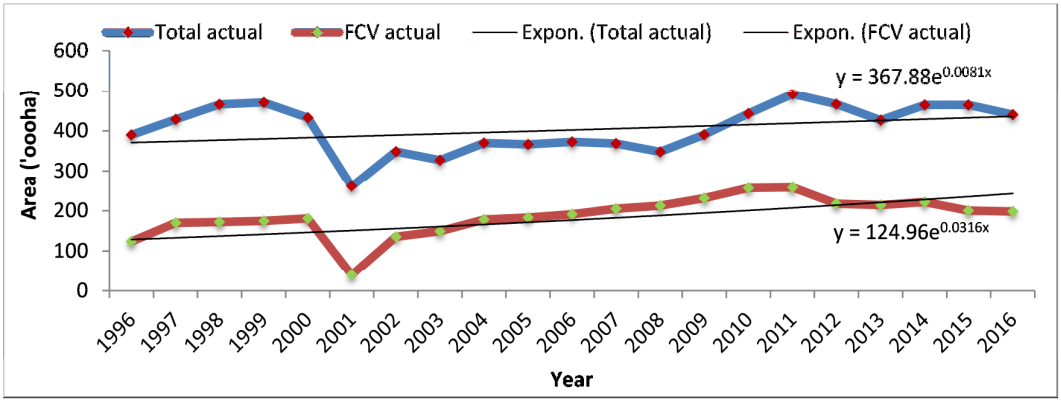


Fig 5.10 Trend in area of Total and FCV tobacco during post WTO period (1996-2016)

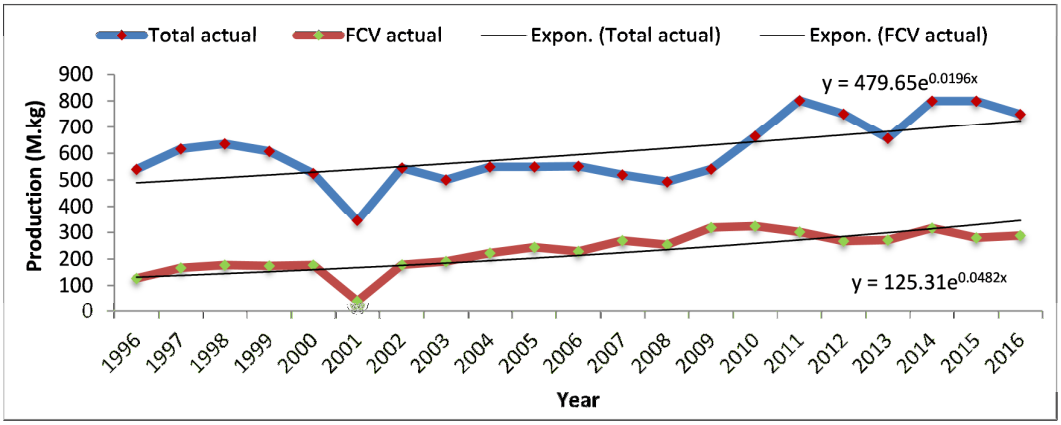


Fig 5.11 Trend in production of Total and FCV tobacco during post WTO period (1996-2016)

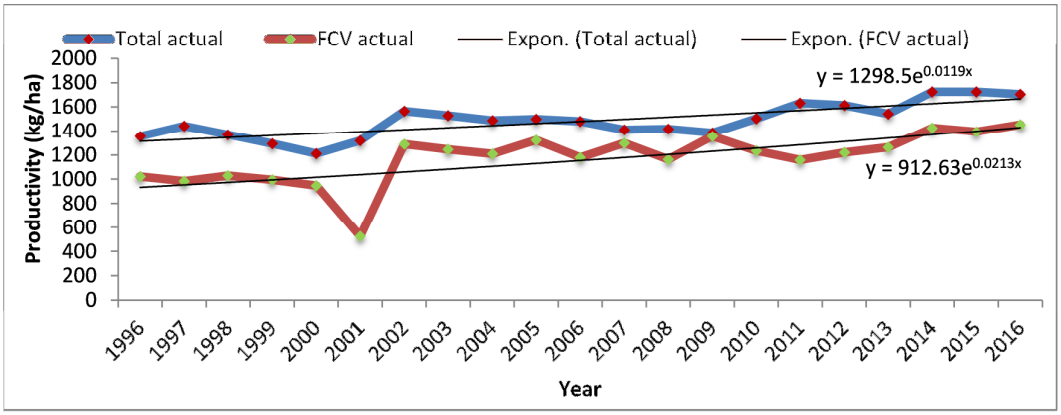


Fig 5.12 Trend in productivity of Total and FCV tobacco during post WTO period (1996-2016)

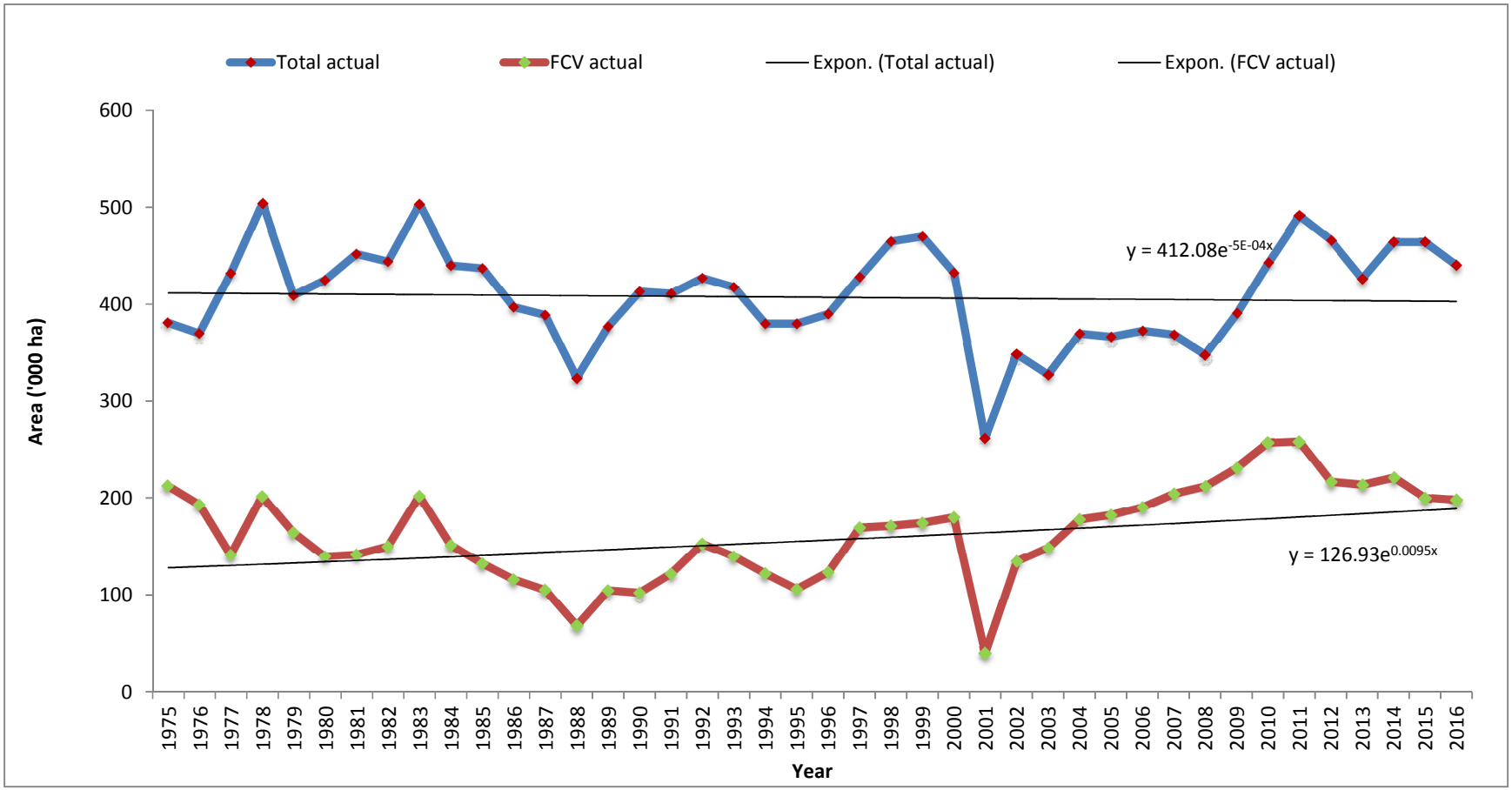


Fig 5.13 Trend in area of Total and FCV tobacco during overall period (1975-2016)

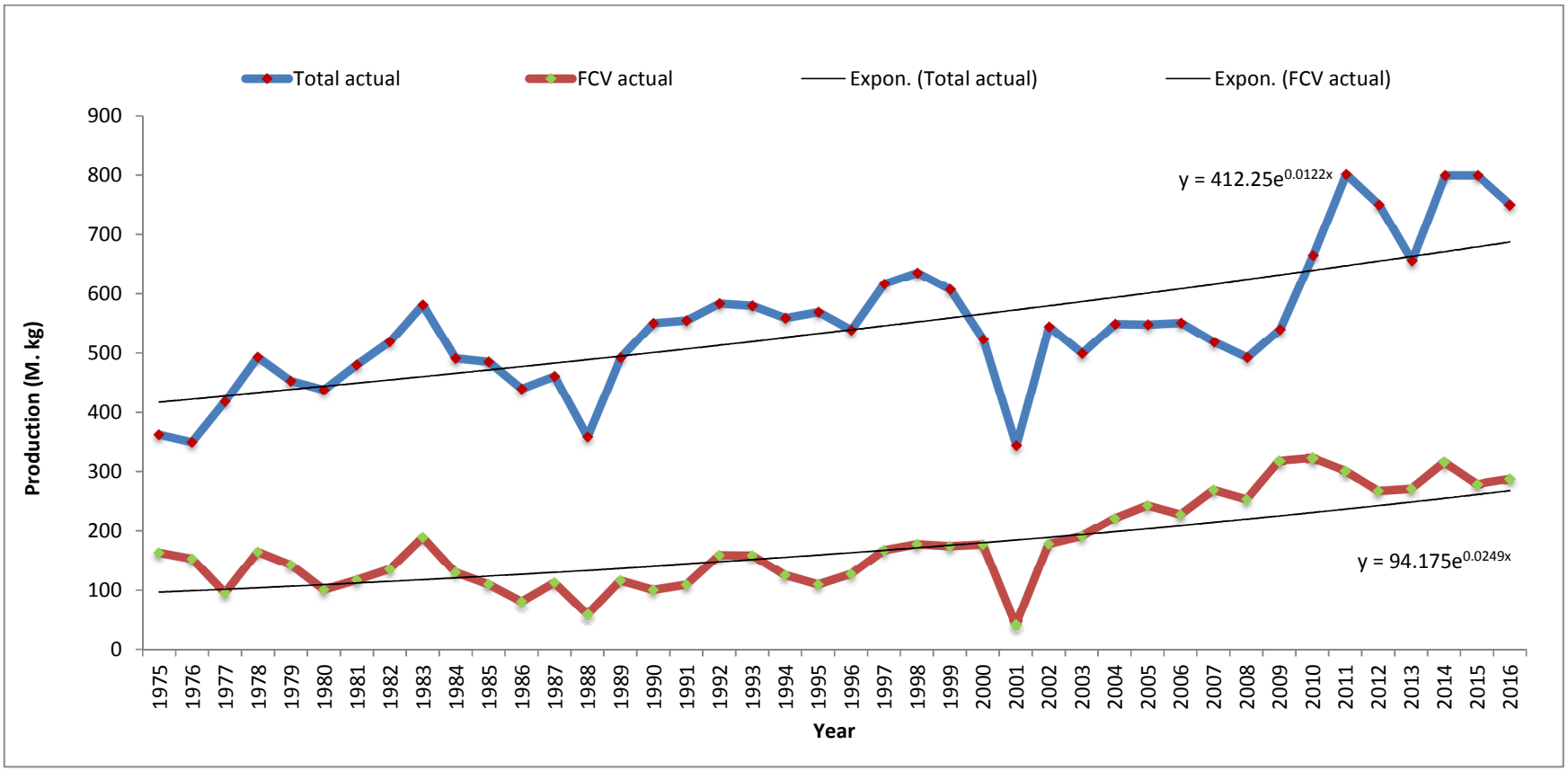


Fig 5.14 Trend in production of Total and FCV tobacco during overall period (1975-2016)

