

IMPACT OF TIRUPUR GARMENT INDUSTRIAL EFFLUENTS DISCHARGES ON AGRICULTURE AT NOYYAL RIVER BASIN

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Abstract

A study was conducted in Noyyal river basin to analyze the external effects of industrial development. Tiruppur is known world wide for hosiery and garments. It is an undisputed fact that the ground water and surface water is contaminated from the discharge of treated / untreated effluents from the textile units. Based on the extent of external impacts on land and water resources, two affected and two non-affected villages are selected and data are selected from 120 farm households. In the Noyyal river effluent affected area only 35.91 per cent of the agricultural lands are under cultivation, whereas it is 94.08 per cent in the Noyyal river effluent not affected area. The pollution impact on land is analysed through productivity of land, ie., the per acre agricultural income. Per acre agricultural income for effluent affected village was Rs. 3366. But for effluent not affected village it is Rs. 44273. The average loss of effluent affected and not affected village farmers per acre earning is Rs. 40907. The results suggested that the water in the river was polluted and not good for agriculture. It is therefore recommended that unless the authorities implement the laws governing the disposal of wastes, this may affect the lives of the people.

Keywords: Tiruppur, Agriculture, River water effluent, and Production and productivity

Introduction

India has seen tremendous economic growth in recent years. Rapid industrialisation, urbanisation and social changes have raised the standard of living for millions of Indian people. Industrialisation, which regarded as key element in development, is important to Government as major source of wealth. They are the means by which raw materials are converted into finished products and a source of foreign exchange and domestic employment. An increase of industrialisation reduces freshwater sources because of the large amount of water required by manufacturing facilities and because pollutants from manufacturing processes pollute the remaining freshwater sources and cause many environmental problems. The effluent discharged by the industries leads to serious

pollution of surface water sources, ground water and soil that ultimately affects the livelihood of the poor. This phenomenon is very common where the polluting industries like textile dyeing, leather tanning, paper and pulp processing, sugar manufacturing, etc. Generally, the above-mentioned industrial units are functioning in small/medium scales with high employment generation and foreign exchange potential. But the pollution control mechanisms among these units are extremely weak.

The river Noyyal originates from the hills of Western ghats towards the south west of Coimbatore. The river course is almost 172 km long to join the river Cauvery, at Kodumudi, Karur district. During its course Noyyal flows through Coimbatore, Tirupur, Erode and Karur districts. The Noyyal basin covering 3510 km² falls in seven taluks namely Coimbatore, Tirupur, Avinashi, Palladam, Karur, Erode and Dharapuram. Of the 3510 km² basin 1752 km², which is 49.9 per cent of the total is under cultivation and 178 km² (5.1 per cent of the total) is under forest and wasteland growing teak and eucalyptus. The rest 45 per cent (1580 km²) is barren, uncultivated lands, rocky strata, permanent pastures and fallow lands.

Tiruppur is known world wide for hosiery and cotton textile garments. It is an undisputed fact that the ground water and surface water is contaminated from the discharge of treated / untreated effluents from the textile wet processing units. The Tiruppur town located on the bank of river Noyyal about 50 km east of Coimbatore city is spread over 27.20Sq.Km. This city is frequent feed news to media regarding its poor environmental conditions and the consequences of the pollution of the textile industries.

There are 41626 small and big size industries located in the Noyyal river basin. Among them 11440 are cotton hosiery, 5909 are cotton textiles industries, 1754 are paper industries, 994 are chemical product industries, 742 are leather products industries, 521 are beverages and tobacco products industries, 112 wool and silk and synthetic fibres industries and 1512 rubber and plastic products industries. These industries located in the Noyyal river basin and polluted the river water.

Hence, the industrial effluent released by dyeing and bleaching factories in Tiruppur has become a serious issue. At present, there are about 800 dyeing and bleaching industries in Tiruppur. Due to industrial pollution, the adverse impact is severe on agriculture, fisheries, human health, and livestock. Under these circumstances, it has become the need to study the impact of industrial effluent on agriculture. The impact of pollution was examined by way of comparing the socio-economic characteristic in effluent affected and non-affected areas. Keeping the necessity in view, a study is undertaken to analyse the impact of effluents discharged by dyeing and bleaching industry especially on agriculture in Noyyal river basin.

Objectives of the study

The main objectives selected for the study are as follows.

