

## IMPACT ASSESSMENT OF FLUE CURED VIRGINIA TOBACCO IN SLS AND SBS REGIONS OF ANDHRA PRADESH

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**Flue-Cured Virginia (FCV) tobacco is a highly remunerative crop fetching huge benefits to farmers in the tobacco growing regions of Andhra Pradesh and Karnataka. The present study is an attempt to assess the impact of FCV tobacco crop on socio-economic status of tobacco farmers in SLS (Southern Light Soils) and SBS (Southern Black Soils) regions of Andhra Pradesh. The study was conducted during the year 2017-2018 in Southern Light Soils (SLS) and Southern Black Soils (SBS) regions of Prakasam and Nellore districts of Andhra Pradesh. A total of 10 tobacco and 10 non-tobacco farmers from each auction platform was selected, therefore data was collected from 120 tobacco and 120 non-tobacco (bengal gram and red gram) farmers. The average net returns from tobacco grown is Rs 25,000-30,000/acre in SLS and SBS region respectively compared to bengal gram (Rs 10,700/acre) and red gram (Rs 6000/acre). High level of socio-economic impact is observed for tobacco growers in terms of annual income, returns, possession of assets, information seeking behavior, food security, habitat security and social empowerment than non-tobacco farmers. Less availability of ground water, wild boar damage, fluctuating weather conditions, yearly price fluctuations, high labour wages are the severe constraints in SLS and SBS regions.**

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### INTRODUCTION

India is an important grower of tobacco on a global scale. The crop involves wider social and economic significance in India as it provides livelihood to 45.7 million people (TII, 2019). According to FAOSTAT (2019) reports, India ranks third (750 M kg) in global tobacco production after China and Brazil. Among different types of tobacco, Flue-Cured Virginia (FCV) tobacco is a highly remunerative crop providing benefits to farmers in the tobacco growing regions of Andhra Pradesh

and Karnataka. At present, tobacco cultivation is constantly leading to intense scientific debates and public controversy surrounding with ethical questions of human health and environmental risk. Even then majority of tobacco farmers in Andhra Pradesh and Karnataka are growing tobacco crop since many years and this cash crop significantly influencing the prosperity of the farming community. In view of the important role that tobacco plays in the country's economy, particularly in terms of employment and livelihood of millions dependent on tobacco, there is a need to strike a balance between tobacco control policies and socio-economic imperatives of tobacco in India. Hence, analyzing the socio-economic impact of tobacco with other crops is important in the present anti-tobacco situation. Estimation of impact in terms of social and economic aspects with respect to tobacco and other major crops cultivated in the tobacco growing regions is the objective of the study. The study addressed different socio-economic parameters like cost of cultivation, yield, net returns, profitability and social empowerment.

### METHODOLOGY

Southern Light Soils (SLS) and Southern Black Soils (SBS) regions of Prakasam and Nellore districts of Andhra Pradesh were purposively selected as a representative study area for FCV tobacco. As Vellampalli I, II and Podili I, II auction platforms are merged by Tobacco Board due to reduction in tobacco cultivated area, therefore data was collected from 12 Auction Platforms of SLS (Kandukur I & II, Podili I, Kaligiri, DC Palli and Kanigiri) and SBS (Ongole I & II regions, Tangutur I & II), Vellampalli II and Kondepi) regions. A total

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of 10 tobacco and 10 non-tobacco farmers from each auction platform was selected, therefore data was collected from 120 tobacco ( $n_1$ ) and 120 non-tobacco ( $n_2$ ) farmers. In the present study, non-tobacco crops selected for the study were bengal gram and red gram as these are the other major cultivating crops having considerable acreage in addition to FCV tobacco. Data was collected through semi structured interview schedule designed for the study. The variables selected for the study were economic variables *viz.*, land size, source of credit, annual income, expenditure pattern, assets owned, yield and returns and social impact variables *viz.*, information seeking behaviour, social security and empowerment. Major constraints faced by tobacco and non-tobacco growers were also analyzed. The different

statistical tools used in the analysis were parametric tests like Independent samples 't' test and Non-parametric tests like 'Wilcoxon Mann Whitney' test and 'Friedman' test. The statistical software used for the analysis was SPSS and XL STAT.

