

DETERMINANTS OF CROP DIVERSIFICATION IN FCV TOBACCO GROWING AREAS OF ANDHRA PRADESH AND KARNATAKA

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The present study is an attempt to identify different determinants of crop diversification in FCV tobacco growing areas and it was conducted in NLS, SLS, SBS regions of Andhra Pradesh and KLS region of Karnataka during 2019-20. Random sampling technique was employed in selection of respondents. A total of 90 farmers (30 from NLS; 30 from SLS and SBS; and 30 from KLS) were selected and data was collected through semi structured interview schedule. Multiple regression analysis was used to examine the determinants affecting crop diversification. Major ones viz., size of land holding, family size, access to modern irrigation facilities, farm income, infrastructure facilities and more number of livestock are the major determinants for crop diversification in FCV tobacco growing areas of AP and Karnataka.

INTRODUCTION

Crop diversification, within agriculture sector is one among the major sources of growth in the present government focus on 'Doubling Farmer's Income' (DFI) 2022-23. According to the reports, doubling real income of farmers till 2022-23 over the base year of 2015-16, requires annual growth of 10.41% in farmers' income (NITI Aayog 2017). Introducing a greater range of varieties in a particular agro - ecosystem leads to diversification of agricultural production which can lead to enhancement in the income of farmers, improve health of soils and prevents deterioration of ground water and also increase natural biodiversity. Traditionally, agricultural diversification is said to be a subsistence kind of farming where the farmers were cultivating more than one crop on their land

and undertaking several enterprises on farm. Diversification of agriculture is an important strategy to augment farm income and lessen the risk (Rubina Khanam *et al.*, 2018). During the recent period, cultivation of high value crops is one of the parameter in agricultural diversification.

Tobacco, particularly Flue-Cured Virginia (FCV) cultivation is most common in Andhra Pradesh and Karnataka because of its location specificity and assured market price. Crop diversification in tobacco growing areas is not a new phenomenon. But, due to prevailing uncertainty in the present conditions, tobacco sector is at cross roads. Besides, safeguarding interests of farmers on one side and tobacco control policies on the other, crop diversification is again gaining attention. The farmers' choice towards crop diversification is based on their preferences, access to resources and demand. Therefore a sound and empirical understanding about the determinants of crop diversification is needed. In this backdrop, a study was undertaken with an objective to identify the determinants of crop diversification in FCV tobacco growing areas of Northern light Soils (NLS), Southern Light Soils (SLS), Southern Black Soils (SBS) of Andhra Pradesh and Karnataka Light Soils (KLS) region of Karnataka.

METHODOLOGY

The present study was conducted in NLS, SLS, SBS regions of Andhra Pradesh and KLS region of Karnataka during 2019-20. Random sampling technique was employed in selection of respondents. Altogether, 90 farmers (30 from NLS; 30 from SLS and SBS; and 30 from KLS) were

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selected and data was collected through semi structured interview schedule. The data on relevant aspects were collected by eliciting views and documenting oral information provided by the respondents on a specifically prepared and pre-tested questionnaire. Multiple regression analysis was employed to identify the drivers of crop diversification in FCV tobacco growing areas of AP and Karnataka.

RESULTS AND DISCUSSION

Crop diversification is being followed by FCV tobacco farmers in tobacco growing areas of Andhra Pradesh and Karnataka. Some of the crops other than tobacco are also being cultivated as major crops in the tobacco growing areas since many years and it is seriously came into action after implementation of Crop Diversification Programme (CDP), a sub scheme of Rashtriya Krishi Vikas Yojana (RKVY). Per cent share for tobacco growing areas in total budget for CDP is increased from 16.67 lakhs in 2015-16 to 33.35 lakhs in 2019-20 to encourage tobacco growing farmers to shift to alternative crops/cropping system in tobacco growing states (Hema et al., 2020). As a result, the area under cultivation is increased for other

major crops like, maize, paddy in NLS; red gram, black gram in SLS; chickpea in SBS; and cotton, ginger in KLS.

