

Influence of Cropping Intensity and Irrigation Intensity on Crop Diversification Practices of Farmers in Villupuram District

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Abstract

This paper addresses Influence of Cropping Intensity and Irrigation Intensity on Crop Diversification Practices of Farmers in Villupuram District. Changing scenario of agriculture has forced the farming community and policy makers in agriculture to search for a more remunerative and viable production portfolio. The diversification of agriculture towards non – food grains and high value commodities has been the right answer for it, because these commodities have potential of income augmentation, employment generation, poverty alleviation and export promotion. In this context, the cropping intensity and irrigation intensity are the determining factors of crop diversification practices of farmers. If the cropping intensity is more, then the farmers will be producing more number of crops in their farms.

Keywords: Agriculture, Farming Community, Cropping Intensity, Export Promotion, Poverty Alleviation, Employment Generation, Irrigation Intensity

Introduction and Statement of the Problem

A sustained economic growth, rising per capita income and growing urbanization are ostensibly causing shift in the consumption pattern in favor of high – value food commodities like fruits, vegetables, dairy, meat and fish products from staple food such as rice, wheat and coarse cereals. The demand for and supply of these commodities have grown much faster than those of food- grains (Kumar et al., 2003, Joshi et al., 2004). Agriculture is the backbone of the economy of Tamil Nadu since it provides livelihood support to 56 per cent of the population. The state accounts for 7 per cent of water resources of the country. About 56 per cent of the total cropped area of the state is under irrigated conditions while around 44 per cent of the area was under dry land farming. The contribution of Agriculture to state income is around 13 per cent in 2008-09. It supplies raw materials to agro based industries besides providing employment opportunities to the rural population. The state aims at increasing production and productivity of both food and non-food crops and focuses on the development of wastelands. The Agriculture in Tamil Nadu is generally subject to impediment such as not tapping potential yields. Unbalanced fertilizer use, low rate of seed replacement, non- availability of institutional credit in time, diversion of cultivable land for non- agricultural purposes, poor contribution from rain fed cultivation, lack of proper rain water harvesting and conservation and its optimum utilization, lack of technology, etc. All these are the causes for the low production and productivity of the state agriculture in Tamil Nadu between 2002-2003 and 2008-09. It is in this respect, diversification both within crop enterprise, i.e towards high value crops like vegetables and horticultural crop as well as across enterprise and activities. i.e., promoting judicious activities is being advocated as a strategy for the development of small and marginal farm groups.

Concept

Cropping Intensity

Cropping intensity refers to the ratio between the Gross area sown and the Net area sown.

Irrigation Intensity

The irrigation intensity refers to the ratio of gross area irrigated to net area irrigated.

Cropping pattern

Cropping pattern refers to the proportionate area under different crops.

Review of Literature

Kumar and Mruthyunjaya, (2002), stated that a sustained economic growth, rising per capita income and growing urbanization caused a shift in the consumption pattern factor of high value crops which substantiated the role of diversification as a policy tool for development in the agricultural sector.

Joshi ET. al., (2004), examined the extent of diversification in south Asia Modified Entropy Index took the value between zero and one. In case of perfect diversification it assumed the upper limit and approached the lower limit when there was concentration of crop. It was also useful in ranking the districts based on the level diversification

Premed Kumar et, al., (2005) examined the performance of major crops of Tamil nadu state, since liberalization. The growth and instability in acreage is due to fluctuations in prices and non-price signals, so that certain policy measures to stabilize the prices could be taken to increase the production and thereby income of farmers

Objectives

The specific objectives of the study are:

- To identify cropping intensity and irrigation intensity on crop diversification
- To analyze the crop diversification practices of farmers in Villupuram district

Methodology

The present study is based on secondary data. The information's relating to the determining factors of crop diversification practices of farmers, and crop pattern change at the district level is collected from Season and Crop Reports for twelve years from 1998- 2009. In Villupuram District

Hypotheses

The changes in the level of crop diversification are significantly influenced by the cropping intensity and irrigation intensity of the district.

Statistical Tools

- 1 Diversification indices are constructed by selecting suitable indicators.
2. Regression Technique is used to cropping intensity and irrigation intensity change in crop diversification.

