



Research Article

AN INQUIRY ON AGRICULTURE-INDUSTRY LINKAGE IN KRISHNAGIRI DISTRICT OF TAMIL NADU

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Abstract: Being a developing economy there should be vast agricultural performance and industrial growth. In many ways both agriculture and industry are interdependent and influence each other. The sectors with strongest linkage tend to stimulate rapid growth in production, income, employment and plays very crucial role in poverty alleviation. This paper deals with economic development at regional level through agriculture and industry linkage. This study revealed that there is the vast scope for emergence of agriculture based industries since the study region has cultivation of major agricultural and horticultural crops which will ultimately provide livelihood for farming, industrial and household sectors.

Keywords: Agriculture- industry linkage, economic development, regional

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Introduction

Interdependence among the sectors is one of the most needed phenomena's for survival. The region is said to be economically developed when the weaker section of the region develops. The weaker section always remains in the rural region whose only dependence is farming and labour. For a developing economy there should be vast agricultural performance and industrial growth. In many ways both agriculture and industry are interdependent and influence each other. Agriculture generates demand for industrial products while farming like polyhouse construction, precision farming, machinery, fertilizer, tools, engineering works and etc. The agriculture based industrial sectors are very need fully dependent on agriculture from head to toe. It requires each and every part of the crop / tree as raw materials to produce its own output/ final product. The households who own the factors of production to firms and farming are the final consumers of produced commodities (like clothing, footwear, sugar, edible oils, furniture and other value additions) and firms rent the factor of production from household for producing goods and services that households, farmers and Rest of World (ROW) then consume. ROW (which is called outside the study region), also supplies raw materials and other factors as demanded by firms/ farmers for their production process. Since backbone of India is agriculture, the interrelationship between agriculture and agro based industry had received major attention among the researchers and policy makers. In India, the past study related to sectoral linkages highly followed Lewisian 'two-sector' framework. The industry sector had a close relationship with agriculture due to the agro-based industrial structure in the pre-independence and early post-independence period. The sectors with strongest linkage tend to stimulate rapid growth in production, income, employment and plays very crucial role in poverty alleviation [1]. From Hirschman's theory of 'Unbalanced growth', the sectoral linkage had been initially evolved and it was an important contribution and guide for economic development. During mid-1960s, industrial sector showed slow growth and stagnation which severely attributed the stunned agricultural growth and favorable agricultural trade [2,3]. During 1980s and 1990s interdependence between the two sectors had found to be weakened [4]. Between 1982 to 2000, there was decline in forward production linkage between agriculture and industry but increase in backward production linkage [5].

This resulted decline in agriculture's demand linkage to industry while the linkage increased from industry to agriculture. With this view the present study inquired the linkages within sectors at regional level.

General Characteristics of the Study Area

Krishnagiri district which was carved from Dharmapuri district before fourteen years (i.e., 2004) is surrounded by Vellore and Thiruvannamalai districts in the East, Karnataka state in the West, State of Andhra Pradesh in the North and Dharmapuri District in the South. The area of the district is 5143 Sq. Kms and is located at the elevation of 300m to 1400m above the mean sea level and is located between 11° 12' and 12° 49'N Latitude, 77° 27' and 78° 38'E Longitude. The district received annual rainfall of 830 mm and majorly sourced by southwest monsoon. The district has bounded with multicoloured granite named "paradise" seemed to be in higher proportions which gives rise to many granite industry through which granite slabs are made, polished and exported to America, England, Australia and some European countries. Sandal, teak, rose wood and bamboo are seen to be the major forest resource which yields great demand for structural works, house construction, ship buildings and pulp and paper manufacturing industry and etc [6-10].

Population

As per the 2011 census [Table-1], the total population of the district was 1883731 in which the male population shared 51.13 percent. The district was dominated by rural population (72.25 percent). The male and female population share in both rural and urban population was almost equal with a marginal one percent higher in male population.

Sectoral Composition of Workers

The sectoral composition of workers includes cultivators, agricultural labourers, household workers, other workers and marginal workers. With regard to distribution of workers across major sectors, workers who are involved in agricultural activities are high.