Statistics revealed that there are considerable variations in the area planted under FCV tobacco across different regions of AP and Karnataka states. Although the total area cultivated under FCV tobacco has increased in AP and Karnataka for the past five years but NLS region of Andhra Pradesh witnessed diversification towards other crops. Study conducted by Viswanatha Reddy *et al.*, (2017) showed that in case of West Godavari district of AP (NLS region), the major share of spared tobacco area is replaced by maize followed by the green gram during 2013-17 period. In NLS Region, the area under FCV tobacco has declined from 2016-17 to 2019-20. Tobacco Board reports shows that, the NLS area under FCV tobacco is particularly declined during 2019-20 year due to scarcity of skilled labor and increase in area under plantation crops like cashew nut. Where as in Karnataka, a total area of 80,364 ha. of FCV tobacco was planted in KLS region during 2019-20, which is lower by 3.98% as compared to 83,696 ha. planted during 2018-19. (Tobacco Board 2016-20). The area planted under FCV tobacco of AP

Table 1: Area Planted under FCV tobacco in Andhra Pradesh

Regions	Area planted under FCV tobacco in hectares				
	2015-16	2016-17	2017-18	2018-19	2019-20
NLS	17776	21103	21635	20288	17911
SLS	30025	21500	29409	34139	37221
SBS	21046	17207	17933	21026	22744
NBS	1275	1470	1339	1496	1417
Total	70122	61280	70316	76949	79293

Source: Annual Report, Tobacco Board 2015-20

Table 2: Area Planted under FCV tobacco in Karnataka

Regions	Area planted under FCV tobacco in hectares				
	2015-16	2016-17	2017-18	2018-19	2019-20
Mysore	36405	37778	40298	41407	39909
Periyapatna	39432	38310	40785	42289	40455
Total	75837	76088	81083	83696	80364

Source: Annual Report, Tobacco Board 2015-20

and Karnataka from 2015 to 2020 is given in table 1 and 2.

From the farmers' point of view, farmers are interested in crop diversification if they are provided timely inputs and assured prices. In general, level of diversification is governed by the market forces (relative price, profitability of crops), advancement of technology (access to inputs and implements), agro-climatic conditions, development of infrastructural facilities like communication, market and storage facility and institutional factors like government's policy, protection and risk factors (Ahmad Nasim *et al.*, 2019). To identify the various factors underlying crop diversification, multiple regression analysis was carried out.

Determinants of crop diversification

Different determinants of crop diversification were identified and analyzed by using multiple regression analysis for FCV tobacco growing areas of Andhra Pradesh and Karnataka. Crop diversification depends on various quantitative and

qualitative factors. From the primary information collected from the respondents, the present study tested the variables that are considered important for analyzing the determinants of crop diversification in FCV tobacco growing areas of AP and Karnataka. From the results of multiple regression analysis, it is clear from Table 3 that there are substantial variations among the regions with respect to each of the variables considered. The differences under each variable were given below.

Size of landholding

Among the resources land is an indicator of welfare among rural farm households. Results from Table 3 shows that there is positive and significant relation of size of land holding and crop diversification in NLS region. Whereas in case of SLS, SBS and KLS regions, the sign of regression coefficient of average size of land holding is also positive but not statistically significant. It is observed from the study area that NLS farmers are having large land size (average 10-15 acres) compared to SLS & SBS (6-8 acres) and KLS

Table 3: Determinants of crop diversification by using multiple regression analysis

Determinants	Regression Coefficients		
	NLS	SLS & SBS	KLS
Size of Landholding	13.22*	2.36	3.53
Education level	0.76	0.28	1.01
Family size	9.96*	6.01*	1.43*
Number of livestock	11.82*	9.11	10.57
Access to modern Irrigation facilities	1.51*	1.38	17.34*
Farm Income	3.68*	1.718	1.35
Non-farm income	-0.19	0.01	2.39
Infrastructural facilities	15.38*	12.38*	23.19*
Labour availability	0.18	0.34	0.55
Extension services	2.09	9.46	10.99
Input prices	-1.24*	-1.27*	-1.08*
Incidence of crop pests and diseases	-2.51*	-1.18*	-1.36*
R² value	0.65	0.56	0.54

* 5 per cent significant

regions (3-5 acres). Farmers operating on a bigger piece of land have a wider choice and options for cultivating diversified crops. This means that larger the operated area, the higher will be the extent of crop diversification. Further, farmers with own land are more likely to diversify their farms as compared to the tenant farmers. Similar findings are reported by Mitchler *et al.*, (2017) and Evans Kemboi *et al.*, (2020).

Education level

Refers to the literacy level of the family head and it is considered as an important factor of agricultural diversification strategies. A family headed by a highly educated member is more likely to diversify into different agricultural enterprises as his decision is governed by the sound economic estimates of costs and benefits. Besides, an educated farmer is more enlightened about the existing choices of demand and supply and more tuned to advanced techniques than illiterate farmer. From the Table 3, it is observed that there is positive relation with education level and diversification, but it is not significant. Farmers in the study area are having almost same level of education, hence it is not significant. The results are in line with the findings of Anjani kumar *et al.*, (2012).