## RESULTS AND DISCUSSION

### Factors for growing tobacco and non-tobacco crops

The different factors for growing tobacco and non-tobacco crops was compared among tobacco ( $n_1=120$ ) and non-tobacco growers ( $n_2=120$ ). These factors were compared using Friedman's two-way ANOVA and the results are presented in Table 1 and 2.

**Table 1: Factors for growing tobacco based on mean ranks**

( $n_1=120$ )

Factors	Mean Rank	Std. Deviation	Groups
Availability of timely and sufficient credit	8.59	1.13	A
Profitable nature	8.12	0.97	A
Habitual practice	7.46	1.40	A
Access to credit facilities	7.45	0.86	A
Location suitability	7.26	1.44	A
Contact with Institutions/organizations	7.01	1.15	A
Aware of Good Agricultural Practices	6.32	1.42	B
Provision of timely inputs	6.09	1.33	B
Organized market and timely market information	6.02	1.31	B
Quick payment to the produce	4.93	1.36	C
Family members interest	4.57	1.38	C
Following the practices of fellow farmers	4.13	1.28	C

**Table 2: Factors for growing non-tobacco based on mean ranks**

( $n_2=120$ )

Factors	Mean Rank	Std. Deviation	Groups
Location suitability	8.97	1.82	A
Following the practices of fellow farmers	8.87	1.28	A
Family members interest	6.27	1.79	A
Profitable nature	6.26	1.76	A
Habitual practice	6.07	1.78	B
Access to credit facilities	6.02	1.77	B
Aware of Good Agricultural Practices	6.01	1.27	B
Contact with Institutions/organizations	5.97	1.75	B
Availability of timely and sufficient credit	5.97	1.75	B
Provision of timely inputs	5.87	1.75	C
Organized market and timely market information	5.67	1.79	C
Quick payment to the produce	5.43	1.79	C

**Table 3: Friedman's test statistic of factors for growing tobacco and non-tobacco**

Test statistic	Tobacco farmers( $n_1=120$ )	Non-tobacco farmers( $n_2=120$ )
Q (Observed value)	220.01*	251.86*
Q (Critical value)	19.67	19.67
DF	11	11
p-value (one-tailed)	< 0.01	< 0.01

\*  $p < 0.05$  significant at 5 per cent

**Table 4: Land size comparison using independent samples 't' test**

(N=240)

Particulars		SLS region		SBS region	
Category	Farmers	Mean (acre)	t-test for equality of means, t, df (prob. t)	Mean (acre)	t-test for equality of means, t, df (prob. t)
Own land	Tobacco	7.28	1.15 <sup>ns</sup> 238 (0.24)	7.12	1.86 <sup>ns</sup> 238 (0.06)
	Non-tobacco	6.89		6.52	
Leased in	Tobacco	5.37	-0.08 <sup>ns</sup> 238 (0.93)	4.55	-1.69 <sup>ns</sup> 238 (0.09)
	Non-tobacco	5.48		4.99	
Leased out	Tobacco	1.78	3.02* 238 (0.01)	1.79	2.77* 238 (0.01)
	Non-tobacco	1.35		1.38	

\*  $p < 0.05$ , t= value of the t statistic, df = degrees of freedom

From the Table 1 it is evident that there is difference in the opinion of different tobacco growers in explaining the reasons for tobacco cultivation. Of which, availability of timely and sufficient credit, profitable nature of tobacco crop and habitual practice of the farmers in cultivating tobacco since many years are the major ones. For non-tobacco crops (bengal gram and red gram), the major factors for cultivation are location suitability of a particular crop, following the practices of fellow farmers and family member's interest in cultivating the particular crop are the major ones (Table 2). Further the multiple pair wise analysis revealed that the same group factors are on par with each other.