Cropping Intensity and Irrigation Intensity in Villupuram District

The cropping intensity and irrigation intensity are the determining factors of crop diversification practices of farmers. If the cropping intensity is more, then the farmers will be producing more number of crops in their farms. Likewise if irrigation intensity is more, then the farmers will be producing the crops which require more irrigation in more hectares of their farms. Therefore, both these intensities determine the value of the crop diversification index. (Tables-.1.1& .1.2)

Table-.1.1

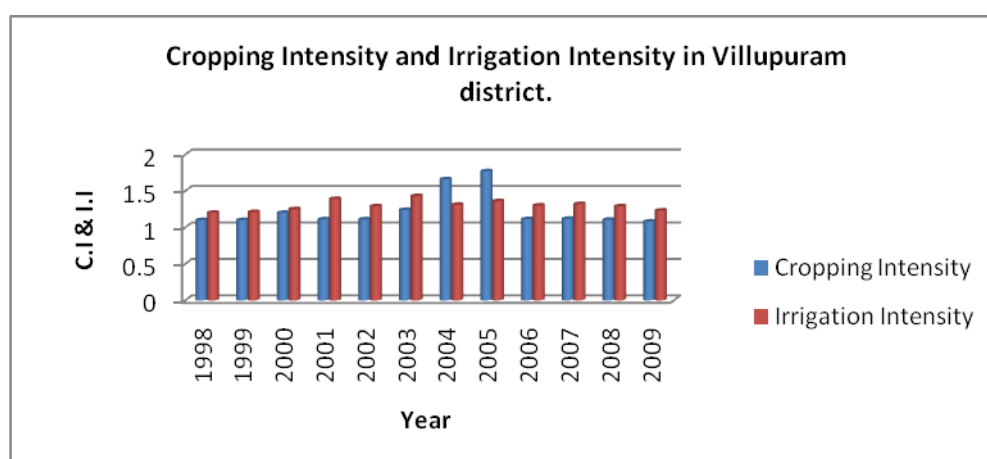
Cropping Intensity and Irrigation Intensity in Villupuram District

(in Ha)

Sl. No	Year	Cropping Intensity	Irrigation Intensity
1	1998	1.1	1.20
2	1999	1.1	1.21
3	2000	1.20	1.25
4	2001	1.11	1.39
5	2002	1.11	1.29
6	2003	1.239	1.43
7	2004	1.66	1.31
8	2005	1.77	1.36
9	2006	1.113	1.30
10	2007	1.117	1.32
11	2008	1.105	1.29
12	2009	1.08	1.23

Sources: Season and Crop Report

Figure-1.1



The crop diversification practices of the farmers measured by Herfindhal Index.

The Herfindhal index values are computed for twelve years for Villupuram District. When more crops are cultivated by the farmers in the district, the area proportion under each crop will be less in total and when only few crops are raised by the farmers the area proportion will be high in total. Hence the index will be having value nearer to 1 if only few crops are raised and the value will be nearing 0 when there is diversification of the crops. (Table- .1.2)

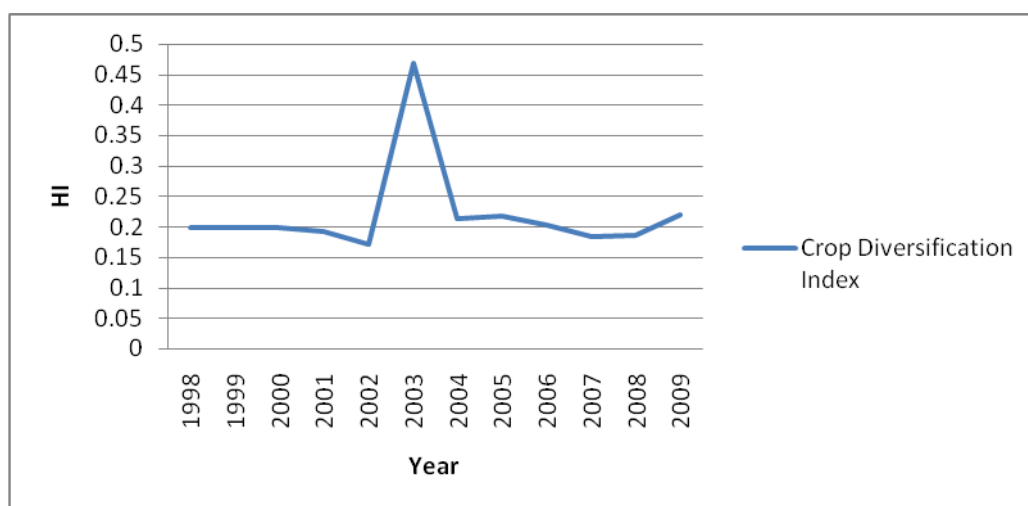
Table-.1.2

Herfindhal Index Values for Villupuram District

Year	Crop Diversification Index(CDI)
1998	0.199
1999	0.198
2000	0.199
2001	0.193
2002	0.171
2003	0.469
2004	0.213
2005	0.217
2006	0.202
2007	0.184
2008	0.185
2009	0.220