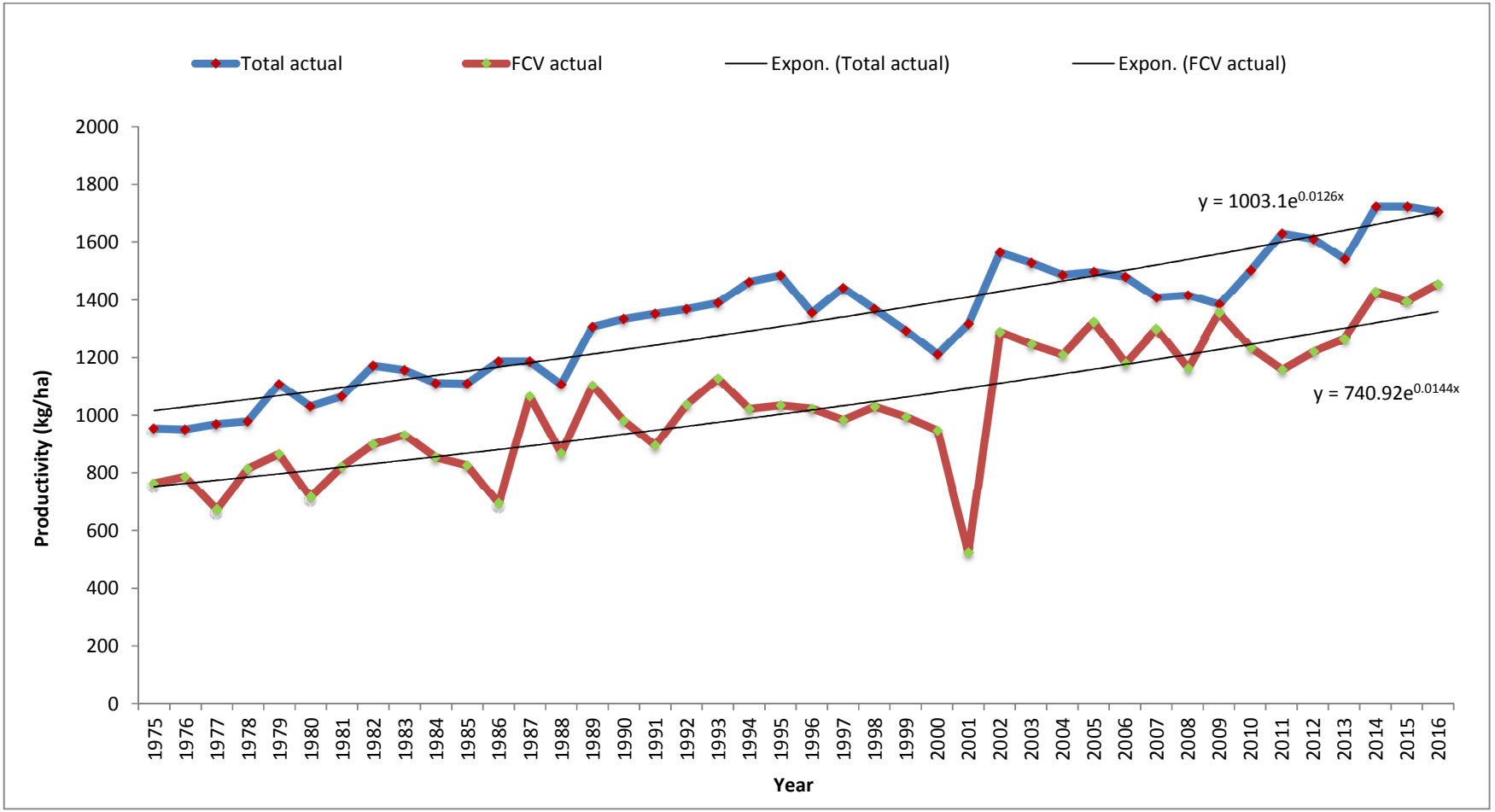


Fig 5.15 Trend in productivity of Total and FCV tobacco during overall period (1975-2016)

the cultural practices. Further, area, production and productivity has been found to be least during the year 2000-01 due to Crop holiday was there in Andhra Pradesh.

5.3 Cost of and returns from FCV tobacco cultivation

The profitability of a crop depends on the level of costs and returns. The allocation of area under a particular crop by farmers besides other factors depends on the level of net profit generated per unit area. Hence, study of costs and returns of various crop enterprises exercises an important role in determining the level of profit and identifying the relative profitability of various crop enterprises.

FCV tobacco appeared as the most important crop in the study area as it occupied 40 per cent of gross cropped area. In view of this fact, it was thought pertinent to evaluate costs of and returns from cultivation of FCV tobacco. Detail of cost and returns of FCV tobacco is presented in the table 5.3.3 and discussed below.

FCV tobacco crop is not alike all other crops, its pre-requisite is curing of leaf before it is marketed. In order to cure green leaves farmers incurs a significant amount of expenditure on fire wood, barn, grading and labourers. Hence, cost of FCV tobacco is worked out in two phases. In first phase costs incurred till harvesting of leaves means cost of cultivation at the field level is worked out from which one can easily arrive at costs of FCV tobacco at field level and results for the same are presented in Table 5.3.1. In second phase, costs are worked out by considering items of expenditure on firewood, fixed cost on barn etc. and depicted in Table 5.3.2 as cost of curing. Table 5.3.3 presents the cost of production of cured FCV tobacco, comprised of cost of cultivation and cost of curing of FCV tobacco leaf.

5.3.2 Costs of curing in FCV tobacco

Curing of leaves is an important and pre-requisite process for sale of FCV tobacco. It incurs expenditure on different items of costs of curing are presented in table 5.3.2.

Table 5.3.1 Costs of FCV tobacco cultivation

(Per hectare)

Particulars	State				Overall	
	Andhra Pradesh		Karnataka			
	₹	%	₹	%	₹	%
A. Operational costs						
1. Human labour						
a. Hired	21,043	24.13	21,765	22.81	21,316	23.61
b. owned	492	0.56	3,375	3.53	1,580	1.75
Total	21,535	24.70	25,140	26.35	22,896	25.36
2. Bullock labour						
a. Hired	8,251	9.46	3,826	4.01	6,581	7.29
b. Owned	715	0.82	2,959	3.10	1,562	1.73
Total	8,967	10.28	6,785	7.11	8,143	9.02
3. Machine labour						
a. Hired	1,994	2.28	4,258	4.46	2,848	3.16
b. Owned	3,417	3.91	2,511	2.63	3,075	3.41
Total	5,411	6.20	6,769	7.09	5,924	6.56
Sub Total **(1+2+3)**	35,913	41.19	38,695	40.56	36,963	40.94
B. Material costs						
1. Seed	0	0	96	0.10	36	0.04
2. Seedlings	4177	4.79	0	0	2600	2.88
3. Manure and Fertilizers	11,099	12.73	15,700	16.45	12836	14.21
4. Plant Protection Chemicals	713	0.81	1,277	1.33	926	1.02
5. Irrigation	843	0.96	148	0.15	581	0.64
Sub Total **(1+2+3+4+5)**	16,833	19.31	17,223	18.06	16,980	18.81
Total working capital	52,254	59.94	54,503	57.14	53,103	58.82
C. Other costs						
1. Rental Value of Owned Land	12,500	14.33	12,500	13.10	12,500	14
2. Land Revenue	100	0.11	100	0.10	100	0.11
3. Depreciation	273	0.31	605	0.63	399	0.44
4. Interest on Working Capital @ 7%	914	1.04	954	0.99	929	1.02
5. Tray and coco peat	0.00	0	1961	2.05	740	0.81
6. Interest on the Value of Fixed Assets	318	0.36	414	0.43	354	0.39
Sub Total **(1+2+3+4+5+6)**	14,106	16.18	16,534	17.33	15,022	16.64
Grand Total (A+B+C)	66,851	76.68	72,451	75.95	68,966	76.39
a. Cost A_1	53,541	61.41	56,162	58.87	54,531	60.40
b. Cost A_2	53,541	61.41	68,662	71.98	54,531	60.40
c. Cost B_1	53,860	61.78	58,442	61.26	55,590	61.58
d. Cost B_2	78,760	90.34	83,342	87.37	80,490	89.16
e Cost C_1	54,352	62.34	61,818	64.80	57,170	63.33
f. Cost C_2	79252	90.90	86,718	90.90	82,071	90.90
g. Cost C_2*	79,252	90.90	86,718	90.90	82,071	90.90
h. Cost C_3	**87,177**	**100**	**95,390**	**100**	**90,278**	**100.00**

Note: Figures are rounded off their nearest integer

Table 5.3.2 Cost of curing in FCV tobacco

(Per hectare)

Particulars	State				Overall	
	Andhra Pradesh		Karnataka			
	₹	%	₹	%	₹	%
A. Operational costs						
1. Human labour						
a. Hired	6,379	17.16	2,496	7.08	4,913	14.37
b. owned	2,219	5.97	201	0.57	1,458	4.26
Total	8,598	23.13	2,697	7.65	6,371	18.64
Transportation						
2. Bullock labour						
a. Hired		0	---			
b. Owned		0	291	0.82	110	0.32
Total		0	291	0.82	110	0.32
3. Machine labour						
a. Hired	1,750	4.71	2,162	6.14	1,905	5.57
b. Owned	1,370	3.68	1,294	3.67	1,341	3.92
Total	3,121	8.39	3,457	9.81	3,246	9.49
Sub Total **(1+2+3)**	11,718	31.53	6,445	18.30	9,727	28.46
B. Material costs						
1. Firewood	18,396	49.49	24,600	69.86	20,738	60.68
Sub total	18,396	49.49	24,600	69.86	20,738	60.68
Total working capital	27,895	75.05	30,844	87.60	29,007	84.88
C. Other cost						
1. Land rent on barn	1,875	5.04	1,250	3.55	1,562	4.57
2. Depreciation on barn	4,090	11.00	2,045	5.80	2,670	7.81
3. Interest on working capital @ 7%	488	1.31	540	1.53	508	1.48
4. Interest on fixed capital @10%	596	1.60	329	0.93	423	1.23
Sub Total (1+2+3+4)	7,050	18.96	4,167	11.83	5,163	15.10
Grand total (A+B+C)	**37,164**	**100**	**35,209**	**100**	**34,171**	**100**