- To illuminate the impact of industrial effluents on agricultural practices in effluent affected and non-affected villages of Noyyal river basin.
- To provide suggestions to improve the existing environmental degradation arising out of industrial effluent discharges.

Review of Literature

Regarding to the effluent river water Paul P Appasamy (2000) studied the economic assessment of environmental damage - a case study of industrial water pollution in Tiupur. The pollutants responsible for widespread damage are not only organics, dyes etc, but total dissolved solids and largely chlorides. TDS has affected ground water to a significant extent, resulting in damage to agriculture, fisheries, and ground water.

Senthilnathan (2004), studied the micro level environmental status report of river Noyyal basin. Most of the industries are located on either side of the Noyyal river bank at Tiruppur. These industries especially dyeing and bleaching units are the water consuming one. Nearly 9,000M³T of effluent from these industries are released directly in to the river Noyyal with incomplete treatment. This ultimately affects the river surface water system severely. The characterization of the water quality of the surface water samples of the river Noyyal is found higher and well above the threshold limit. The chemical composition is likely to be greatly affected by the nature and amount of effluent dumped into it as well as biotic and abiotic processes in the water body.

Prakash Nellyat (2005), studied the industrial growth and environmental degradation: A case study of industrial pollution in Tirupur 1999 to 2005. In the several affected areas farmers were not cultivating paddy at all, and the study estimates the loss of not cultivating paddy. In the several affected irrigated area the value of productivity loss per acre was estimated to be Rs.7,362 per year and in the unirrigated area it was Rs.2,910. Using GIS the total cultivatable area in the pollution affected zone was estimated to be 1,46,389 acres, of which 36,139 acres (24.7 per cent) could be classified as injurious, 53,938 acres (36.8 per cent) as critical and 56,312 acres (38.5 per cent) as normal for cultivation.

Myilsamy. A (2012) had undertaken the study to economic impact of water pollution on rural households - A case study of Noyyal river basin in Tamil nadu. The average difference was estimated as 5.123 bags with statistical significance at 1 per cent level. That is, after pollution, the average paddy production per acre was 5.123 bags less than the average paddy production per acre before pollution.

Research Methodology

The present study, data were collected from primary sources. The primary data the field survey was carried out during the period starting from March to June 2012. In order to satisfy the objectives set for the study, two affected villages and two non-affected villages from Noyyal river basins selected. From the cluster of villages within 5 km distance from industrial location, the one affected village of the river basin was selected purposively, and the another affected village was selected from the cluster of village beyond the distance of 5 km. The non-affected villages were selected purposively from among the cluster of villages away from the river banks, and are agriculturally progressive at the different points. The respondents were selected through stratified random sampling method from the category of small (40 farmers), medium (40 farmers) and large farmers (40 farmers). From each village, 10 each from small (below 2 acre), medium (2-4 acre) and large (above 4 acre) farmers were selected and therefore 30 farmers from each village were selected. In total 120 farmers from 4 villages were selected for the study.

Impact on Agriculture

Agriculture sector was major sector which bore the brunt of the impact of pollution in the form of decline in yields, it is necessary to study the impact on agriculture. Agricultural yields depends upon many factors like seeds, weather, soil fertility, irrigation, technology, manures, fertilizers, and pesticides used, capital invested and management practices. Other things are remaining the same, water pollution and soil pollution mainly caused a significant fall in crop yield.

Normally, the entire water used in the process of dyeing and bleaching is discharged as the chemical effluents. The biggest pollutant in the effluent is heavy metals. This effluence from the dyeing and bleaching units from Tiruppur, is let out into the open, without any treatment or semi treated. The effluents from the dyeing and bleaching form stagnant pools, and their stench is quite unbearable. The presence of metals in excess of tolerable limits results in the withering away of standing crops including full grown palm and coconut trees, while seedling just do not germinate. The dyeing and bleaching industry has not only ravaged the land but has also upset the intricate biological food chain of the area.

The abandoning of agricultural lands in effluent affected and not affected villages is presented in the table 1. In the Noyyal river effluent affected area only 35.91 per cent of the agricultural lands are under cultivation, remaining 64.09 per cent lands are abandon or fallow land. In the Noyyal river effluent not affected area 94.08 per cent of the agricultural lands are cultivated; remaining only 5.92 per cent lands are abandon or fallow land. It is clear from the table that effluent affected area the abandon lands size is higher than effluent not affected area.