Further Friedman's two-way ANOVA analysis from Table 3 revealed that the computed p-value is less than the significant level at five per cent ( $p < 0.05$ ). Hence, it can be inferred that the level of influence of different factors for growing tobacco and non-tobacco crops are different.

## Economic Impact

### Land size

The land size of the respondents was compared between tobacco ( $n_1=120$ ) and non-tobacco ( $n_2=120$ ) growers with respect to own, leased in and leased out land for SLS and SBS regions. For analysing the significant difference between two groups, independent samples 't' test was carried out and the results are presented in Table 4.

Table 4 clearly shows that the average own land size of tobacco and non-tobacco farmers is 6-8 acres in SLS and SBS regions. It is observed that there is no significant difference in the extent of average land size between tobacco and non-tobacco growers. In case of leased in land, some of the red gram and bengal gram cultivating farmers in SLS and SBS regions respectively are taking land for lease and cultivating the crop. But there

is no significant difference between the two groups in case of leased in land. The average land taking for lease by the two groups ranges from 4-6 acres. Whereas in case of leased out land, there is significant difference ( $t = 3.02$ ,  $p < 0.05$  in SLS and  $t = 2.77$ ,  $p < 0.05$  in SBS regions) between the two groups as some of the tobacco farmers are giving out for lease to gain income especially when there is high demand in the locality to cultivate tobacco. It can be interpreted that, the leased land size depends on interest and risk taking power of the farmers to go for cultivation on lease basis and it changes every time based on market demand of the chosen crop. It is also observed from the study area that the land lease rent amount under different situations differ on account of the land characteristics. The minimum lease rent in SLS is ₹ 10000-15000/- compared to SBS 20000-25000/- for different crops. It is also observed among tobacco farmers that the cultivation area per barn varies *viz.*, 8 to 9 acres in SLS and 6-7 acres in SBS regions.

### Source of credit

The source of credit for farming is analyzed between the tobacco ( $n_1=120$ ) and non-tobacco growers ( $n_2=120$ ). For analyzing the significant difference between two independent groups, independent samples 't' test was carried out and the results are presented. Data from Table 5 revealed that, tobacco is a crop financed adequately by the banks to an average extent of up to 75000/acre, where as for other selected crops, the scale of finance is restricted to average maximum limit of 12000/acre. It was found from the study that banks are major sources of credit in case of tobacco as it is a highly remunerative crop whereas in other crops, money lenders followed by banks are the major sources of credit. All the tobacco grower respondents emphasized on bank credit which is one among the solutions to improve tobacco production because various activities to manage the farm operations cannot be done without credit support. While majority of non-tobacco growers

**Table 5: Comparison of source of credit using independent samples 't' test**

(N=240)

Particulars		SLS region		SBS region	
		Mean (acre)	t-test for equality of means, t, df (prob. t)	Mean (acre)	t-test for equality of means, t, df (prob. t)
Bank	Tobacco	75000	422.74*(238, 0.01)	75000	422.74*(238, 0.001)
	Non-tobacco	12300		12300	
Money lenders	Tobacco	13300	-8.08*(238, 0.01)	13600	-7.72*(238, 0.01)
	Non-tobacco	23800		23900	
Friends/ relatives	Tobacco	5180	-10.47*(238, 0.01)	5316	-10.88*(238, 0.01)
	Non-tobacco	10900		11600	

\*  $p < 0.05$ , t= value of the t statistic, df = degrees of freedom

**Table 6: Comparison of annual income using independent samples 't' test**

(N=240)

Particulars		SLS region		SBS region	
Source	Category	Mean (acre)	t-test for equality of means, t, df (prob. t)	Mean (acre)	t-test for equality of means, t, df (prob. t)
Farming (per acre)	Tobacco	62000	36.39*238 (0.01)	111600	90.10*238 (0.01)
	Non-tobacco	16000		28700	
Livestock	Tobacco	6820	37.81*238 (0.01)	6980	39.26*238 (0.01)
	Non-tobacco	2640		2680	
Non-farm sources	Tobacco	5150	-0.16 <sup>ns</sup> 238 (0.86)	5300	-0.07 <sup>ns</sup> 238 (0.94)
	Non-tobacco	5160		5600	