Note: Figures are rounded off their nearest integer

Table 5.3.3 Cost of and returns from Cured FCV tobacco production

(per hectare)

Particulars	State				Overall	
	Andhra Pradesh		Karnataka			
	₹	%	₹	%	₹	%
A. Operational costs						
1. Human labour						
a. Hired	27,422	21.07	24,261	17.9	26,229	19.61
b. owned	2,711	2.08	3,577	2.63	3,038	2.98
Total	30,132	23.15	27,838	20.54	29,267	22.6
2. Bullock labour					0	0
a. Hired	8,251	6.34	3,826	2.82	6,581	4.29
b. Owned	715	0.54	3,250	2.39	1,672	1.22
Total	8,967	6.8	7,076	5.22	8,253	5.52
3. Machine labour				0	0	0
a. Hired	3,744	2.87	6,420	4.73	4,754	3.67
b. Owned	4,787	3.67	3,805	2.8	4,417	3.41
Total	8,532	6.55	10,225	7.54	9,171	7.09
Sub Total **(1+2+3)**	47,631	36.60	45,139	33.31	46,691	35.22
B. Material costs					0	0
1. Seed	0	0	96	0.07	36	0.02
2. Seedlings	4177	3.20	0	0	2,600	2.01
3. Manure and Fertilizers	11,099	8.53	15701	11.58	12,836	10.06
4. Plant Protection Chemicals	713	0.54	1,277	0.94	926	0.71
5. Irrigation	843	0.64	148	0.1	581	0.44
6. firewood	18,396	14.13	24,600	18.15	20,738	16.04
Sub Total **(1+2+3+4+5+6)**	35,229	27.07	41,822	30.86	37,718	29.3
Total working capital	80,149	61.60	85,345	62.98	82,111	62.11
C. Other costs					0	0
1. Rental Value of Owned Land	14,375	11.04	13,750	10.14	14,139	10.87
2. Land Revenue	100	0.07	100	0.07	100	0.07
3. Depreciation	4,363	3.35	2,650	1.95	3717	2.35
4. Interest on Working Capital @ 7%	1,403	1.07	1,494	1.1	1,437	1.08
5. Tray and coco peat		0	1,961	1.44	740	0.57
6. Interest on Fixed Assets @ 10%	914	0.70	2,610	1.92	1,554	1.36
Sub Total **(1+2+3+4+5+6)**	21,156	16.25	22,565	16.65	21,688	16.33
D. Grand Total (A+B+C)	1,04,015	79.93	1,09,526	80.83	1,06,096	80.86
a. Cost A_1	86,015	66.10	89,595	66.12	87,367	65.63
b. Cost A_2	86,015	66.10	1,03,345	76.26	87,367	65.63
c. Cost B_1	86,929	66.80	92,204	68.04	88,921	66.24
d. Cost B_2	1,15,579	88.82	1,19,604	88.26	1,17,100	87.92
e Cost C_1	89,640	68.89	95,781	70.68	91,959	69.23
f. Cost C_2	1,18,290	90.90	1,23,181	90.9	1,20,137	90.90
g. Cost C_2*	1,18,290	90.90	1,23,181	90.9	1,20,137	90.90
h. Cost C_3	**1,30,119**	**100**	**1,35,499**	**100**	**1,32,151**	**100**
E. Cost of production (₹/kg)						
a. at Cost A_1	**56.45**	**-**	**53.80**	**-**	**55.39**	**-**
b. at Cost C_3	**85.39**	**-**	**81.37**	**-**	**83.79**	**-**

A. Operational costs

The component wise various costs incurred in the cultivation of FCV tobacco have been presented in the table 5.3.3. Table 5.3.3 reveals that cost of human and bullock labour constituted the most important component of operational cost. Out of total human labour cost, cost of hired labour is higher in both the states. The per hectare cost of hired labour in Andhra Pradesh and Karnataka farms are ₹ 27,422 and ₹ 24,261, respectively and on overall basis is ₹ 26,229. Whereas family labour for the respective farms were ₹ 2,711 and ₹ 3,577 and on overall basis was ₹ 3,038.

The next component of operational cost is bullock labour which has been divided into two parts viz.., hired bullock labour and owned bullock labour. The per hectare cost of hired bullock labour in Andhra Pradesh and Karnataka farms are ₹ 8,251 and ₹ 3,826, respectively and on overall basis is ₹ 6,581. Whereas owned bullock labour for the respective farms are ₹ 715, and ₹ 3,250 and on overall basis is ₹ 1,672.

B. Material costs

From table 5.3.3 it is evident that material cost has been the major components of costs in the total cost of cultivation of FCV tobacco. The main items of expenditure of material cost are on firewood and manures and fertilizers followed by expenditure on plant protection measures, seedlings and cost of seed are found to be negligible. Cost of firewood in case of Andhra Pradesh is ₹ 18,396 against Karnataka ₹ 24,600 this is because Andhra farmers having barn which is type of duplex where, Karnataka farmers have single type. Hence, more quantity of firewood is required for curing of same quantity of leaves in Karnataka so the more expenditure. Expenditure on fertilizers in Andhra Pradesh is ₹ 11,099 while it is found higher in Karnataka as ₹ 15,701 this is because in Karnataka, tobacco is grown in red soils, whereas, in black soils in Andhra Pradesh. Nutrient 'K' consumption is more in Karnataka and its price (SOP) is also too high hence, fertilizer expenditure has been found to be more in Karnataka. Expenditure on N and P of Karnataka is at par with Andhra Pradesh. Cost of Plant protection chemicals is found to be more in Karnataka i.e. ₹ 1277.49 this is because there are four different types of chemicals used hence, quality leaf is produced and comparatively more price has been received by the Karnataka farmers as compared to Andhra Pradesh tobacco farmers.

(C) Other costs

In the total cost of production of a crop enterprise besides operational and material costs, other costs constitute an important component. Since study pertained to only specific crop, hence annual depreciation and interest obtained on the capital investment on fixed farm assets is apportioned in proportion to the cropped area occupied by FCV tobacco in the total cropped area of the farm during the study year. Rental value of land, depreciation and interest as obtained on the value of farm assets and land revenue paid to the government are the items of fixed costs. As reflected through the value of fixed cost for Andhra Pradesh and Karnataka, it is found that rental value of land constituted around 11 per cent and 10 per cent of the total cost, respectively. However, total fixed cost accounted for 16.25 per cent in Andhra Pradesh and 16.65 in Karnataka but in value terms the difference between two states is found around ₹ 1500 and the rental value of land prevalent in the study area is ₹ 12,500 per hectare for a crop season (6 months).

The perusal of the table further reveals that firewood, fertilizers, human labour and rental value have been important items of cost in both Andhra Pradesh and Karnataka. Bullock labour, machine labour, and plant protection chemicals are the other important items of cost of cultivation.

The total cost of production of tobacco produced in one hectare area **(Cost C_3)** for Andhra Pradesh and Karnataka farms are found to be ₹ 1, 30,119 and ₹ 1, 35,499, respectively. The cost of cultivation on overall basis is worked out as ₹ 1, 32,151 per hectare. It is found that per hectare cost of cultivation on Andhra Pradesh farms is less than that of Karnataka, this may due to seedlings are not raised by using trays. Hence, costs over trays are not paid by Andhra farmers. Further, it is observed that cost of production in Karnataka is more than that of Andhra Pradesh.

Cost of production of per unit kg of cured leaf at cost A_1 is higher in Andhra Pradesh (₹ 56.45) as compared to Karnataka (₹ 53.80). It is true at cost C_3 also, Andhra Pradesh incurs ₹ 85.39 to produce one kg of cured leaf against Karnataka ₹ 81.37. It has been concluded that Karnataka has an economy of scale in cured FCV tobacco production over Andhra Pradesh.

Comparison of costs based on CACP cost concept

The table 5.3.3 further reveals that cost A_1 which is also called as out of pocket expenses is found ₹ 86,015 and ₹ 89,595 per hectare in Andhra Pradesh and Karnataka, respectively. However on overall basis is ₹ 87,367 per hectare. Cost A_1 is also observed to increase with increase in the size of holding.

As for as in case of cost C_2 and cost C_2* was concerned, it is found that in terms of cost per hectare produce, these two costs are same for both the states. Due to the fact that actual wage rate was higher than the statutory minimum wage rates. Per hectare 'Cost C_3' is the total cost of production which included the managerial cost of farmers also. It came out to be ₹ 1,30,119 and ₹ 1,35,499 for Andhra Pradesh and Karnataka, respectively to produce FCV tobacco leaf produced in the one hectare area.

5.3.4 Yield and returns from Cured FCV tobacco production

Quantity of Cured FCV leaf produced is the main product of FCV tobacco which has been found to be 1577.10 kg per hectare on overall basis. Table 5.3.4 summaries per hectare gross return and net return of the sample farmers from Andhra Pradesh and Karnataka. It could be seen from the table, that the average yield has been found to be highest in Karnataka i.e. 1665.07 kg, whereas, in Andhra Pradesh 1523.75 kg per hectare. The gross return from per hectare cured FCV tobacco production for Andhra Pradesh and Karnataka is found as ₹ 1,96,315 and ₹ 2,38,055, respectively. The average price received by the Andhra's farmers is ₹ 128.83 and which is lower than that of Karnataka i.e. ₹ 142.97.

The net return per hectare over cost C_3 from FCV tobacco cultivation is found to be ₹ 66,196 in Andhra Pradesh and ₹ 1,02,556 in Karnataka. On overall basis it is found to be ₹ 79,922. Further, it is observed that Karnataka farmers earning around ₹ 36,000 more over Andhra Pradesh farmers, this is because Karnataka farmers have got advantage both in quantity and price over Andhra farmers.

The ratio of gross return to the cost C_3 is worked out for both Andhra Pradesh and Karnataka and is found to be 1.50 and 1.75, respectively. It indicates that there is ₹ 0.50 net profits for every one rupee of investment for Andhra Pradesh and ₹ 0.75 for Karnataka farmers from FCV tobacco production. Further, it can be concluded that Karnataka farmers have been getting 25 paisa as net return more from every single rupee of investment over Andhra Pradesh farmers from FCV tobacco production.

Table 5.3.4 Returns from Cured FCV tobacco production

(Per hectare)

Particulars	State		Overall
	Andhra Pradesh	Karnataka	
	₹	₹	₹
Average yield (kg/ha)	1,523.75	1,665.07	1,577.10
Average price (Rs./kg)	128.83	142.97	134.47
Gross return (Rs./kg)	**1,96,315**	**2,38,055**	**2,12,073**
Net return (Rs./ha) over			
a. Cost A1	1,10,300	1,48,460	1,24,706
b. Cost A2	1,10,300	1,34,710	1,24,706
c. Cost B1	1,09,386	1,45,851	1,23,152
d. Cost B2	80,736	1,18,451	94,973
e. Cost C1	1,06,675	1,42,274	1,20,114
f. Cost C2	78,025	1,14,874	91,936
g. Cost C2*	78,025	1,14,874	91,936
h. Cost C3	**66,196**	**1,02,556**	**79,922**
Net return (Rs./ha)	66,196	1,02,556	79,922
Return per rupee of investment	**1.50**	**1.75**	**1.60**

5.4 Resource use efficiency in FCV tobacco cultivation

In order to examine the resource use efficiency in the cultivation of FCV tobacco in Andhra Pradesh, Karnataka and on Overall basis, regression analysis was carried out. Cobb-Douglas production function has been fitted to estimate the parameters.