Table 1 Respondent abandoning of agricultural lands (in acre)

Nature of land	Effluent affected villages	Effluent not affected villages
Cultivated	109 (35.91)	313.5 (94.08)
Abandon	194.5 (64.09)	26 (5.92)
Total land	303.05 (100)	339.5 (100)

Cropping Area

The farm size wise and crop wise distribution of agriculture at Noyyal river basin is given the table 2. It is seen that 82.2 acre (42.37 per cent) of the agriculture land cropped Sorghum at Noyyal river effluent affected area, followed by 11.8 acre (3.89 per cent) land cropped the Tapioca, 11 acre (3.62 per cent) land cropped sunflower, 4 acre (1.32 per cent) of the land cropped coconut. The farmers are cultivate sorghum because of livestock fodder, sunflower and tapioca crops are most pollution tolerance crops. In the Noyyal effluent not affected area it is seen that 141 acre (41.53 per cent) of the agriculture land cropped sugarcane, followed by 118.75 acre (34.98 per cent) land cropped the turmeric, 25 acre (7.36 per cent) land cropped banana, 12 acre (3.53 per cent) of the land cropped coconut, 11.75 acre (3.46 per cent) of land cropped sorghum and remaining 5 acre (1.47 per cent) of the agriculture land is cultivate the paddy. Majority of the farmers centre to turmeric, sorghum, sugarcane and banana.

Productivity of Crops

The result shows in the table 2 shows that the farmer's potential yield of sorghum, coconut, tapioca, and sunflower productivity in the Noyyal river effluent affected area. In Noyyal river basin the crop sorghum does not produce any yield, farmers cultivate because of domestic animals fodder. The productivity of the Sorghum is 54 fodder bundle in per acre. The productivity of the coconut nut is 4843 nuts in per acre. The productivity of the Tapioca is 6493 kg in per acre. The productivity of the Sunflower is 421 kg in per acre.

Table 2 Net return of earnings from average per acre crops yield at Noyyal river basin

Crop	Market Price	Affected villages						Not affected villages					
		Yield per acre	Per acre Income	Per acre Expenditure	Per acre Profit /loss	Total land	Net income	Yield per acre	Per acre income	Per acre expenditure	Per acre Profit /loss	Total land	Net income
	(Rs.)		(Rs.)	(Rs.)	(Rs.)	Acre	(Rs.)		(Rs.)	(Rs.)	(Rs.)	Acre	(Rs.)
	1	2	3	4	5	6	7	8	9	10	11	12	13
		1x2		3-4		5x6		1x8		9-10		11x12	
Turmeric (Kg)	60	0	0	0	0	0	0	2305	138300	81964	56336	118.75	6689900
Sugarcane (tone)	2100	0	0	0	0	0	0	54	113400	72021	41379	141	5834439
Paddy (Kg)	15	0	0	0	0	0	0	2834	42510	37293	5217	5	26085
Sorghum (Fodder bundle)	150	54	8100	9187	-1087	82.2	-89351	61	9150	10272	960	11.75	11280
Sorghum (Kg)	6	0	0	0	0		0	347	2082				
Coconut (nuts)	5	4843	24215	4590	19625	4	78500	6147	30735	5300	25435	12	305220
Banana (Kg)	5	0	0	0	0	0	0	18587	92935	52426	40509	25	1012725
Tapioca (Kg)	6	6493	38958	15925	23033	11.8	271789	0	0	0	0	0	0
Sunflower (Kg)	80	421	33680	24045	9635	11	105985	0	0	0	0	0	0
Total earning						109	366923					313.5	13879649
Per acre earning							3366						44273
Different between effluent affected and not affected village farmers per acre earning is Rs. 40907													

The result shows that the farmer's potential yield of turmeric, sugarcane, paddy, sorghum, coconut, and banana productivity in the Noyyal river effluent not affected area. The productivity of the turmeric is 2305 kg in per acre. The average productivity of the turmeric 2305 kg at effluent not affected area. The average productivity of the sugarcane 54 tones in per acre. The productivity of the Paddy is 2834 kg in per acre. The productivity of the coconut is 6147 nuts in per acre. The productivity of the banana is Expenditure Pattern of Agriculture Product