Family size

Refers to the number of people working together and sharing a common pool of resources. This variable had a positive and significant effect on the probability of diversification at 5% significance level. This implies that large families are more likely and are able to engage in multiple cropping systems. Further, households with larger size have the advantage of availability of more assured family labour resource for growing more number of crops. This result is contradictory to the findings of Gupta *et al.*, (1985) reported that share cropping and family size do not affect the level of crop diversification.

Number of livestock

Livestock number had a positive relationship with diversification in all the regions. In NLS, farmers owned with large number of livestock have chances of diversifying into allied enterprise like dairy and significant influence on the probability of diversification at 5% level. Livestock constitute

the main source of animal power for agricultural work. All agricultural work such as ploughing, inter culture and transportation of farm input and output utilizes animal power. Further, livestock ownership permits cultivation of larger areas of arable land and provides manure, an important farm input. In NLS region, as majority are large farmers, they possess a considerable number of livestock than other regions and is also constitutes source of extra income.

Access to Irrigation

Access to modern irrigation facilities is an important pre-requisite for crop diversification. Positive and significant relation is observed for access to irrigation facilities and crop diversification in NLS and KLS areas. In case of SLS and SBS areas, the crop is grown as rain fed and there is less scope for crop diversification. Crops suitable to rain fed conditions are to be wisely chosen to these areas. The similar results are reported by Gupta *et al.*, (1985) stated that farms with higher irrigation intensity and located nearer to market are relatively more diversified.

Farm Income

Farm income had a positive and significant relationship with diversification at 5 per cent significance level in NLS. Higher incomes allow farmers to have access to critical productive resources such as farm assets, inputs and land which in turn increase the likelihood of crop diversification. The extra income earned by farmers from one crop is also important in providing financial resources that are used for diversification into other crops. In SLS, SBS and KLS regions, farm income had a positive relation with diversification but not significant. Swati *et al.*, (2017) also pointed out that the effect of off farm/ non-farm income on crop diversification has shown significant positive effect.

Non-farm income

Non-farm income has positive relation with crop diversification in SLS, SBS and KLS regions but not significant. In case of NLS region, non-farm income has a negative relation with crop diversification. Farmers are in the opinion that any excess non-farm income earned is used for family expenses but not for agriculture purpose.

Infrastructural facilities

To capture the effect of infrastructure development on diversification, the important variables, namely, storage godowns, number of markets and tractor has been included. All the variables yielded positive and significant influence on diversification at 5 per cent level. Obviously, storage godowns and better market induce diversification. Improved market means low marketing cost and easy and quick disposal of commodities. It also reduces the risk of post-harvest losses. Availability of tractor assists the farmers to undertake field operations very fast and enable them to have multiple crops on the same piece of land. Swathi *et al.*, (2017) stated that the creation of basic infrastructural facilities is an essential prerequisite for crop diversification and fostering the process of agricultural development.

Labour availability

In instances where farming households do not have enough domestic labour, hired labour is used as a supplement. In most cases, hired labour is sourced within the community, with wages being paid either in kind or in cash. Greater use of both family and hired labour is positively associated with increased crop diversification though they are not statistically significant.

Extension services

Farmers contact with extension agents provides information on latest agricultural technologies. From the results, the sign of regression coefficient of extension contact is positive. The results are in line with the findings of Abdul *et al.*, (2020) highlighted that the determinants of crop diversification *viz.*, occupation, technology adoption, labour, extension contact and farm size were significant.

Input prices

This variable is highly significant with a negative sign in all the regions at 5 per cent level. It is observed from the study area that increasing cost of inputs coupled with indiscriminate use of fertilizers and pesticides makes the farmers to go for single crop.

Incidence of crop pests and diseases

Threats from pests and diseases to FCV tobacco production were negatively and

significantly associated with diversification at 5 per cent level in all the regions. The possible explanation for this negative direction in the relationship between crop pest and crop diversification is that pests cause crop damage which discourage diversification. It is with the assumption that the second crop may be prone to the same pests, dis-incentivizing farmers from diversifying.

Multiple regression analysis results from the study indicated that among the parameters under consideration for the study; size of land holding, family size, number of livestock, access to modern irrigation facilities, farm income and infrastructural facilities has shown positive and significant relation. These are the major driving forces for crop diversification in NLS region. Family size and infrastructural facilities has shown positive and significant relation, are the major driving forces for crop diversification in SLS and SBS regions. The major determinants for crop diversification in KLS regions are family size, infrastructural facilities and access to modern irrigation facilities which has shown positive and significant relation.

The role of infrastructural facilities in promoting crop diversification is prominent in all the FCV tobacco growing regions, suggesting the need for increase in government expenditure for developing the markets and transport facilities to help accelerate the pace of crop diversification. Diversification can also manage price risk, on the assumption that not all products will suffer low market prices at the same time and increase the profitability of the farming community.

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