The results of fitted production functions (Cobb-Douglas form) in which yield is taken as dependent variable and input variables are taken as independent variables *viz.,* human labour (man days), bullock labour (pair days), machine labour (hours), fertilizer, P.P. Chemicals and seedling cost (in rupees) are measured per hectare in the

production function. The marginal value productivities of input used in FCV tobacco cultivation are presented and discussed below.

Table 5.4.1, 5.4.2 and 5.4.3 at a glance based on coefficient of multiple determinations (R^2), indicates that the explanatory variables included in regression model are responsible for 0.82 per cent, 0.87 per cent and 0.80 per cent variation in per hectare output in Andhra Pradesh, Karnataka and on overall basis, respectively.

The table 5.4.1 clearly reveals the elasticity or regression coefficient of human labour (0.889) is observed to be positive and statistically significant, where P. P. Chemicals exercised its negative and significant impact on the yield. Impact of rest of the inputs is found non-significant.

Table 5.4.1: Estimates of production function for FCV tobacco cultivation in Andhra Pradesh

Variables	Coefficients	Standard Error	MVP	MFC	MVP/MFC
Constant	2.488*	0.600	---	---	----
Human labour	0.889*	0.067	3260	300	10.86
Bullock labour	0.004	0.044	--	--	----
Machine hours	-0.026	0.027	--	--	----
Fertilizer	0.024	0.036	--	--	----
P.P. Chemicals	-0.008*	0.004	-4.289	1	-4.289
Seedling cost	0.077	0.065	--	--	----

*Indicates significant at 1% level of significance $R^2 = 0.8280$, Adjusted $R^2 = 0.8085$

The elasticity of human labour was less than unity indicates that there existed diminishing marginal productivity for this variable. All the variables taken together accounted for more than 82 per cent of total variation in the yield of FCV tobacco in Andhra Pradesh. The marginal productivity of human labour estimated as ₹ 3,260 for Andhra Pradesh. As MVP of human labour is statistically higher than its acquisition cost hence, there exists scope for increasing the use of human labour in FCV tobacco cultivation to realize higher productivity.

Table 5.4.2: Estimates of production function for FCV tobacco cultivation in Karnataka

Variables	Coefficients	Standard Error	MVP	MFC	MVP/MFC
Constant	3.804*	0.479	---	---	----
Human labour	0.771*	0.052	2144.75	300	7.30
Bullock labour	0.044	0.032	--	--	----
Machine hours	-0.040	0.109	--	--	----
Fertilizer	-0.019	0.051	--	--	----
P.P. Chemicals	0.002	0.008	--	--	----
Seedling cost	0.007	0.006	---	--	----

*Indicates significant at 1% level of significance $R^2 = 0.8722$, Adjusted $R^2 = 0.8578$

As depicted in table 5.4.2 only one variable namely human labour has shown positive and significant impact on FCV tobacco cultivation in Karnataka. The elasticity of human labour was less than unity indicates that there existed diminishing marginal productivity for this variable. All the variables taken together accounted for more than 87 per cent of total variation in the yield of FCV tobacco in Karnataka. The marginal productivity (MVP) of human labour estimated as ₹ 2,144.75 for Karnataka. As MVP to MFC ratio more than unity indicates that under-utilization of that particular resource. Therefore, there exists scope for increasing the use of human labour in FCV tobacco cultivation to realize higher productivity.

The table 5.4.3 shows that the production elasticity on overall basis, in which expenditure on human labour (0.6960), bullock labour (0.075) is observed to be positive and statistically significant on overall basis, where fertilizer and P.P. Chemicals exercised its negative and significant impact on the yield. Thus, human labour and bullock labour were the important explanatory variables (crop inputs) which along with other inputs accounted for more than 80 per cent of the variation in the yield of FCV tobacco on overall basis.

Table 5.4.3: Estimates of production function for FCV tobacco cultivation for combined data

Variables	Coefficients	Standard Error	MVP	MFC	MVP/MFC
Constant	4.893*	0.213	---	---	----
Human labour	0.696*	0.041	2226.58	300	7.42
Bullock labour	0.075**	0.030	948.119	450	2.10
Machine hours	-0.037	0.027	--	--	---
Fertilizer	-0.095*	0.026	-1.633	1	-1.633
P.P. Chemicals	-0.012*	0.004	-3.770	1	-3.770
Seedling cost	0.009	0.008	--	--	---

* indicates significant at 1% level of significance $R^2 = 0.8075$

** indicates significant at 5% level of significance Adjusted $R^2 = 0.7972$

The marginal productivity of human labour estimated as ₹ 2,226. 58 and bullock labour ₹ 948.11 on overall basis. As MVP of human labour and bullock labour are higher than its acquisition cost. Therefore, there exists scope for increasing the use of human labour and bullock labour in FCV tobacco to realize higher productivity. The negative and significant marginal productivity of fertilizer and P. P. Chemicals indicates that there is excess application of the same inputs in FCV tobacco cultivation on overall basis. Hence, there exists much scope to decrease the use of the two same inputs in FCV tobacco cultivation to realize higher productivity.

The empirical findings from the sections 5.4.1, 5.4.2 and 5.4.3 reflect the existence of resource-use inefficiency in the study area. The resource use in most of the cases is suboptimal indicating a scope of enhancement of the productivity of FCV tobacco by changing the level of use of such resources.

5.5 Nature of and destinational changes in exports of FCV tobacco

The results for the above objective are presented in two parts. First, nature of exports of FCV tobacco has been studied by estimating growth using time-series data as detailed in chapter 3, for the period 1974-75 to 2015-16, splitted in to pre WTO and

post WTO periods and results for the same are presented in section 5.5.1. Second, destinational changes in exports of FCV tobacco are analyzed by Markov chain analysis and results are presented in section 5.5.2. As there is no data available separately for report of FCV tobacco. Therefore, export data on unmanufactured tobacco is taken as proxy for export of FCV tobacco. This unmanufactured tobacco comprised of FCV tobacco besides other tobacco, but lions share is of FCV tobacco (85 per cent) this export.

5.5.1. The nature of exports of FCV tobacco

Tobacco is an important agricultural commodity traded in the world market, in the form of cured leaf as well as tobacco products, mainly cigarettes. The unit price realization from exports of FCV tobacco was ₹ 230 per kg during the year 2015-16 **(Tobacco Board, 2016).** Understanding growth in export of FCV tobacco is an important part of present study. Hence, the growth in export of FCV tobacco from India has been estimated using exponential growth function. The results are presented in Table 5.5.1 and discussed below.

It is revealed from the table 5.5.1 that during pre WTO period there was no change in the quantity exported as the trend coefficient estimated has been found non-significant, but in monitory term export of unmanufactured tobacco registered a CAGR of 5.82 per cent and as it can be seen in fig. 5.16. During post WTO period significant increase has been observed in export quantity as well as value thereof. Export quantity registered CAGR of 5.42 per cent which is less than half of the CAGR of its monitory value (12.86 per cent) indicating increasing international price of tobacco and it is graphically presented in fig. 5.17. Similar picture emerged with respect to increase in quantity of export and export value in the period from 1974-75 to 2015-16 wherein both registered significant increase, but export value increased at the CAGR of 10.82 per cent which is more than three times that of increasing rate of export quantity and as shown in fig. 5.18.

An all-time record of exports of unmanufactured tobacco was observed for year 2010 and 2014 from the fig. 5.5.3. This is because of exports to West Europe and South and South East Asia was maximum, compared to the past decade.

Table 5.5.1 Growth in export of unmanufactured tobacco during 1975 – 2016 from India

Period	Variable	Initial year observation	End year observation	Constant	Trend coefficient	R^2	CAGR
Pre WTO (1975-95)	**Qty. (M.tones)**	74,300	44,600	11.370	-0.017 (0.009)	0.15	--
	Value (Rs. Cr)	93.1	207.83	4.490	0.056* (0.013)	0.50	5.82
Post WTO (1996-16)	**Qty. (M. tones)**	72,052	2,09,244	11.319	0.052* (0.006)	0.79	5.42
	Value (Rs. Cr)	361.36	4331	5.939	0.121* (0.010)	0.87	12.86
Overall (1975-16)	**Qty. (M. tones)**	74,300	2,09,244	10.892	0.031* (0.004)	0.60	3.17
	Value (Rs. Cr)	93.1	4331	4.046	0.102* (0.004)	0.91	10.82

Note: Figures in parentheses are standard errors of the estimates

*Indicates significant at 5% level of probability

5.5.2. Destinational changes in exports of unmanufactured tobacco from India

Regarding the direction of trade of tobacco to different regions/countries and to study the shifts/loyalty in the exports of tobacco, Markov-chain analysis was employed using the time-series data from 2010-11 to 2015-16 as detailed in chapter 3. **Mandanna (1998), Kunder (2004) and Bisht (2015),** have employed Markov Chain analysis for studying shifts in the direction of trade. The transition probability matrix for shifts in export of unmanufactured tobacco from India is presented in Table 5.5.2.

The row elements in a transitional probability matrix provide the information on the probability of retention in the volume of trade and the extent of loss in trade on account of competing regions/countries, whereas, the column elements indicate the probability of gains in trade from other competing regions/countries.

Table 5.5.2 Transitional probability matrix for shifts in export of unmanufactured tobacco from India (2010-11 to 2015-16)

Regions	West Europe	East Europe	Middle East	South & South East Asia	Africa	North & South Americas	Australasia
West Europe	**0.3346**	0.1639	0	0.2468	0.1570	0.0977	0
East Europe	0	**0.1438**	0.2055	0.6507	0	0	0
Middle East	0.1216	0.3778	**0**	0.0509	0.4175	0	0.0322
South & South East Asia	0.9427	0	0	**0**	0	0.0573	0
Africa	0.0829	0.2145	0.3295	0	**0.2066**	0.1665	0
North & South Americas	0.0958	0	0.4375	0.2706	0	**0.1961**	0
Australasia	0	0	0	0	1	0	**0**

An examination of the transitional probability matrix estimated using Markov chain analysis, presented in Table 5.5.2 reveals that West Europe had retained 33.46 per cent of the previous year's export share in the current period. West Europe had also gained from South and South East Asia (94.27 per cent), Middle East (12.16 per cent), Africa (8.29 per cent) and North and South America (9.42 per cent). West Europe had also lost its previous year import share of unmanufactured tobacco to mainly South and South Asia (24.68 per cent), East Europe (16.39 per cent) and Africa (15.70 per cent). During this period West Europe exhibited a strong preference for unmanufactured tobacco from India.

Africa was next in order retaining 20.65 per cent of the previous year's share in the current year, gaining mainly from Middle East (41.75 per cent) and West Europe (15.70 per cent). Africa had also lost its previous year's share substantially to Middle East (32.95 per cent), East Europe (21.44 per cent) and North and South America (16.65 per cent). However, North and South America had retained 19.60 per cent of previous year's share in the current period, it gained mainly from Africa (16.65 per cent) and meagerly from South Asia and West Europe. North and South America had also lost its share to Middle East (43.75 per cent) and South and south East Asia (27.06 per cent).