\*  $p < 0.05$ , t= value of the t statistic, df = degrees of freedom

preferred credit from informal sources due to the perception of complex procedural formalities of banks. The 't' test statistic results also showed that there is significant difference in source of credit between the two groups with respect to banks ( $t = 422.74, p < 0.05$ ), money lenders ( $t = -8.08, p < 0.05$ ) and credit from friends/relatives ( $t = -10.47, p < 0.05$ ) in SLS region. Similar difference was witnessed in source of credit between the two groups with respect to banks ( $t = 422.74, p < 0.05$ ), money lenders ( $t = -7.72, p < 0.05$ ) and credit from friends/relatives ( $t = -10.88, p < 0.05$ ) in SBS region. It can be inferred that tobacco grower's gets financial assistance in the form of input loans through nationalized banks at competitive rate of interest.

**Annual Income**

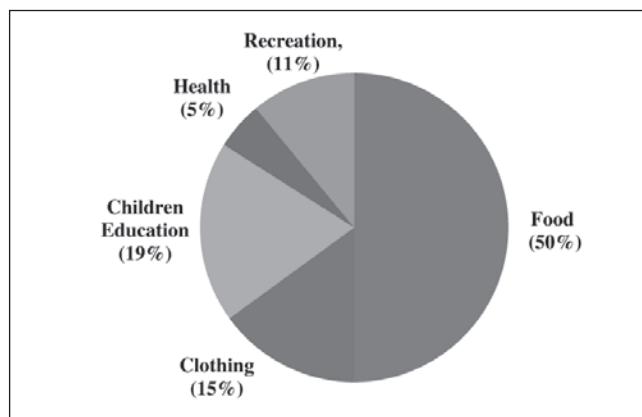
Income is an important indicator to measure the standard of living of an individual. The different sources of income between tobacco ( $n_1=120$ ) and non-tobacco growers ( $n_2=120$ ) is identified. For analyzing the significant difference between these

two groups, independent samples 't' test was carried out and the results are presented in Table 6.

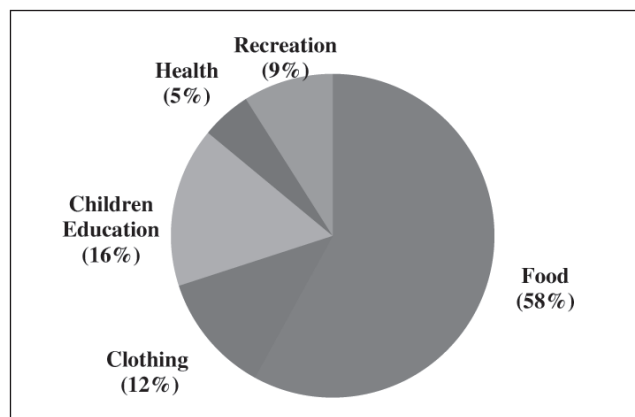
Table 6 indicates the different sources of annual income between the two groups. From the study, it was found that the average returns per acre of own land is high for tobacco than other selected crops. The average gross returns from tobacco in SBS region (1,11,600) is comparatively higher than SLS region (62,000). It is also found that there is no significant difference in non-farm sources of income between the two groups in both the regions. From the 't' test results it is inferred that, the income from farming and livestock of tobacco farmers are significantly differed than non-tobacco growers. The different sources of income to the tobacco farmers makes relatively financially independent and leads to better living standards.

**Expenditure pattern**

The monthly expenditure pattern between tobacco ( $n_1=120$ ) and non-tobacco growers ( $n_2=120$ ) was analysed and depicted in figure 1 and 2.



