Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(5): 788-790
Received: 06-07-2017
Accepted: 07-08-2017

S Yuvasakthi
Department of Agricultural Economics Sam Higginbottom University of Agriculture, Technology & Sciences, Formerly Allahabad Agricultural Institute, Tamil Nadu

Dr. Dinesh Kumar
Department of Agricultural Economics Sam Higginbottom University of Agriculture, Technology & Sciences, Formerly Allahabad Agricultural Institute, Tamil Nadu

Correspondence
S Yuvasakthi
Department of Agricultural Economics Sam Higginbottom University of Agriculture, Technology & Sciences, Formerly Allahabad Agricultural Institute, Tamil Nadu

An economic impact of water pollution on value of crop land in Tiruppur District of Tamil Nadu

S Yuvasakthi and Dr. Dinesh Kumar

Abstract
Water pollution is a serious threat to the present globalised scenario. Tiruppur district was purposively selected for the present study, since the Noyyal River was polluted due to discharging of industrial wastewater into the river. The study focused on the economic impact of water pollution and survey was conducted in four affected villages of Uthukuli block, Tiruppur, Tamil Nadu with the objective followed by the impact of pollution on land value. The research was based on Hedonic model to study the value of crop land resulting from farm income, irrigation and land quality indices, distance between farm and pollution point with the help of SPSS, all data were calculated in the areas for highly affected, moderately and less affected respectively which concluded that the farm income, irrigation water and land quality indices, distance between farm and polluted river were influencing the value of crop land in affected areas.

Keywords: water pollution, hedonic model, value of crop land.

Introduction
Water is an essential component of life, but it is limited on earth. The water resource is polluting and declining due to agricultural and industrial activity. Urbanization and rapid industrialization have resulted in heavy losses to economic welfare in terms of the effect on agricultural activities, human health and ecosystem at large through air and water pollution. (Reddy, 2006) [1]. Water pollution is mainly due to the flow of untreated industrial effluent into the water resources. With rapid industrialization and urbanization, the water requirement for energy and industrial use is estimated to rise to about 18 per cent (191 bcm) of the total requirements in 2025. Poor environmental management systems, especially in industries such as thermal power stations, chemicals, metals and minerals, leather processing and sugar mills, have led to discharge of highly toxic and organic wastewater. This has resulted in pollution of the surface and groundwater sources from which water is also drawn for irrigation and domestic use (CPCB 2012) [2]. Most of the rivers in the country get polluted as they enter cities due to discharge of pollutants such as fertilizers and insecticides, domestic sewage and industrial effluents. Many rivers in Tamil Nadu had been polluted by the wastage released from the factories and industries. These wastages are mixed with the river waters and make them as polluted water. The city Tiruppur is very famous for textile, cotton and knitting items. There are many dying and bleaching units running in this city and they produce huge wastages every day. These wastages are directly mixed with the Noyyal river while it flows through Tiruppur.
Many dyeing industries are operating in Tiruppur district. A large quantity (about 42,050 kiloliters) of wastewater or effluents discharged from the dyeing factories to the river streams during the processes. These dyeing factory effluents released to agricultural lands also deteriorate the soil physical and chemical properties. Though Tiruppur district was a major cotton belt area, farmers have switched over to alternate crops like sorghum, maize etc due to effluent discharge to the Noyyal River.

Statement of the study
The present study concentrates mainly impact of industrial water pollution on the value of crop land. This will help the farmers to analyze the causes and effects of industrial pollution on crop production, income, soil fertility and socio-economic condition. This result will be more useful to farmers to better understand the problems regarding dyeing industry effluents and their farmlands. The present study analyzes the factors responsible for the change in land value.

Objective
To study the impact of water pollution on crop land value.

Materials and Methods

The statistical tool Hedonic Pricing Technique is a multiple regression method was used for the analysis and which is done with the help of SPSS. The hedonic pricing method is used to estimate economic values for ecosystem or environmental services that directly affect market prices. It can be used to estimate economic benefits or costs associated with environment quality, including air pollution, water pollution, or noise and also environmental amenities, such as aesthetic views or proximity to recreational sites. The hedonic pricing method is most often used to value environmental amenities that affect the price of residential properties.

In present study hedonic model is used to find out the value of agricultural land in relation to prices of attributes. It can be done through hedonic price function, which describes the equilibrium relationship between land values and attributes.

The hedonic model formulated for the present study was of the following

$VCL = \beta_0 + \beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+U_1$

- The dependent variable in the above equation is Value of Crop Land (VCL)
- The independent variables that affect the value of crop land are farm income(X_1), irrigation water quality index(X_2), Land quality index (X_3), Distance between farm and polluted river (X_4). In this irrigation water quality and land quality indices measured with the use of dummy variables that are 1- poor, 2- Moderate, 3- Good.
- β_0 – Regression constant
- β_1 to β_4 – Regression coefficients.
- U_1 - Error term

Results and Discussion

The environmental problem like water pollution includes loss of soil quality and water quality and pollution of particular areas by industrial effluent. The effects of water pollution had resulted in changes to the land value reported by the farmers. In the present study, the qualitative and quantitative characteristics *viz.,* farm income, Irrigation and land quality indices and distance between affected farm and polluted river were influencing the value of crop land. Hence it was used for the estimation of the parameters in hedonic regression analysis. The results of hedonic regression analysis are presented in Table: 1.