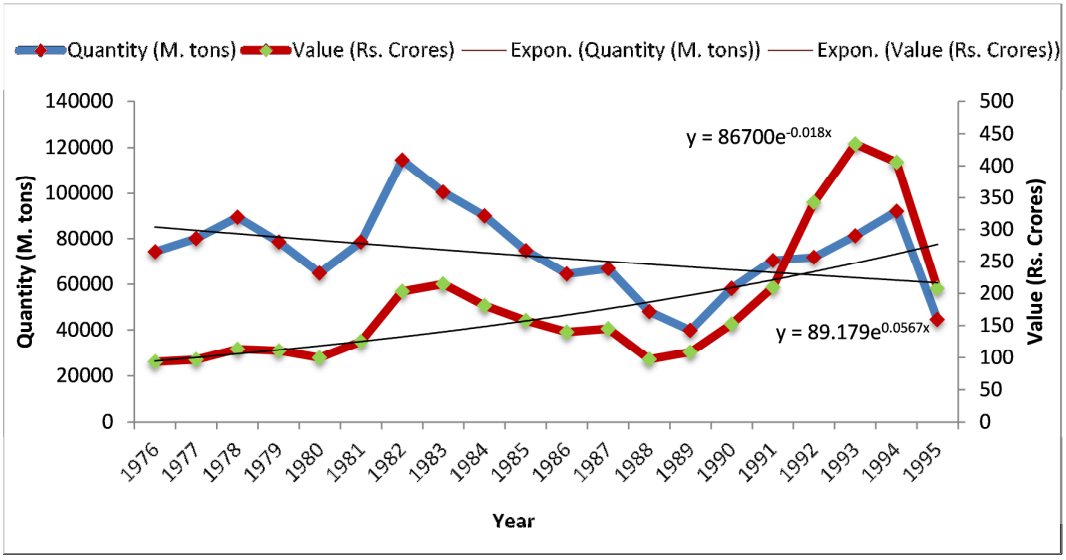


Fig. 5.16 Growth in exports of unmanufactured tobacco during pre WTO period (1975-95)

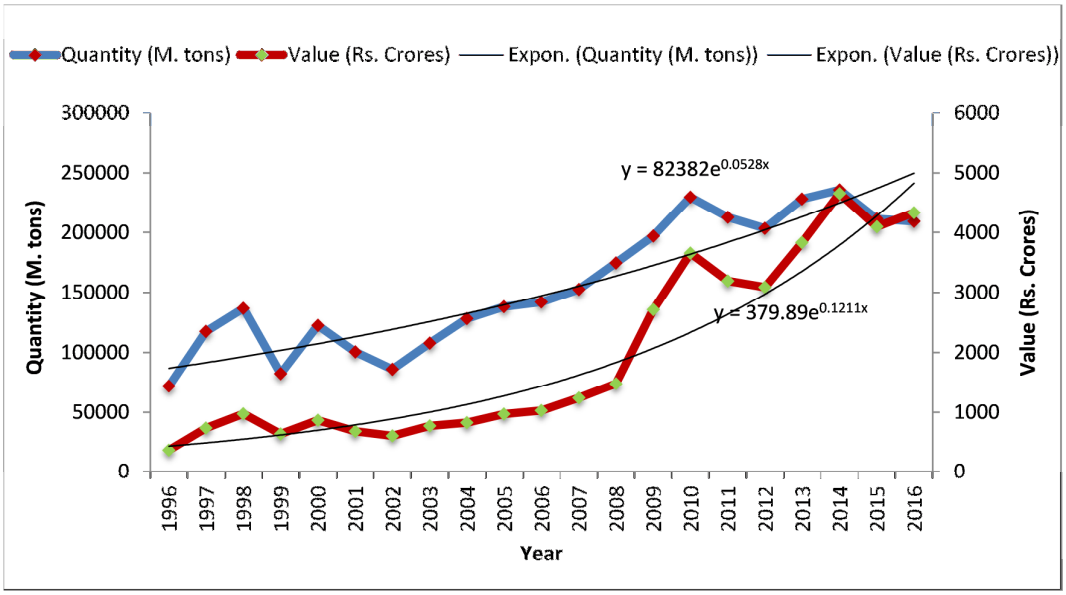


Fig. 5.17 Growth in exports of unmanufactured tobacco during post WTO period (1996-2016)

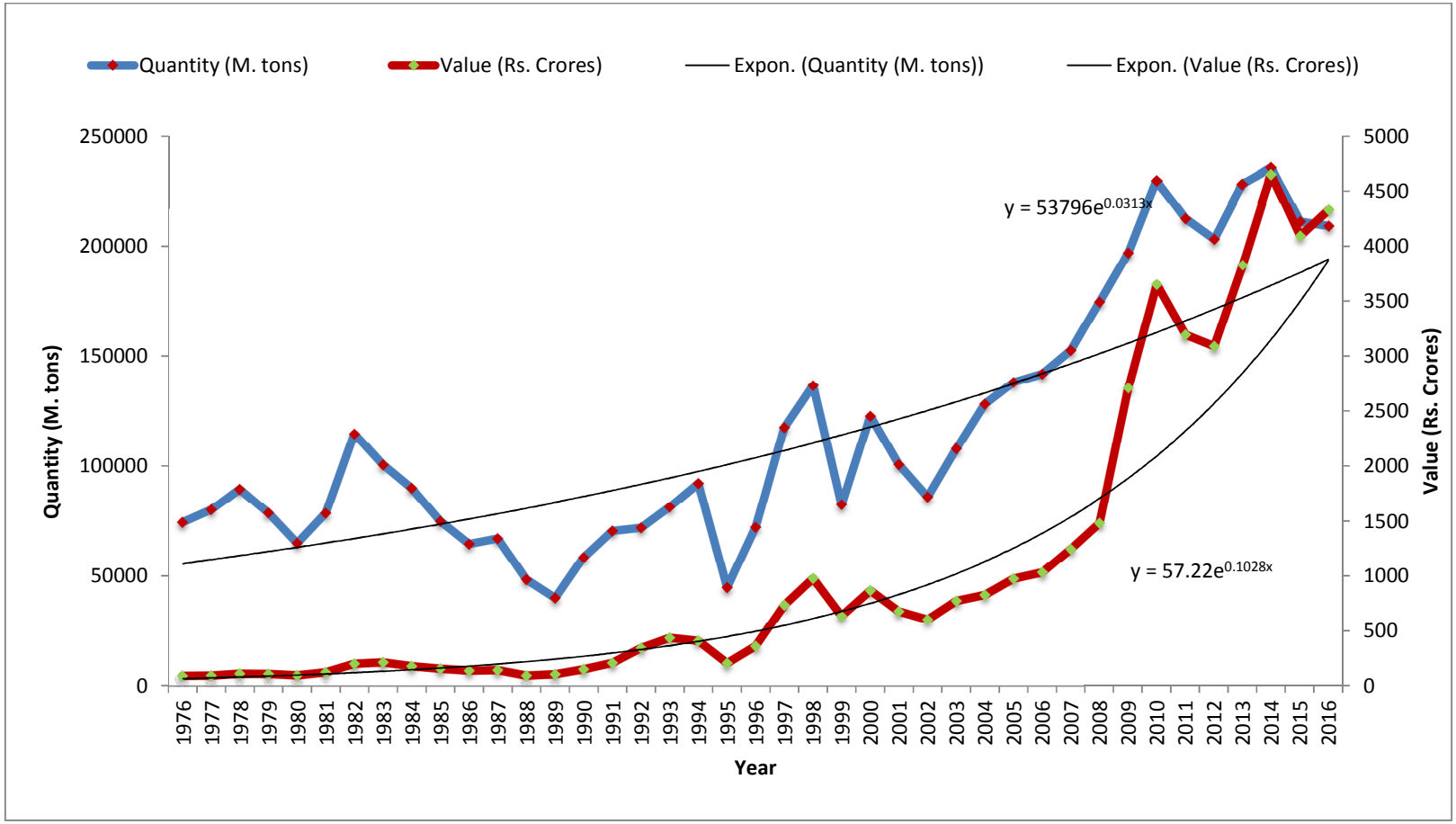


Fig. 5.18 Growth in exports of unmanufactured tobacco during overall period (1975-2016)

Further, East Europe had retained 14.37 per cent of the previous year's share in the current year, gaining mainly from Africa (21.44 per cent), Middle East (37.77 per cent) and West Europe (16.39 per cent). East Europe had also lost its share to South and south East Asia (65.06 per cent) and Middle East (20.55 per cent). Middle East, South and South East Asia and Australasia had not retained any share of the previous year's share, hence are seen as unstable markets for our unmanufactured tobacco. These markets did not exhibit any preference for unmanufactured tobacco from India.

Middle East, even though had not retained any share of our exports of the previous year, had gained from North and South America (43.75 per cent), Africa (32.9 per cent) and East Europe (20.55 per cent). On the other hand Middle East lost its entire share of the previous year imports from India to Africa (41.75 percent), East Europe (37.77 per cent) and West Europe (12.16 per cent). Similarly South and South East Asia, while not retaining any share, gained substantially from East Europe (65.06 per cent), North and South America (27.06 per cent) and West Europe (24.67 per cent). However, it lost its share to West Europe (94.27 per cent) and Australasia lost to Africa (100 per cent) and gained from Middle East.

The perusal of the table 5.5.2 indicates that West Europe followed by Africa and North and South America are the best and loyal importer of unmanufactured tobacco from India. It is suggested that India should not only depend on these trade partners only but also diversify its exports to other regions too.

5.6 Constraints faced by the FCV tobacco growers

The constraints faced by the farmers in FCV tobacco cultivation are discussed under this section. To study the various constraints associated with FCV tobacco cultivation, eight constraints were put before the sample farmers and asked to rank them according to their severity. The constraints faced by the farmers are analyzed by using Garrett's ranking technique. The rank given by the farmers are converted into per cent position. Therefore, per cent position is converted into score and finally the scores are converted into the ranks by using the Garrett's ranking table. Ranks of different constraints along with their scores have been presented in table 5.6.1.

Table 5.6.1: Ranking of the constraints faced by the FCV tobacco growers

Sl. No.	Constraints	State		
		Andhra Pradesh	**Karnataka**	**Overall**
01	Inadequate and untimely rainfall	I (77.25)	II (72.95)	I (75.1)
02	Non-adoption of improved method of nursery	III (59.51)	VI (39.65)	IV (49.58)
03	Not aware of recommended package of practices	VI (37.46)	V (43.95)	VI (40.1)
04	Scarcity of labour	II (70.1)	I (73.15)	II (71.62)
05	Inadequate availability of finances	VIII (23.65)	VIII (27.61)	VIII (25.63)
06	Attack of pest and diseases	V (46.31)	IV (50.83)	V (48.57)
07	High cost of firewood	IV (54.98)	III (63.13)	III (59.05)
08	Non-contact with extension agency	VII (31.7)	VII (34.58)	VII (33.14)

Note: Figures in parentheses indicates mean score of respective constraints

Table 5.6.1 reveals that inadequate and untimely emerged as the topmost constraint for the sample farmers with a mean score of 77.27 in Andhra Pradesh, whereas, in Karnataka the same constraint stood second with a mean score of 72.95 and on overall basis it ranked first. Scarcity of labour and non-adoption of improved method of nursery became second and third constraint for the farmers in Andhra Pradesh, while in Karnataka they stood at second and sixth ranks, respectively. Inadequate availability of finances stood on the last rank for Andhra Pradesh, Karnataka and on overall basis by indicating that bank, co-operatives and other financial institutions serving tobacco growers in a better way.