**Fig 1: Expenditure pattern of tobacco growers**



**Fig 2: Expenditure pattern of Non-tobacco growers**

**Table 7: Comparison of assets owned using independent samples 't' test**

(N=240)

Category	SLS region	SBS region
	t-test for equality of means, t, (prob. t)	t-test for equality of means, t, (prob. t)
Household assets	8.45*	3.78*
Farm assets	43.82*	37.67*
Livestock possession	17.71*	13.68*
Vehicles possession	2.50	2.13

\*  $p < 0.05$ , t= value of the t statistic

It is well apparent from figure 1 and 2 that the monthly average expenditure of tobacco and non-tobacco growers towards different items vary based on their preference and capacity to spend. The expenses towards health are same in both the groups.

#### Assets owned

The different categories of assets owned by the respondents was analysed by using independent samples 't' test and the results presented. Data from Table 7 reveals that there is significant difference in assets owned by the tobacco and non-tobacco growers in respect to household assets (amenities), farm assets (implements and curing barn) and livestock possession (number of animals). As majority of the respondents are having cycles and two-wheelers, there is no significant difference in vehicles possession between the two groups.

#### Returns from the crop

The yield and returns of tobacco with other selected major crops is analyzed and given in table 8.

It is perceived from the Table 8 that the average gross returns/acre for own land is comparatively high for tobacco than bengal gram and red gram. This is because the average price per quintal is more for tobacco as it is being highly remunerative commercial crop. Therefore the farmers in the study area gives more importance to cultivate tobacco than other food crops due to the fact that tobacco is highly facilitative crop in terms of timely finance from banks, guaranteed market, inputs and other welfare benefits from Tobacco Board. The yield and returns varies based on weather parameters and average price to the product.

**Table 8: Yield and Returns**

Particulars (per acre)	Tobacco		Bengal gram	Red gram
	SLS region	SBS region		
Cost of Cultivation (/acre)	88000	82000	18000	10000
Average Yield (qt/acre)	5	9	7	4
Average Price* (/qt)	12400	12400	4100	4000
Gross Returns (/acre)	62000	111600	28700	16000
Net Returns (/acre)	26000	29600	10700	6000

\*Average Price for the year 2016-17

**Table 9: Information seeking behavior by using multiple pair wise comparisons**

(N=240)

Particulars	Mean Ranks		Groups
	SLS region	SBS region	
<b>Tobacco growers (n<sub>1</sub>=120)</b>			
ICAR-CTRI	3.95	3.91	A
Tobacco Board	3.68	3.72	A
ITC Ltd	3.24	3.12	A
Progressive farmers	2.30	2.54	B
Input dealers	1.81	1.28	C
<b>Non-tobacco growers (n<sub>2</sub>=120)</b>			
Input dealers	3.89	3.67	A
Progressive farmers	3.76	3.81	A
Government officials	2.57	2.54	B
Private companies	2.01	1.92	C



## Social Impact

### Information seeking behavior

The information seeking behavior of the respondents was analyzed by using Friedman's test and the responses were recorded on a five point continuum starting from 1= to a very low extent to 5= to a very high extent on different components. Total score of each component was taken into account and further compared by using multiple pair wise comparisons.

Results from Table 9 shows that majority of the tobacco growers seek information from ICAR-CTRI followed by Tobacco Board and ITC in both the SLS and SBS regions. Multiple pair wise comparisons revealed that CTRI, Tobacco Board and ITC are on par in providing information on technologies and varieties. Whereas in case of non-tobacco growers, majority seek information from input dealers and progressive farmers in both the SLS and SBS regions. It is also observed from the respondents that in both the groups, majority of large farmers seek information from authorized government sources as they have greater scope

for interaction with officials and for authentication of information. Whereas small farmers seek information from local sources as they are having less contact with external agents. In case of non-tobacco growers, the farmers had more trust on the input dealers and the fellow farmers rather than the agricultural institutes/organizations.

Further Friedman's test statistic results (Table 10) revealed that the computed p-value is significant at five per cent ( $p < 0.05$ ) with Q value 180.69 and 294.33 for tobacco and non-tobacco growers respectively. It can be inferred that the information seeking behavior of the respondents differs in both the groups.