In the Noyyal river effluent affected area it is seen that the total cost of production of Sorghum at one acre was worked out for Rs. 8187, this total cost incurred includes the seed cost Rs. 2983, labour cost of Rs. 1850, fertilizer and pesticide cost of Rs. 1566 and other cost of Rs. 1788. The total cost of production of Coconut at one acre was worked out for Rs. 4590; this total cost incurred the labour cost of Rs. 1525, fertilizer and pesticide cost of Rs. 1637 and other cost of Rs. 1428. The total cost of production of Tapioca at one acre was worked out for Rs. 15925, this total cost to be incurred includes the seed cost Rs. 3238, labour cost of Rs. 5514, fertilizer and pesticide cost of Rs.3430 and other cost of Rs. 3743. The total cost of production of Sunflower at one acre was worked out for Rs. 24045, this total cost incurred the seed cost Rs. 4794, labour cost of Rs. 9967, fertilizer and pesticide cost of Rs.4252 and other cost of Rs. 5032.

In the Noyyal river effluent not affected area it is seen that the total cost of production of Turmeric at one acre was worked out for Rs. 81964, this total cost to be incurred includes the seed cost Rs. 37500, labour cost of Rs. 16407, fertilizer and pesticide cost of Rs. 5665 and other cost of Rs. 22391. The total cost of production of Sugar cane at one acre was worked out for Rs. 72021, this total cost to be incurred includes the seed cost of Rs. 8000, labour cost of Rs. 42350, fertilizer and pesticide cost of Rs. 7039 and other cost of Rs. 14632. The total cost of production of Paddy at one acre was worked out for Rs. 37293, this total cost to be incurred includes the seed cost Rs. 4281, labour cost of Rs. 20649, fertilizer and pesticide cost of Rs. 6872 and other cost of Rs. 5491. The total cost of production of Sorghum at one acre was worked out for Rs. 10272, this total cost to be incurred includes the seed cost Rs. 3024, labour cost of Rs. 3460, fertilizer and pesticide cost of Rs. 1634 and other cost of Rs. 2154. The total cost of production of Coconut at one acre was worked out for Rs. 5300; this total cost to be incurred includes the labour cost Rs. 1904, fertilizer and pesticide cost of Rs. 1785 and other cost of Rs. 1611. The total cost of production of Banana at one acre was worked out for Rs. 52426, this total cost to be incurred includes the seed cost Rs. 9637, labour cost of Rs. 25274, fertilizer and pesticide cost of Rs. 5643 and other cost of Rs. 11872.

Net return earned from per acre crop yield The pollution impact on land is analysed through productivity of land, ie., the per acre agricultural income. Per acre agricultural income for effluent affected village was Rs. 3366. But for effluent not affected village it was Rs. 44273. The average loss of effluent affected and not affected village farmers per

acre earning is Rs. 40907. The reason for higher per acre income in effluent affected village was due to higher yield rate and absence of soil salinity, which was a major contributing factor to the problem in effluent affected village. All the reported respondents cited that pollution of ground water and soil was the main reason for the very low yield rate at effluent affected village. In the effluent affected village farmers cultivate only wet crops like Sorghum, Tapioca and Sunflower they are most effluent tolerance crops. Farmers particularly cultivate sorghum because not for its yield, they cultivate only for their cattle fodder.

Conclusion

The use of the untreated effluent water from the Noyyal river basin for the irrigation of crops created adverse impact on the farming lands, as well as it increases pressure on environment by damaging the ecology. The study had found that majority of the rural communities were not depending on the river water for drinking, irrigation, fishing, washing the cloths, bathing the livestock. Agricultural works is closely disappearing, and if remedial action and the preventing steps will not be taken, in due course, agriculture will disappear soon. Although the people were aware of the water pollution, their awareness was not yet translated into action which was mainly because of lack of integrated institutional mechanism. A wide public participation with effective institution support could help in controlling the discharge of industrial effluent into the river, towards abatement and control of river pollution and make the agricultural sector and the dependent more progress.

Suggestions to Eradicate the Pollution Problems

The suggestions to overcome the problems encountered by the farmers are expected remedial measures for better environmental management. In the Noyyal river effluent affected village farmers suggested that to stop effluent discharge in the river the supreme court order must be implemented. In the Noyyal river effluent not affected village farmers suggested that government must take initiative to promote agricultural activities and to save water source.

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