The perusal of the table 5.6.1 indicates that untimely rainfall and scarcity of labour are the major constraints faced by the farmers in the study area. Shortage of human labour in the study area is also verified by the finding of sub optimal use while examining resource use efficiency in section 5.4 of this chapter. High cost of firewood and non-adoption of improved method in nursery are the other important constraints. Non-availability of finance is the least constraint as observed in the study area.

Summary and Conclusions

Chapter 6 SUMMARY AND CONCLUSION

The concluding chapter summarises the findings of this study. The first part highlights the background of this study. This is followed by the summary of the findings and policy implications emerging from it.

Tobacco which belongs to the family 'Solanaceae' is an important crop grown in India. India is the second largest producer of tobacco in the world after China. Tobacco is grown in an area of about 0.45 million hectares producing on an average 650 million kg annually, which accounts for 10 per cent of the world's area and 9 per cent of production. Though tobacco occupies less than one per cent of the gross cropped area in India, it has earned a prominent place in the national economy through its employment generating capacity, besides being a major source of excise and foreign exchange earnings.

Among the different types of tobacco produced in India, Flue-Cured Virginia tobacco (FCV) is of considerable commercial significance, since it is the main ingredient used in the manufacture of cigarettes. Further, FCV is the major tobacco type traded in the international market in the form of cured leaf as well as cigarettes. However, the composition of tobacco production in India reveals that only about 32 – 35 per cent of the total tobacco production is of FCV type as against 65 per cent in the major tobacco producing countries.

Tobacco's role in providing rural employment and alleviating rural poverty is universally acknowledged. No country including India will be able or willing to do away with tobacco in the foreseeable future. Significant changes in the leaf market structure have been taken place after the introduction of the auction sale of tobacco in India. Similarly, drastic changes have also taken place in the export trade with the globalization, liberalization of trade policies and establishment of WTO.

Recognizing the commercial importance of the crop and in order to faster the development of the tobacco sector, the Government of India established the Tobacco Board in the year 1976. Introduction of auction sale of FCV tobacco under the Board's supervision since 1984 onwards, was a major step in streamlining FCV tobacco

marketing in India. The tobacco Board regulates area and production of FCV tobacco in order to provide remunerative price to the growers and help in price stabilization process.

The major FCV tobacco growing states are Andhra Pradesh and Karnataka which accounts for 55 and 44 per cent of total FCV tobacco production, respectively. Tobacco from Andhra Pradesh is mainly of filler type and that of Karnataka is semi flavored type, is highly preferred for exports. Out of the total Indian unmanufactured tobacco exports, FCV tobacco exports constituted 72 per cent in terms of quantity and 81 per cent in terms of value. FCV tobacco exports were in the order of 1,51,670 Metric tons valued ₹ 3,495.81 crores during 2015-16.

Due to less availability of labour, high cost of inputs and poor farm mechanization, resources may not utilize efficiently. Increasing productivity and thereby reducing costs will greatly enhance the competitiveness of tobacco industry both globally as well as in the domestic market. Therefore, the growth in area and production and the performance of productivity needs to be studied. This study was undertaken with overall objective of estimating the cost of production of Flue-Cured Virginia tobacco in Prakasam district of Andhra Pradesh and Mysuru district of Karnataka. Also, it is imperative to understand the export trade pattern of Indian tobacco for planning efficient production and marketing strategies. The present study is carried out with the specific objectives as follows:

1. To estimate the trend in area, production and productivity of FCV tobacco.
2. To estimate the cost of and returns from FCV tobacco production.
3. To examine the resource use efficiency in FCV tobacco cultivation.
4. To enquire into the nature of export of FCV tobacco.
5. To identify and rank the constraints faced by the FCV tobacco growers.

METHODOLOGY

In order to estimate growth in area, production and productivity of FCV tobacco and total tobacco in major states *viz.,* Andhra Pradesh and Karnataka as well as in India time-series data for the period 1975 – 2016 were used. Similar analysis has been carried out for two sub-periods. The first period extending from 1975 – 1995 pertaining to pre WTO and the second period from 1996 – 2016 signifies the post WTO period.

Multistage stratified random sampling procedure is followed. Prakasam district of Andhra Pradesh and Mysuru district of Karnataka state are chosen purposively for study as they rank first in area and production of FCV tobacco in respective state. Two blocks *viz.,* Ongole and Kondepi from Prakasam district and Periyapattana and Hunsur from Mysuru district are selected randomly. In the next step, three villages are selected randomly from each block, wherein tobacco is being produced. From the selected villages a list of farmers cultivating tobacco is prepared and 10 farmers are selected randomly from each village. Thus, a total 120 farmers are selected for collection of primary data. The present study is based on information collected from these 120 sample respondents for the year 2015-16.

To get a brief idea about sample farmers descriptive analysis has been done using averages, percentages etc. To attain the first objective, exponential growth function has been used. For the second objective, cost concept given by CACP has been used. To attain the third objective, marginal value product (MVP) of resources are compared with its marginal factor costs (MFC) using Cobb-Douglas production function. To attain the fourth objective, exponential growth function as well as Markov-chain analysis has been done. Finally, for the fifth objective Garrett's ranking technique has been used.

Findings

- ✓ FCV tobacco occupied 40.24 per cent and 42.25 per cent of the gross cropped area in Andhra Pradesh and Karnataka, respectively. Cropping intensity has been found to be 187.35 per cent and 191.46 per cent for the respective states.
- ✓ The average operational land holding in Andhra Pradesh is 4.35 ha while, 2.46 ha in Karnataka. However, on overall basis 3.40 ha per farm has been found. There is no evidence of leased-in and leased-out land with any of sample farmers in Andhra Pradesh whereas, on an average 0.48 ha land is taken on lease in Karnataka.
- ✓ The major varieties grown in Andhra Pradesh are Siri and Hema against, Kanchan, CH3 and FCH222 in Karnataka.
- ✓ During the pre WTO period Andhra Pradesh registered a CAGR of 2.52 per cent of growth in productivity While, Karnataka registered a CAGR of 1.68,

3.34 and 1.61 per cent growth in area, production and productivity, respectively. Area and production under FCV tobacco in Andhra Pradesh remained stagnant during pre WTO period. Growth rate of productivity in Karnataka is less than that of Andhra Pradesh for the same period.

- ✓ In India growth in area showed negative trend at the CAGR of -2.76 whereas, productivity increased at the CAGR of 1.84 per cent during pre WTO period. Growth in production has been remained stagnant during the same period.
- ✓ During the post WTO period Andhra Pradesh registered a CAGR of 1.48 and 2.08 per cent of growth in production and productivity, respectively, While Karnataka registered a CAGR of 2.74, 4.25 and 1.46 per cent growth in area, production and productivity, respectively
- ✓ In India growth in area, production productivity registered a CAGR of 3.20, 4.93 and 2.15 per cent during post WTO period. These growths are comparatively more than that of pre WTO growths of India.
- ✓ The costs of cultivation of FCV tobacco (green leaf) for Andhra Pradesh, Karnataka and on overall basis have been found to be ₹ 87,177, ₹ 95,390 and ₹ 90,278, per hectare respectively. Karnataka incurring more cost than that of Andhra Pradesh.
- ✓ The costs of curing of FCV tobacco for Andhra Pradesh, Karnataka and on overall basis have been found to be ₹ 37,164, ₹ 35,209 and ₹ 34,171, per hectare of green leaf respectively. The net return over cost A_1 (Farm Business Income) tobacco for Andhra Pradesh, Karnataka and on overall basis have been found to be ₹ 1,10,300, ₹ 1,48,460 and ₹ 1,24,706, respectively. It has been found that Karnataka's farmers reaping more Farm Business Income than that of Andhra Pradesh tobacco growers.
- ✓ The net returns per hectare over cost C_3 for Andhra Pradesh, Karnataka and on overall basis have been found to be ₹ 66,196, ₹ 1,02,556 and ₹ 79,922, respectively. It has been found that Karnataka farmers have ₹ 36,000 edge over Andhra's tobacco farmers.

- ✓ The returns per rupee of expenditure for Andhra Pradesh, Karnataka and on overall basis are 1.50, 1.75 and 1.64, respectively. Cost of production of per unit kg of cured leaf has been found more in Andhra Pradesh (₹ 85.39) over Karnataka (₹ 81.37).
- ✓ Human labour and Plant Protection Chemical resources have been found to be significant in Andhra Pradesh. MVP over MFC for human labour is 10.86 indicating its underutilisation and for P.P. Chemicals is -4.28 indicating its overutilization. Human labour resource has been found to be significant in Karnataka. MVP over MFC for human labour is 7.30 indicating its underutilisation.
- ✓ Human labour, Bullock labour, Fertilizer and Plant Protection Chemical resources have been found to be significant on overall basis. MVP over MFC for human labour is 7.42 and for bullock labour is 2.10 indicating its underutilisation and for Fertiliser is -1.633 and for P.P. Chemicals is -3.77 indicating its overutilization.
- ✓ Export growth analysis for the pre WTO period revealed that India's export of un-manufactured tobacco in quantity terms has remained stagnant. During post WTO period it registered a CAGR of 5.42 per cent per annum. This is probably may due to changes in the trade policies after the establishment of World Trade Organization (WTO).
- ✓ The direction of un-manufactured tobacco exports to different regions have been estimated through the transitional probability matrix using Markov chain for the period 2010-11 to 2015-16. The analysis revealed that West Europe followed by Africa exhibited a strong preference for un-manufactured tobacco from India.
- ✓ Untimely rainfall emerged as rank constraint faced by the farmers in Andhra Pradesh whereas, scarcity of labour has been first rank constraint for farmers in Karnataka. On overall basis again untimely rainfall became first rank constraint faced by the farmers.

Conclusions and Policy Implications

The two major economic policy reforms viz., the economic reforms launched in 1991 designed to integrate Indian economy with the global economy and the establishment of World Trade organisation in 1995 have put Indian agriculture into the framework of global competition and rule of the global market. Tobacco, the least protected agricultural commodity has high potential both in the domestic as well as international market. Suitable policy changes in this sector may help in developing the tobacco economy. The policy implications originated from this study are briefly presented here under:

1. It has been found that tobacco crop is profitable in both the states but the productivity is less in Andhra Pradesh as compared to Karnataka. The Tobacco Board and other related agencies need to explore the possibilities to provide technical know-how and other support to the farmers in order to increase the productivity.
2. The results of resource use efficiency revealed that human labour being employed below their optimum level and especially fertilizer and P.P. Chemicals being used above their optimum level. Hence, profits to the grower is less to some extent. Therefore, it is necessary to educate the farmers to use resources optimally, so that the profits can be maximised.
3. Unmanufactured tobacco export has increased during post WTO period (1995-2016). Growth in unmanufactured tobacco exports in monetary terms is twice that of quantity, it signifies international price realization is also increasing. Hence, concerned authority should take measures to produce more quality leaf in order to meet international standards so that more benefits can be reaped from exports in future.
4. Export of unmanufactured tobacco should be diversified instead of heavily depending on one or two regions. The study has identified West Europe, Africa and North and South America preferring Indian tobacco. Export diversification helps in stabilising the export trade.
5. Rainfall, scarcity of labour and high cost of firewood has been the major constraints faced by the FCV tobacco growers. Hence, farmers should be educated to adopt water conservation practices in their fields. High cost of

firewood also emerged as a major constraint; the concerned agencies should take necessary steps to provide alternative fuel material other than wood. At the same time the concerned scientists must take up a research study to find out the alternative fuel at cheaper rates to reduce the cost of curing as well as to check the deforestation.