It is found from [Table-2] that workers engaged in agricultural activities, both cultivators and agricultural labourers, were found to be more in the district with 56.89 percent. Next to agricultural workers, household industry workers and marginal workers also constitute considerable work force in total work force with 40.61 percent in the district.

Table-1 Demographic Details of Krishnagiri District (2011 census)

SN	Particulars	Number of Persons	Male	Female
1	Total population	1883731(100.00)	963152(51.13)	920579(48.87)
2	Rural population	1455183(77.25)	743904(51.18)	709503(48.82)
3	Urban population	428548(22.75)	219248(50.95)	211076(49.05)
4	Literate population	1216436(72.41)	682852(79.65)	533584(64.86)
5	Density of population (Number per sq. km)	367		

Source: District Census Handbook, Series-34, Directorate of Census Operations, Tamil Nadu, 2011.

Note: Figure in the parentheses indicate percentage to their respective total population.

Table-2 Compositions of Workers in Major Sectors-2011

S	Blocks	Total workers		Cultivators		Agricultural Labourer		Household industries manufacturing, servicing & repairs		Main workers		Marginal workers	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	Thally	58187	36744	31122	15869	9027	9220	505	656	10605	3286	6928	7713
2	Hosur	109336	37166	12519	4014	7557	5888	1279	1233	79065	20084	8916	5947
3	Kelamangalam	50958	31919	18304	11119	9924	8844	896	1083	16378	4593	5456	6280
4	Shoolagiri	53594	31402	18447	9785	13310	11561	625	669	15879	4580	8916	5947
5	Veppanapalli	32526	21121	8674	5033	8285	7313	495	1045	10283	2992	4789	4738
6	Krishnagiri	62283	29533	8327	5266	7208	7163	795	839	40108	10369	5845	5896
7	Bargur	57740	34465	10852	6044	14631	13167	630	687	23299	6294	8328	8273
8	Kaveripattinam	54654	34465	13568	7613	12111	10784	705	651	23546	6019	7724	9428
9	Mathur	28529	20989	5823	3753	6818	7400	474	692	10381	2806	5033	6338
10	Uthangarai	50539	37393	12078	7967	14584	15444	686	711	16101	4984	7090	8287
	District	561634	316145	139714	76463	103455	96784	7090	8266	242645	66007	65442	67707

Source: District Census Handbook, Series-34, Directorate of Census Operations, Tamil Nadu, 2011.

Agriculture and Allied Activities

Operational land Holdings (2015-16)

Distribution of land holdings among various size categories of farmers in a country in general possesses much variation. Krishnagiri district is not exception to this. The operational land holding in the district is shown in [Table-3].

Table-3 Number and Area of Operational Land holdings (2015-16)

S	Size of landholding (ha)	Type	Number	Area (ha)
1	Below 1.0	Marginal	212897(75.66)	85111(37.76)
2	1.0 to 2.0	Small	45893(16.31)	63932(28.36)
3	2.0 to 4.0	Semi medium	18060(6.42)	48337(21.44)
4	4.1 to 10.0	Medium	4227(1.50)	23133(10.26)
5	Above 10.0	Large	315(0.11)	4896(2.17)
	Total		281392(100.00)	225409(100.00)

Source: District Statistical Handbook (2016-17), District Statistical Office, Department of Economics and Statistics, Government of Tamil Nadu, Krishnagiri.

The proportion of the total number of farmers with operational land holdings seem to be in the same proportion when compared to the other categories of farmers. District has highest number of marginal farmers (75.66 percent) with major portion of operational land holdings of 37.76 percent followed by small farmers comparatively. Only 0.11 percent of them are large farmers with 2.17 percent of land holdings. It is common that a large proportion of land area being owned by few people and small portion being owned by large number of people.

Cropping Pattern

Area under Cereals (34.40 percent) seems to be at largest proportion to the gross cropped area. In cereals, *ragi* (46 percent) is grown in higher proportion of area than other districts. Pulses like *lablab* (30.44 percent) and *horse gram* (27.53 percent) occupies highest area than other districts of Tamil Nadu. While *red gram* occupies second highest (19.11 percent) area in hectare preceded by *Vellore* district (23.13 percent). In total, the area of pulses influences (47646 ha) about 22.29 percent of the gross cropped areas. Total area under oilseeds in Krishnagiri district is 29371 ha. i.e., nearly 14 percent of the gross cropped area.