### Social security and Empowerment

Social security and Empowerment was compared between tobacco and non-tobacco growers in the study area by using Wilcoxon Mann-Whitney test and the results are presented below.

Data from Table 11 reveals that tobacco farmers are comparatively having higher level of social status and security than non-tobacco

**Table 10. Friedman test statistics of information seeking behaviour**

(N=240)

Test statistic value	Tobacco growers ( $n_1=120$ )	Non-tobacco growers ( $n_2=120$ )
Q (Observed value)	180.69	294.33
Q (Critical value)	9.488	7.815
Df	4	3
p value	< 0.0001	< 0.0001

\*  $p < 0.05$  significant difference at 5 per cent level

**Table 11. Social security and Empowerment comparison by using Wilcoxon test**

(N=240)

Category	Mean rank		Mann - Whitney 'U' value	Wilcoxon 'W'	Z value	P value
	Tobacco ( $n_1=120$ )	Non-tobacco ( $n_2=120$ )				
Food security	180.50	60.50	0.0001*	7260	-14.579	0.0001
Habitat security	137.57	103.43	5150*	1241	-4.443	0.0001
Educational security	124.00	117.00	6780*	1404	-2.680	0.007
Health security	120.50	120.50	7200	1446	0.001	1.000
Social empowerment	179.60	61.40	107*	7368	-13.235	0.0001

\*  $p < 0.05$  significant difference at 5 per cent level

growers. This clearly shows that tobacco farmers are comparatively well empowered in social status than others which is due to high economic gain from tobacco. Regarding food security, the food in any kind is available to both tobacco and non-tobacco farmers throughout the year and providing balanced food to all family members which is

affordable with the income but the quality of food difference shows the significant difference ( $U = 0.0001$ ,  $p < 0.05$ ) with high mean rank for tobacco growers. Regarding habitat security, the basic facilities like water, electricity etc are same for both the groups but due to variation in housing type, there is significant difference ( $U=5150$ ,  $p < 0.05$ )

**Table 12: Mean ranks comparison of technical and environmental constraints**

Technical and Environmental constraints	Mean Ranks	
	Tobacco growers ( $n_1=120$ )	Non-Tobacco growers( $n_2=120$ )
Lack of awareness on GAP	4.55	7.40
Lack of availability of literature	2.55	2.80
Lack of training programmes	2.50	2.25
Inadequate technical capacity	4.65	5.30
Highly fluctuating weather condition	6.75	5.95
Less availability of ground water	<b>8.45</b>	7.90
Low soil fertility status	2.60	2.80
Heavy incidence of diseases/insects/parasites	6.30	2.25
Wild boar damage	6.65	<b>8.35</b>

**Table 13: Mean ranks comparison of financial constraints**

Financial constraints	Mean Ranks	
	Tobacco growers ( $n_1=120$ )	Non-Tobacco growers( $n_2=120$ )
Price fluctuation every year	6.79	<b>7.12</b>
Distress sale due to immediate need of money	5.14	3.21
High labour wages	5.54	6.91
Lack of sufficient finance	1.47	5.07
High rate of interest for credits	5.28	5.43
Lack of banking facilities near by	1.53	1.65
High cost of inputs	6.33	5.23
High fuel wood charges for curing	<b>7.23</b>	1.55
Indebtedness	3.92	5.61

**Table 14: Mean ranks comparison of infrastructure and marketing constraints**

Infrastructure and marketing constraints	Mean Ranks	
	Tobacco growers ( $n_1=120$ )	Non-Tobacco growers( $n_2=120$ )
Lack of adequate number of go downs	2.95	3.10
Inadequate transportation facilities	7.25	2.65
Distant market	5.30	3.75
High cost of transportation	8.10	6.65
Exploitation by middlemen	4.10	7.20
Delayed payment	3.80	3.30
Lack of market intelligence	<b>8.20</b>	<b>7.90</b>
Large numbers of middlemen	2.65	2.75
Lack of appropriate marketing channels	2.65	7.70



with high mean rank for tobacco growers. There is significant difference in providing educational facilities to children ( $U=7200$ ,  $p<0.05$ ) and social empowerment of respondents ( $U=107$ ,  $p<0.05$ ) between the two groups. It is also observed that the tendency towards health security is same in both the groups.