6. In the study area almost all the tobacco growers are found to be curing their tobacco green leaves with their traditional barn structures. This calls for establishment of mechanised processing unit to cure the FCV tobacco leaves for quality improvement. This will benefit farmers as well as enhance the trade competitiveness, besides, less requirement of human labour.

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Appendices

APPENDIX - I

Area, Production and Productivity of FCV tobacco in Andhra Pradesh and Karnataka during 1996 to 2016

STATE						
	ANDHRA PRADESH			KARNATAKA		
Year	Area ('000 ha)	Production (M. kgs)	Productivity (kg/ha)	Area ('000 ha)	Production (M. kgs)	Productivity (kg/ha)
1996	115.5	135	1173	69.5	56	805
1997	123	144.2	1172	70.3	57	811
1998	150.9	151.5	1003	70.8	62.2	879
1999	143	176	1230	83.7	59	705
2000	128.76	131.63	1022	51.989	45.3	871
2001*	105.25	125.835	1195	40.012	41.98	1049
2002	87.754	120.04	1368	47.699	57.68	1209
2003	93.209	127.67	1370	56.365	63.25	1122
2004	109.373	147.98	1353	69.158	73.69	1066
2005	113.334	153	1350	69.701	90.35	1296
2006	117.242	145.36	1240	73.98	82.91	1121
2007	126.889	171.95	1355	78.162	96.98	1241
2008	126.7	165.33	1305	85.755	87.65	1022
2009	140.875	203.94	1448	90.427	114	1261
2010	150.233	207.58	1382	106.601	115.67	1085
2011	139.24	173.25	1244	118.989	127.85	1074
2012	112.792	162.7	1442	104.393	104.29	999
2013	120.105	176.65	1470	93.974	93.86	999
2014	123.615	213.93	1731	97.77	102.02	1043
2015	108.737	190.05	1748	85.934	103.4	1203
2016	70.122	126.34	1801	75.837	83.43	1100

Source: Tobacco Board, Guntur

*During 2001 there was a crop holiday in Andhra Pradesh hence, no production but for the analysis purpose it has been obtained by interpolation method.

APPENDIX - II

Area, Production and Productivity of Tobacco in India during 1996 to 2016

INDIA						
	FCV			Total		
Year	Area ('000 ha)	Production (M. kgs)	Productivity (kg/ha)	Area ('000 ha)	Production (M. kgs)	Productivity (kg/ha)
1996	124.14	127	1023.03	390	540	1356
1997	170	167.11	983	428	617.8	1443
1998	172	177.25	1030	465	636.5	1369
1999	175	174	994	470.1	608.2	1294
2000	180.749	176.93	946.5	432.5	524	1211
2001	40.012	41.98	524.5	261.5	344.7	1318
2002	135.453	177.72	1288.5	348.5	545.5	1565
2003	149.574	190.92	1246	327.2	500.2	1529
2004	178.531	221.67	1209.5	369.7	549.9	1487
2005	183.035	243.35	1323	366.5	549.1	1498
2006	191.222	228.27	1180.5	372.8	552.1	1481
2007	205.051	268.93	1298	368.5	519.3	1409
2008	212.455	252.98	1163.5	348.1	493.3	1417
2009	231.302	317.94	1354.5	390.7	541.1	1385
2010	256.834	323.25	1233.5	443	665.6	1503
2011	258.229	301.1	1159	491.2	801.6	1632
2012	217.185	266.99	1220.5	466	751.2	1613
2013	214.079	270.51	1264	426	657	1542
2014	221.385	315.95	1427	464	800	1724
2015	200	279	1395	464	800	1724
2016	198	288	1454	440	750	1704

Source: Tobacco Board, Guntur

APPENDIX - III

Export of unmanufactured tobacco from India during 1996 - 2016

Year	Quantity (M. tonnes)	Value (₹ Crores)
1996	72052	361.36
1997	117466	733.66
1998	136739	972.83
1999	82366	634.48
2000	122590	864.77
2001	100537	677.04
2002	86010	602.89
2003	107715	770.62
2004	128186	825.48
2005	138159	968.9
2006	142007	1027.52
2007	152618	1241.05
2008	174690	1478.51
2009	197127	2713.28
2010	229632	3655.49
2011	212573	3192.39
2012	203294	3090.21
2013	228023	3831.84
2014	235653	4649.92
2015	211212	4095.87
2016	209244	4331

Source: Tobacco Board, Guntur

APPENDIX - IV

Region-wise exports of unmanufactured tobacco from India during 2013-14 to 2015-16

Regions	Year					
	2013-14		2014-15		2015-16	
	Quantity	Value	Quantity	Value	Quantity	Value
West Europe	80063	1861.72	57627	1232.93	69634	1577.8
East Europe	33719	728.51	32783	686.96	29768	645.23
Middle East	24947	422.98	20237	320.05	25986	513.21
South & South East Asia	46912	973.16	46619	912.33	40193	879.14
Africa	29848	555.07	38477	677.97	25918	457.59
North & South America	19266	285.61	14754	246.23	17420	247.16
Australasia	898	22.87	715	19.4	325	11.31
Total	**235653**	**4849.92**	**211212**	**4095.87**	**209244**	**4331.44**

Source: Tobacco Board, Guntur

APPENDIX – V

Zero order correlation matrices of FCV tobacco for Andhra Pradesh

Variables	Human labour	Bullock labour	Machine hours	Fertilizer	P.P. Chemicals	Seedlings
Human labour	1					
Bullock labour	0.479956	1				
Machine hours	0.188785	0.140319	1			
Fertilizer	0.149772	0.117641	0.413473	1		
P.P. Chemicals	0.019712	-0.02081	0.170534	-0.06687	1	
Seedlings	0.252892	-0.02675	0.031786	-0.0726	-0.14233	1

APPENDIX – VI

Zero order correlation matrices of FCV tobacco for Karnataka

Variables	Human labour	Bullock labour	Machine hours	Fertilizer	P.P. Chemicals	Seedlings
Human labour	1					
Bullock labour	0.350492	1				
Machine hours	0.254295	0.042339	1			
Fertilizer	0.003056	-0.06176	0.31574	1		
P.P. Chemicals	-0.21799	-0.27102	-0.13111	0.240803	1	
Seedlings	0.29182	0.205139	-0.02121	0.066598	-0.10532	1

APPENDIX – VII

Zero order correlation matrices of FCV tobacco for combined data

Variables	Human labour	Bullock labour	Machine hours	Fertilizer	P.P. Chemicals	Seedlings
Human labour	1					
Bullock labour	-0.02985	1				
Machine hours	0.703775	-0.21099	1			
Fertilizer	0.759377	-0.28322	0.781322	1		
P.P. Chemicals	0.488805	-0.33374	0.460496	0.664062	1	
Seedlings	0.11684	0.000123	0.001039	-0.01172	-0.0499	1

APPENDIX - VIII

GARRETT RANKING CONVERSION TABLE

The conversion of orders of merits into units of amount of "scores"

Per cent	Score	Per cent	Score	Per cent	Score
0.09	99	20.93	66	80.61	33
0.2	98	22.32	65	81.99	32
0.32	97	23.88	64	83.31	31
0.45	96	25.48	63	84.56	30
0.61	95	27.15	62	85.75	29
0.78	94	28.86	61	86.89	28
0.97	93	30.61	60	87.96	27
1.18	92	32.42	59	88.97	26
1.42	91	34.25	58	89.94	25
1.68	90	36.15	57	90.83	24
1.96	89	38.06	56	91.67	23
2.28	88	40.01	55	92.45	22
2.63	87	41.97	54	93.19	21
3.01	86	43.97	53	93.86	20
3.43	85	45.97	52	94.49	19
3.89	84	47.98	51	95.08	18
4.38	83	50	50	95.62	17
4.92	82	52.02	49	96.11	16
5.51	81	54.03	48	96.57	15
6.14	80	56.03	47	96.99	14
6.81	79	58.03	46	97.37	13
7.55	78	59.99	45	98.72	12
8.33	77	61.94	44	98.04	11
9.17	76	63.85	43	98.32	10
10.16	75	65.75	42	98.58	9
11.03	74	67.48	41	99.82	8
12.04	73	69.39	40	99.30	7
13.11	72	71.14	39	99.22	6
14.25	71	72.85	38	99.39	5
15.44	70	74.52	37	99.55	4
18.69	69	76.12	36	99.68	3
18.01	68	77.68	35	99.80	2
19.39	67	79.12	34	99.91	1
				100	0

Source: E.Garrett's statistics in Psychology and Education

APPENDIX – IX

India's position in Yield of Tobacco in the World (2013)

Rank	Top 10 Countries	Yield (kg/ha)
1	Peru	17,143.6
2	UAE	13,500
3	Laos	5,820.8
4	Oman	5,000.0
5	Samoa	4,565.2
6	Uruguay	3,855.4
7	Chile	3,842.0
8	Cyprus	3,400.0
9	South Africa	3,310.0
10	Spain	3,300.0
56	**India**	**1,693.9**
	World	**1,754.3**

Source: *Food and Agriculture Organisation, 2013*

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Thesis title : AN ECONOMIC ANALYSIS OF PRODUCTION AND EXPORT OF FLUE – CURED VIRGINIA (FCV) TOBACCO IN INDIA

Tobacco is one of the important commercial crops of India and also called as "golden leaf". It provides employment directly and indirectly to 38 millions of people. As a commercial crop, tobacco forms an important item in the Indian export basket. FCV tobacco accounts for around 85 per cent of total tobacco exports. Andhra Pradesh and Karnataka together have share of 99 per cent of total FCV tobacco production in India. Due to less availability of labour, high cost of inputs and poor farm mechanization, resources may not utilize efficiently. Increasing productivity and thereby reducing costs will greatly enhance the competitiveness of tobacco industry both globally as well as in the domestic market. Therefore, the present study has been conducted with reference to FCV tobacco; to estimate the trend in area, production and productivity, to estimate the cost of and returns from production, to examine the resource use efficiency in cultivation, to enquire into the nature of export and to identify and rank the constraints faced by the growers. The study is based on data collected from 120 FCV tobacco growers of Andhra Pradesh and Karnataka purposively selected to represent India, for the year 2015-16 besides, secondary data from 1974-75 to 2015-16. In order to estimate trend in area, production, productivity and export of FCV tobacco exponential growth function has been employed, to estimate cost and returns the CACP cost concept has been used, MVP of resources are compared with MFC of respective resource to examine resource use efficiency, to identify destinational changes in FCV tobacco exports Markov chain analysis has been done and finally to identify the constraints faced by the growers Garrett's ranking technique has been used.