Source: Computed

Figure-1.2



The Herfindhal Index values shown in Table-.1.2. Indicate that the values are ranging between 0.199 to .220. From these values, it is observed that, the CDI

values are nearer to zero. Hence the farmers are diversifying their crops to a greater extent and they are not concentrating on few crops.

The cropping pattern of the district also reveals that many crops are cultivated by the farmers in Villupuram district. (Table -.1.3)

Table-.1.3

Cropping pattern of Villupuram District

(in Ha)

Sl No.	Name of the crop	05-06	06-07	07-08
1	Paddy	168435	166400	166363
2	Cholam	1465	1000	1151
3	Cumbu	14810	12700	19870
4	Ragi	959	3600	2297
5	Maize	1377	7800	11353
6	Pulses	21476	48500	51455
7	Cotton	5023	9800	8387
8	Sugarcane	56564	54500	46444
9	Groundnut	58252	70500	84111
10	Gingelly	6840	12400	12231
11	Sunflower	995	2900	2496
12	Castor	147	400	414
	TOTAL	336343	390500	406572

Source: Office of Joint Directorate of Agriculture Villupuram

From the(Table – .1.3) it could be found that paddy occupies the maximum area of 1.66 lakh hectares, followed by Groundnut (0.84 lakh hectares), pulses (0.52 lakh hectares), sugarcane (0.46 lakh hectares) and cumbu (0.20 lakh hectares) in 2007-08. Maize, gingelly and cotton are grown in an area of about 10,000 hectares each. The area of cumbu, ragi, maize and pulses have increased dramatically in the three years period from 2005-06 to 2007-08. The area of paddy and sugarcane is more or less constant over the years. The oilseed crops like groundnut, sunflower and castor has increased markedly over the years as could be evidenced from the (Table-.1.3). It is also observed from the cropping pattern of Villupuram district, paddy, sugarcane, groundnut, cotton, gingelly tobacco vegetables, fruits, millets, cholam, cumbu, ragi, and fruits are grown by the farmers.

Crop Diversification Model

In order to know the significant influence of these two intensities on crop diversification index of the district, the linear regression model is attempted. The model is of the form.

$$Y = b_0 + b_1 x_1 + b_2 x_2 + u$$

Y= Crop Diversification Index

b₀, b₁ and b₂ are co-efficient values

x₁ - cropping intensity

x₂ - irrigation intensity

u- Error term.

From the fitted regression model, it is followed that 53.9% of change in the crop diversification index is brought about by changes in cropping intensity and irrigation intensity. It is known from the model that if cropping intensity increases, then crop diversification index changes by .93 and if irrigation intensity increases, then the diversification index changes by .28.(Table .1.4)

Table-.1.4

Crop Diversification Model

Predictor variables	Regression Co-efficient	Standard Error	'T' Values	Significant
Constant	-1.198	.438	-2.734	.023
Cropping Intensity	.930	.452	2.06	.040*
Irrigation Intensity	.280	.309	.906	.049*
R²	.539			

Source: Computed

- Significant at 5% level

Hence the model results prove that the crop diversification index is significantly influenced by cropping intensity and irrigation intensity. In this context, changes in the level of crop diversification are significantly influenced by the cropping intensity and irrigation intensity of the district. The fitted regression model also proves that the changes in crop diversification index are significantly influenced by the cropping intensity and irrigation intensity.

Conclusion

From the fitted regression model, it is followed that 53.9% of change in the crop diversification index is brought about by changes in cropping intensity and irrigation intensity. It is known from the model that if cropping intensity increases, then crop diversification index changes by .93 and if irrigation intensity increases, then the diversification index changes by .28. Hence, the model results prove that the crop diversification index is significantly influenced by cropping intensity and irrigation intensity

The results show that there is a mixed picture regarding the typology of diversification within the state. Some state exhibit more diversification, in there is

no district link between the number of crops and spread in the cropping pattern. The picture for states is completely diverse In terms of relationship of different dimension of diversification with income and risk, and inverse and positive relationship of increasing spread of the cropping pattern with income and risk, respectively is found.

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