### **Constraints of tobacco and non-tobacco growers**

An effort has been made to identify the major constraints of tobacco and non-tobacco farmers and the responses were recorded on a five point continuum starting from 1= to a very low extent to 5= to a very high extent on different components. These constraints were compared using Friedman's two-way ANOVA. As the computed p-value is less than the significant level at five per cent ( $p < 0.05$ ) with test statistic values for Technical and Environmental constraints (Chi-Square =55.21 and  $df =8$ ), financial constraints (Chi-Square =64.21 and  $df =8$ ) Infrastructure and marketing constraints (Chi-Square =72.16 and  $df =8$ ), it can be inferred that the level of influence of different constraints varied accordingly.

It is evident from the results (Table 12) that among the technical and environmental constraints, less availability of ground water (mean rank 8.45), fluctuating weather condition (mean rank 6.75), Wild boar damage (mean rank 6.65), and heavy incidence of diseases/insects/parasite (mean rank 6.30) are the severe constraints for tobacco growers. In case of non-tobacco crops like bengal gram and red gram, wild boar damage (mean rank 8.35), less availability of ground water (mean rank 7.90), lack of awareness on Good Agricultural Practices (mean rank 7.40), fluctuating weather condition (mean rank 5.95) are the major constraints.

It is evident from the results (Table 13) that among the financial constraints, high fuel wood charges for curing (mean rank 7.23), price fluctuation every year (mean rank 6.79), high cost of inputs (mean rank 6.33) and high labour wages (mean rank 5.54) are the severe constraints of tobacco growers. In case of non-tobacco crops like bengal gram and red gram, price fluctuation every year (mean rank 7.12), high labour wages (mean rank 6.91), indebtedness (mean rank 5.61), high

rate of interest for credits (mean rank 5.43) and high cost of inputs (mean rank 5.23) are the severe constraints.

It is clear from the results (Table 14) that among the infrastructure and marketing constraints, lack of market intelligence (mean rank 8.20), high cost of transportation (mean rank 8.10) and inadequate transportation facilities (mean rank 7.25) are the severe constraints of tobacco growers. In case of non-tobacco crops like bengal gram and red gram, lack of market intelligence (mean rank 7.90), lack of appropriate marketing channels (mean rank 7.70), exploitation by middle men (mean rank 7.20) and high cost of transportation (mean rank 6.65) are the severe constraints.

The results revealed that the different factors for growing tobacco are availability of timely and sufficient credit, profitable nature of tobacco crop and habitual practice of the farmers in cultivating tobacco since many years are the major ones. For non-tobacco crops, the major factors for cultivation are location suitability of a particular crop, following the practices of fellow farmers and family member's interest in cultivating the particular crop are the major ones. High level of socio-economic impact is observed for tobacco growers in terms of annual income, returns, possession of assets, information seeking behavior, food security, habitat security and social empowerment than non-tobacco farmers. The major constraints identified from tobacco farmers are less availability of ground water, fluctuating weather condition, wild boar damage, heavy incidence of diseases/insects/parasite, high fuel wood charges for curing, price fluctuation every year, high cost of inputs, high labour wages, lack of market intelligence, high cost of transportation and inadequate transportation facilities. In case of bengal gram and red gram farmers, wild boar damage, less availability of ground water, lack of awareness on Good Agricultural Practices, fluctuating weather condition, price fluctuation every year, high labour wages, indebtedness, high rate of interest for credits, high cost of inputs, lack of market intelligence, lack of appropriate marketing channels, exploitation by middle men and high cost of transportation are the severe constraints.

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