Agricultural Labourers

It was found that highest number of agricultural labourers is observed in the Uthangarai block with 30028 agricultural labourers and lowest number is in Hosur block with 13445 labourers.

Household Industries

The comparatively lesser proportion of worker population was engaged under this sector. The female workers (8266) were highly engaged than the male workers. Since Hosur block is an industrial area the higher number of household industries manufacturing, service and repair workers (both male and female) were noticed there. Next to Hosur block both the workers were highly seen in Kelamangalam block. The least number of male workers (474) were from Mathur block and female workers were from Kaveripattinam block (651 numbers).

Table-4 Cropping Pattern of Krishnagiri District (2015-16)

S	Crop	Area (ha)	Percent to Gross Cropped Area
1	Total cereals	73532	34.40
2	Total Pulses	47646	22.29
3	Total oilseeds	29371	13.74
4	Cotton	2414	1.13
5	Sugarcane	582	0.27
6	Spices	2945	1.38
7	Fruit crops	34261	16.03
8	Vegetable crops	11426	5.35
9	Flower crops	2853	1.33
10	Other crops	7665	3.59
	Net cropped area	172884	80.88
	Gross cropped area	213748	100.00

Source: Season and Crop Report of Tamil Nadu, 2004-06 and 2015-16, Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

Even though oilseeds like *groundnut* and *gingelly* are grown in almost all parts of the study area, *castor* holds second highest (24.26 percent) area in Tamil Nadu followed by *Namakkal* district (25.04 percent). Above said crops are the major agricultural crops highly grown in this district. Horticultural crops hold nearly 24.09 percent of the total cropped area. Area under fruits and vegetables (7.76 percent) holds highest land area followed by *Dindigul* district (7.55 percent). When compared to other districts of Tamil Nadu, the flower crops also occupied largest area (10.48 percent) especially flowers like *rose* (34.52 percent) and *marigold* (62.58 percent) predominantly occupies higher area than other districts. In terms of fibre crops, *cotton* influences only 1.13 percent of the area. Other fibre rich crops like *jute*, *mesta* and *sunhemp* are not grown in Krishnagiri district. Even though the fruits like *banana*, *guava*, *custard apple*, *jamun* are cultivated in this district. Area under *mango* holds on top (23.75 percent) followed by *Dindigul* district (11.65 percent). In terms of vegetable crops, *cabbage* (54.10 percent), *tomato* (23.08 percent), *cucumber* (15.57 percent), *Beans* (42.84 percent), *cauliflower* (48.21 percent), *knolkhol* (57.64 percent) occupies higher proportion of area than other districts while *radish* (24.43 percent) and *capsicum* (72.00 percent) has second largest area under cultivation and area under *carrot* ranks third.

Apart from these crops' sugarcane, tamarind, coconut, tapioca, chilli, etc., are widely grown in all parts of the district. The horticultural crops like rose, gerbera and capsicum were cultivated through polyhouse cultivation and are especially cultivated in Hosur and Thally block of the district. Mulberry is the second highly cultivated (15.26 percent) crop in this area next to Tirupur district (26.21 percent).

Industrial units

In Krishnagiri district, presence of industries is significant. Industrial development in Krishnagiri district gained momentum during 1970s as the Government initiated special measures for promoting industries for removing backwardness in the district. The State Industrial Promotion Corporation of Tamil Nadu, (SIPCOT) has developed one of the largest industrial complexes in the country in Hosur in over an area of 1370 acres and to develop Large/Medium/Small industries with SIDCO offering comprehensive services for around 700 industrial units. Several industrialists of repute have started their units in Hosur. Hosur is able to attract some of the most prestigious industrial houses in the country including the Tatas, Birlas, Hindujas, TVS group companies, Murugappa group of companies, Lakshmi group and also more number of MNC's. The location of these industries in SIPCOT phase I and II, SIDCO industrial estates, SIDCO electronic industrial estate and the outside industries are scattered in private lands within 20 km radius of Hosur towards Krishnagiri, Royakottai and Thalli Roads. Few major industries are located in Harita, Bagalur, Belagondapalli, Thorapalli and in other areas. Hosur is very important area for livelihood for all the sectors (say primary, secondary and tertiary sectors) of the economy. It bears very cool climate in which horticultural crops are cultivated. Many manufacturing industries, factories and spare parts for trucks, automobiles, airplane, machineries, electrical products, jewellery etc are noticed here. Information technology has a great scope for investment because of the proximity of Bangalore.