Hedonic Model for Highly Affected Village

The results indicated that 96.6 per cent of the variation in the land value was explained by the independent variables (*viz.,* farm income, irrigation and land quality indices, distance between farm and polluted river) included in the analysis. Table: 1, further showed that the coefficients of all the independent variables are positively related to the value of cropland. The t-statistics indicated that the variable distance between farm and polluted river was significant at one and five per cent level.

It could be inferred from the table, that one rupee increase in farm income, increased the value of crop land by Rs.1.056 per ha, *ceteris paribus.* Similarly, the irrigation water quality index shifts from poor to good would increase the value of crop land by Rs.1,714.26 per ha, keeping the other variables constant in the highly affected areas. Likewise, the land quality index shifts from poor to good would increase the value of cropland by Rs. 8,935.938 per ha, *ceteris paribus.* Further, one kilometer increase in distance between farm and polluted river would increase the value of cropland by Rs 6, 10, 835 per ha, *ceteirs paribus.*

Tables 1: Estimates of hedonic model

S. No	Variables	Highly affected		Moderately affected		Less affected	
		Coefficient	t value	Coefficient	t value	Coefficient	t value
1.	Constant	893362	27.757	1801048	126.17	1849571	57.68
2.	Farm income	1.056	0.9598	0.2792	0.4792	1.2009	2.939**
3.	Irrigation water quality Index	1714.264	0.0406	2651.491	0.2354	50880.94	1.3141
4.	Land quality index	8935.938	0.2872	41326.83	2.806**	6084.302	0.1566
5.	Distance between farm and polluted river	610835	14.59**	121317.6	5.565**	83747.78	4.174**
6.	R^2 values	96.6		94.5		90	
7.	N	30		30		30	

**indicates significance at one and five percent level

Hedonic Model for Moderately Affected Village

For the moderately affected area, the R^2 value indicated that about 94.5 percent of the variation in the land value was explained by the independent variables (*viz.,* farm income, irrigation and land quality indices, distance between farm and polluted river) included in the analysis. Table: 1further showed that the coefficients of all the independent variables are positively related to the value of cropland. The t-statistics indicated that the variables land quality index and distance between farm and polluted river were significant at one and five per cent level.

It could be inferred from the table that increasing the quality of irrigation water medium to good would increase the value of crop land by Rs.2,651.49 per ha, keeping the other variables constant. Land quality index shifts from medium to good, the value of cropland would increase by Rs. 41, 326.83 per ha, keeping the other variables constant. Also, one kilometer increase in kilometer increase in distance between farm and polluted river would increase the value of cropland by Rs. 1, 21, 317.6 per ha, *ceteris paribus.*

Hedonic Model for Less Affected Village

The results showed that about 90 per cent of the variation in the cropland value was explained by the independent variables (*viz.,* farm income, irrigation and land quality indices, distance between farm and polluted river) included in the analysis. Table: 1further showed that the coefficients of all the independent variables are positively related to the value of cropland. The t-statistics indicated that the variables farm income and distance between farm and polluted river was significant at five per cent level.

It could be inferred from Table: 1, that one rupee increase in farm income, increased the value of crop land by Rs. 1.2009 per ha, *ceteris paribus.* If the quality of irrigation water shifts from medium to good, the value of cropland increased by Rs. 50,880.94 per ha, keeping other variables constant. Likewise, the quality of the land would increase the value of cropland by Rs.6, 084.302 per ha, *ceteris paribus* and one kilometer

increase in distance between farm and polluted river would increase the value of crop land by Rs. 83,747.78 per ha, *ceteris paribus.*

Conclusion

The present study has concluded the impact of industrial water pollution adversely affect the value of cropland. The industrial effluents mixed in the river and so the river gets polluted. As a result, land lost the fertility as well as the rate of production also. Due to this value of the crop land rapidly decreased.

References

1. Reddy VR, Behera. B. Impact of water pollution on rural communities: An economic analysis. Ecological Economics. 2006; 58:526-537.
2. Status of water quality in India. Central Pollution Control Board.www.cpcb.nic.in, 2012.
3. Manoharan S. The polluted rivers and its impacts in Tamil Nadu. www.tamilspider.com, 2012.
4. David Maddison. A hedonic analysis of agricultural land prices in England and Wales. European Review of Agricultural Economics, 2000; 27(4):519-532.
5. Sivasakthi T, Ramasamy C, Gurunathan S, Menaka S *et al.* Estimation of the Negative Externalities of Textile Dying Industry Effluents on Crop Productivity and Value of Farmlands in Tamil Nadu. Indian Journal of Agricultural Economics, 2008; 63(3).