The results of the study indicated that FCV tobacco occupied 40.24 per cent and 42.25 per cent of the gross cropped area in Andhra Pradesh and Karnataka, respectively. Cropping intensity has been found to be 187.35 per cent and 191.46 per cent for the respective states. Area under FCV tobacco in Andhra Pradesh remained stagnant during pre and post WTO periods while, that grew in Karnataka in both the periods. Production of FCV tobacco in AP grew at CAGR of 1.48 per cent during post WTO period while, remained stagnant during pre WTO period. Karnataka's FCV tobacco production grew at 4.25 per cent which is closer to the national growth rate i.e. 4.93. Growth rate of productivity found to be more in AP as compared to Karnataka during pre WTO period. Again, in AP it grew at higher rate than Karnataka during post WTO period. During pre WTO period India's growth in area under FCV tobacco recorded negative trend at CAGR of (-)2.76 per cent, but production remained stagnant as like AP. Productivity grew at CAGR of 1.84 per cent which is higher than state growth rates for the same period. During post WTO period growth in area, production and productivity registered a CAGR of 3.20, 4.93 and 2.15 per cent in India which is again higher than growth rates of same in the states. The cost of production is found higher in Karnataka (₹ 1.35,499) as compared to Andhra Pradesh (₹ 1,30,119) at cost C_3. The per hectare net return over cost A_1 (Farm Business Income) is estimated ₹ 1,10,300 for AP which is lower than Karnataka (₹ 1,48,460) and on overall basis it is ₹ 1,32,151. Returns per rupee invested are 1.50, 1.75 and 1.60 for Andhra Pradesh, Karnataka and on overall basis, respectively. The MVP to MFC ratio for human labour has been 10.86 and on P.P. Chemicals is (-)4.28 for Andhra Pradesh against MVP over MFC on human labour is 7.30 for Karnataka indicating that there exists scope for increasing the use of human labour and decrease the use of P.P. Chemicals in FCV tobacco cultivation to realize higher productivity. During post WTO period export of unmanufactured tobacco registered a CAGR of 5.42 per cent in quantity term and in monetary term it registered a CAGR more than twice that of quantity term (12.86 per cent) this is mainly due to increase in international price as it signifies more demand. West Europe followed by Africa and North and South America are the best and loyal importer of unmanufactured tobacco from India. Untimely rainfall followed by scarcity of labour and high cost firewood is the major constraints faced by the FCV tobacco growers.

Though FCV tobacco cultivation in the study area has been found to be a profitable venture, more profit can be reaped and the business can be made more efficient if the farmers are provided with more labours, water availability and cheap firewood. India should not depend upon few regions for the exports of FCV/unmanufactured tobacco but it should diversify its trade thereby Indian tobacco can be more competitive and farmers' profits may be increased.

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शोध शीर्षक : **''भारत में फ्लू–क्योर्ड वर्जिनिया (एफ.सी.वी.) तम्बाकू के उत्पादन एवं निर्यात का आर्थिक विश्लेशण''**

सलाहकार : डॉ. एस. के. श्रीवास्तवा

तम्बाकू भारत की एक मुख्य व्यावसायिक फसल है, जिसे ''स्वर्णपत्र'' भी कहा जाता है । यह प्रत्यक्ष एवं अप्रत्यक्ष रुप से 38 लाख लोगों को रोजगार प्रदान करता है। एक वाणिज्यिक फसल के रुप में तम्बाकू भारतीय निर्यात का महत्वपूर्ण घटक है। कुल तम्बाकू निर्यात में लगभग 85 प्रतिशत हिस्सेदारी एफ0सी0वी0 तम्बाकू का है। आन्ध्र प्रदेश तथा कर्नाटक राज्य भारत के कुल एफ0सी0वी0 तम्बाकू का 99 प्रतिशत उत्पादन करता है। श्रमिकों की कमी, संसाधनों की अधिक लागत तथा अल्प मशीनीकरण के कारण संसाधनों का उचित उपयोग नही हो पा रहा है। उत्पादकता में वृद्धि से उत्पादन लागत मे होने वाली कमी वैश्विक बाजार के साथ ही घरेलू बाजार में तम्बाकू उधोग के प्रतिस्पर्धा को बढाएगा । अतः वर्तमान शोध का उद्देश्य एफ0सी0वी0 तम्बाकू के संदर्भ में क्षेत्रफल, उत्पादन एवं उत्पादकता की वृद्धि दर ज्ञात करना, लागत व आय का आंकलन, खेती में संसाधन उपयोग की दक्षता ज्ञात करना, निर्यात की प्रकृति का आंकलन तथा उत्पादकों के समक्ष आने वाली समस्याओं की पहचान कर उन्हें क्रमबद्ध करना है। भारत मे फ्लू–क्योर्ड वर्जिनिया (एफ0सी0.वी0) तम्बाकू की स्थिति दर्शाने के लिए दो प्रमुख उत्पादक राज्यों आंध्र प्रदेश राज्यों तथा कर्नाटक के 120 तम्बाकू उत्पादकों से प्राथमिक आँकड़े प्राप्त किये गये तथा गौण आँकडें विभिन्न स्त्रोतों से वर्ष 1974–75 से 2015–16 के मध्य के प्रयोग किये गए। एफ0सी0वी तम्बाकू के क्षेत्रफल, उत्पादक तथा उत्पादकता की वृद्धि दर तथा निर्यात की प्रकृति का अनुमान लगाने के लिये घातांकित वृद्धि फलन तथा लागत व लाभ का अनुमान लगाने के लिए कृषि लागत एवं मूल्य आयोग (सी0ए0सी0वी0) की लागत की अवधारणा का उपयोग किया गया । संसाधनों की सीमान्त मूल्य उत्पाद की तुलना सीमांत संसाधन लागत से करके संसाधनों के उपयोग दक्षता की जाँच की गई । एफ0सी0वी तम्बाकू निर्यात मे भविष्य के परिवर्तन की पहचान करने के लिये मार्कोव –श्रृंखला द्वारा विश्लेषण किया गया और अंत मे उत्पादकों के समक्ष आने वाली समस्याओं की पहचान गैरेट रैंकिंग विधि का प्रयोग कर किया गया।

अध्ययन के परिणामों से यह पता चलता है कि एफ0सी0वी0 तम्बाकू का क्रमशः आंध्र प्रदेश और कार्नाटक में सकल फसली क्षेत्र मे क्रमशः 40.24 एवं 42.25 प्रतिशत् हिस्सेदारी है। संबधित राज्यों के लिऐ फसल सघनता क्रमशः 187.35 प्रतिशत् तथा 191.46 प्रतिशत थी। आंध्र प्रदेश मे एफ0सी0वी0 तम्बाकू का क्षेत्रफल विश्व व्यापार संगठन (विश्व व्यापार संगठन) की स्थापना के पूर्व तथा बाद में भी स्थिर रहा जबकि कर्नाटक में इस तम्बाकू के क्षेत्रफल में दोनो समय मे वृद्वि हुई। आंध्र प्रदेश में विश्व व्यापार संगठन के गठन के उपरान्त एफ0सी0वी0 तम्बाकू के उत्पादन में 1.48 प्रतिशत की चक्रवद्वि दर से वृद्धि हुई जबकि विश्व व्यापार संगठन (डब्लू0टी0ओ0) पूर्व यह स्थिर था। कर्नाटक के एफ0सी0वी0 तम्बाकू उत्पादन में 4.25 प्रतिशत की वृद्वि हुई जो राष्ट्रीय स्तर के वृद्वि दर 4.93 प्रतिशत के निकट है । विश्व व्यापार संगठन के पूर्व मे आंध्र प्रदेश में उत्पादकता की वृद्धि दर आंध्र प्रदेश की तुलना से अधिक थी जबकि बाद के समय मे आंध्र प्रदेश मे एफ0सी0वी0 तम्बाकू की उत्पादकता कर्नाटक मे वृद्वि की दर से अधिक दर से बढ़ी । विश्व व्यापार संगठन के पूर्व भारत की एफ0सी0वी0 के क्षेत्रफल में 2.76 प्रतिशत की दर से गिरावट पायी गई, जबकि उत्पादन आंध्र प्रदेश की भांति स्थिर रहा। राष्ट्रीय स्तर पर उत्पादकता 1.84 प्रतिशत की चक्रवृद्वि दर से बढ़ी जोकि इसी अवधि के लिये राज्यों में उत्पादकता की दर से अधिक है। विश्व व्यापार संगठन के उपरान्त की अवधि के दौरान क्षेत्रफल, उत्पादन तथा उत्पादकता में क्रमशः 3.20, 4.93 तथा 2.15 प्रतिशत की चक्रवृद्धि दर से वार्षिक वृद्धि हुई जो कि दोनों राज्यों में सामान्य वृद्धि दर से बहुत अधिक है। एफ0सी0वी0 तम्बाकू की उत्पादन लागत (सी–3) कर्नाटक में (रू 135499/है0) आंध प्रदेश की अपेक्षा (रू0 130119/है0) अधिक पायी गई। लागत सी–1 की अवधारणा पर प्रति हैक्टेयर शुद्ध लाभ आंध्र प्रदेश में रू0 110300 पायी गयी जो कि कर्नाटक (रू0 148460) से कम रही तथा दोनो राज्यों के औसत आधार पर रु0 132151 रहा। प्रति रुपये व्यय (लागत सी–3) पर आय आंध्र प्रदेश, कर्नाटक ओर समग्र आधार पर क्रमशः रु0 1.50 रु0 1.75 व रु0 1.60 पायी गयी। आन्ध्र प्रदेश में सीमान्त मूल्य उत्पाद एवं सीमांत संसाधन लागत अनुपात 10.86 मानव श्रम हेतु तथा फसल रासायनों का (–)4.28 पाया गया जबकि कर्नाटक राज्य मे यह अनुपात मानव श्रम के लिये 7.30 पाया गया । उपरोक्त यह दर्शाता है कि मानव श्रम के उपयोग में वृद्धि तथा फसल सुरक्षा रसायनों का कम उपयोग एफ0सी0वी0 तम्बाकू के उत्पादकता में वृद्धिदायक है। विश्व व्यापार संगठन की स्थापना के बाद अनिर्मित तम्बाकू के निर्यात मूल्य में 12.86 प्रतिशत की चक्रवृद्वि दर से वार्षिक वृद्धि हुई जो कि तम्बाकू की निर्यात मात्रा की वृद्धि दर के दोगुने से अधिक पाया गया। इसका प्रमुख कारण अंतराष्ट्रीय बाजार में मूल्य वृद्धि है, जो कि इसकी माँग में वृद्धि दर्शाता है। पश्चिमी यूरोप के बाद अफ्रीका और उत्तरी एवं दक्षिणी अमेरिका भारत के अनिर्मित तम्बाकू निर्यात हेतु सबसे अच्छे और विश्वासपात्र आयातक पाये गये है। बेमौसमी वर्षा, श्रम की कम उपलब्धता तथा जलाऊ लकड़ी की अधिक लागत तम्बाकू के उत्पादकों की मुख्य समस्याएँ पायी गई।

अध्ययन क्षेत्र में एफ0सी0वी0 तम्बाकू की खेती एक लाभप्रद व्यवसाय पाया गया। यदि सिंचाई, अधिक श्रम, तथा कम लागत पर जलाऊ लकड़ी उपलब्ध हो जाये तो तम्बाकू उत्पादन और अधिक कुशल तथा लाभकारी हो सकता है । भारत को एफ0सी0वी0/अविनिर्मित तम्बाकू के निर्यात के लिए कुछ क्षेत्रों/देशों पर ही निर्भर नही होना चाहिए तथा निर्यात क्षेत्र में अधिक विविधता लानी चाहिए, जिससे भारतीय तम्बाकू के अधिक प्रतिस्पर्धी होने के साथ ही किसानों की आय में वृद्धि हो सकती है।

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