Other Sectors

In Krishnagiri district, presence of other sectors is also huge. Hotels, Communication, Tourism, Dairy, Quarries, Banking and Horticulture are rendering services to the people and fetching income to the district and contribution to National Domestic Product. District has 8533 registered industrial units [Table-5]. In which 150 medium and large units were being registered. Large and medium industries have provided employment to 22500 people. Turnover of small industries was Rs. 55000 lakhs and Rs. 1000000 lakhs was turnover of medium and large scale industries.

Table-5 Industry at a Glance (2015-16)

S	Particulars	Numbers
1	Registered industrial unit	8533
2	Total industrial unit	8533
3	Registered medium & large unit	150
4	Estimated avg. no. of daily worker employed in small scale industries	8
5	Employment in large and medium industries	22500
6	No. of industrial area	3
7	Turnover of small scale industries	Rs. 55000 lakhs
8	Turnover of medium & large scale industries	Rs. 1000000 lakhs

Source: District Industry Profile, 2015-16, Department of Industry and Commerce, Government of Tamil Nadu.

The [Table-6] shows the total number of Micro and Small Scale Enterprises (MSME) under each category with their investment and the employment created by that industry. The highest number of units in the District is Ready-made garments & embroidery (2303) industry followed by metal based (1560) industry with the investment made of Rs. 22087.1 lakhs and Rs. 14998.5 lakhs respectively. Agro-based industry (1110) units ranked fourth whereas paper industry and soda water industry occupy the least number of units with less amount of investment respectively. In terms of employment, highest employment are created by agro-based industry (164065) followed by metal based industry (20238) whereas the least employment opportunity are created by soda water industry.

Table-6 Micro & Small Scale enterprises and artisan units in the district (2015-16)

S	Type of industry	No. of units	Investment (in Lakh Rs.)	Employment
1	Agro based	1110	10740.1	164065
2	Soda water	8	8.15	64
3	Cotton textile	225	2163.51	1839
4	Woolen, silk & artificial Thread based clothes	0	0	0
5	Jute & jute based	0	0	0
6	Ready- made garments & embroidery	2303	22087.1	6190
7	Wood/wooden based furniture	96	768.17	193
8	Paper & Paper products	68	653.78	1049
9	Leather based	104	832.9	710
10	Chemical/ Chemical based	179	1720.98	3231
11	Rubber, Plastic & petro based	202	1931.11	2894
12	Mineral based	373	2898.75	5516
13	Metal based (Steel Fab.)	1560	14998.5	20238
14	Engineering units	256	2461.29	2695
15	Electrical machinery and transport equipment	188	1807.51	4754
16	Repairing & servicing	1128	10152.1	2506
17	Others	783	4048.13	5301

Source: District Industry Profile, 2015-16, Department of Industry and Commerce, Government of Tamil Nadu.

Conclusion

The study region has the potential for improvement of the primary sector since agriculture and horticulture development provide livelihood in the district in a prominent way. Moreover, mango being an important horticulture crop in the district can be diversified and expanded especially for promoting livelihood opportunities to the people in the district as mango is extensively cultivated across the district. With regard to secondary sector, more number of agro- related industries could be set up in the district as it already has vast scope for setting up industries. Not only agro related industry since the crops like rose, capsicum and gerbera are cultivated through polyhouse cultivation and major agricultural crops are grown through drip irrigation there is the linkage between other industries too. By strengthening this sectoral interdependence the livelihood of farming, industries and households will be enhanced since household provides factor to industries and farming sectors and also are the ultimate consumers.

Application of research: Study of agriculture industry in Krishnagiri district

Research Category: Agriculture Economics

Abbreviations:

ROW: Rest of World

Sq.Kms.: Square Kilometres

SIPCOT : State Industrial Promotion Corporation on Tamil Nadu

SIDCO : Small Industries Development Corporation Limited

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Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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