# Economic Analysis of Resource Use and Productivity: A Case Study on Agriculture Farm

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## ABSTRACT

*This article mainly focussed resource use and productivity in economic analysis of agriculture farm. The agriculture sector has a direct impact on the level of farm income as well as national income of the country. Therefore, it has become a need to increase agricultural production. There are two feasible options especially to increase the agricultural production. The farmers of the study area in Madathukulam block of Tiruppur District displayed a high degree of entrepreneurship in the organisational and operational efficiency of farming as judged by the level of income on their farms. Similarly, the data was collected by personal interview method approaching the selected farmers at the spot with the help of interview schedules keeping in view the convenience of the farmers for investigation. A sample of two hundred and fifty farmers in the study area. Statistical technique was comparison and interpretation of the data. They had devoted a larger area to Sugarcane in their farms to ensure larger profits from their farm business. Besides this the farmers (specially small and marginal farmers) also had a good number of milch cattle for additional farm income. In this connection there are six tilled in this study Introduction, Review of Literature, Objectives, Methodology, Result and Discussion and Conclusion this broad tilled given bellow discussed.*

**KEYWORDS:**
P*roductivity; Resource use; Economic Analysis;* Standard Error and Coefficient

## I. Preface

India is an agricultural country. Most of the developing countries today are in the throes of a technological revolution in the field of agriculture. The new farm technologies introduced in this country during the mid sixties of the last century. India is a progressive country. There are many advancing things making progress today. Agricultural economy plays a vital role in the economic development of India.

Past experience of the developed countries as well as that of the developing ones, confirms that faster growth in agricultural production was necessary for economic development of India too. In a country where sizeable proportion of the population is dependent on agriculture, the development of agricultural sector is prerequisite. Continuous increase in agricultural production was possible by the extension of area under cultivation, through reclamation of waste lands and by increasing productivity of land.

The agriculture sector has a direct impact on the level of farm income as well as national income of the country.

Therefore, it has become a need to increase agricultural production. There are two feasible options especially to increase the agricultural production. The first possibility was to cultivate normal soils through optimal allocation of available resources and to utilise the full potential of existing technology. The second possibility was through external land augmentation without shrinking of the area and productivity of any activity. The farm management picture in India shows a greater change as a result of the green revolution. The introduction of HYV seeds and the greater emphasis on the development of minor irrigation works, greater use of fertilizers and pesticides had opened new possibilities and opportunities for the farmers to improve their farm productivity and increase the level of farms income.

Farm means a piece of land where crops and livestock enterprises was taken up under common management and has specific boundaries. A farm is a socio-economic unit which not only provides income or profit to a farmer but also a source of happiness to him and his family. It is also a decision making unit where the farmer has many alternatives for his resources in the production of crops and livestock enterprise and their disposal. Hence, the farms were the micro units of vital importance which represents the centre of dynamic decision making in regard to guiding the farm resources in the production process. The economic prosperity of a country depends, largely on the viability and the use of the right amount and proportion of various ingredients of a farm unit-land, labour, livestock, implements, machinery, buildings and other capital resources and managerial ability. Farms was classified as Ranching, Dry and Irrigated farming, Mixed farming, Single crop & Multi crop farming and Diversified farming. A farmer can make intelligent decisions on the use of his inputs for profit maximisation if information on the relative efficiencies of his resources like fertilizers, seed, irrigation water, machinery, labour and the like which can be added to a hectare of land. Hence, a concern of the efficiency of resources would guide him to determine the amount of a resources to be used with one hectare of land to attain the expected level of production under the given resource situations.

## II. Review of Literature

Rajesh Kumar et al. (2011) measured water use efficiency in Godavari river basin in India. In Godavari water, the Chinna Ghanapur and Machavaram was important river basin villages selected for the study by census method. Due to the frequent availability and free of cost farmers was inefficiently using the irrigation water for Paddy cultivation.

Taiwo Bintu et al. (2011) studied the resource use efficiency in hybrid and traditional Maize and various input factors for Maize cultivation. 100 farmers in Giwa local government area of Kaduna State was surveyed by random sampling method. There was large scope for increase in the resource use in both hybrid and traditional Maize cultivation.

Dina Padilla Fernandez and Peter Leslie Nuthall (2009) identified the sources of input use inefficiency in Sugarcane production. A total of 140 respondents was interviewed in Negros Island by using random sampling method. The overall technical efficiency of Sugarcane farmers in Central Negros was positively related to farmers' age and experience, access to credit, nitrogen fertilizer application, and soil type and farm size.

Bhende et al. (2007) analysed the technical efficiency of major food and cash crops in Karnataka. Secondary data

used from University of Agricultural Sciences during the period of 1993-94. Educational achievements of the farm household determined technical efficiency in both food and cash crops in Karnataka. In addition to that, the farm size and technical efficiency was with inverse relationship.

Shanmugam et al. (2006) explored the technical efficiency in agriculture production in India. Secondary data used from Indian Agricultural Institute during the period of 1990-91 revealed that the technical efficiency greatly depends on agro-climatic zones, technological factors and crop mix.

Senthil Kumar et al. (2005) explored the resource use efficiency in Paddy cultivation. Various input factors for Paddy cultivation 90 farmers surveyed from head, mid and tail reach of the Lower Bhavani Basin Project (LBP) Command Area of Tamil Nadu. The study suggested that there was scope for further use of various input factors for enhancing the productivity.

Koshta et al (2005) analysed the economic efficiency of Paddy production. Various input factors for Paddy cultivation 202 farm households was selected from irrigated and rain fed regions of Chattisgarh. The cost of cultivation was much higher in irrigated area as compared to rainfed region.

Uma Devi et al. (2002) studied resource productivity and input efficiency of coffee in Visakhapatnam district of Andhara Pradesh. The data was collected from 90 farmers of two villages each from the three selected Mandals viz., G.K.Veedhi, Chintapalli and Paderu district for the year 1999-2000. The Cobb-Douglas production function was used to estimate productivity and input efficiency of coffee. The study indicated high degree of resource use inefficiencies with respect to various inputs and the productivity level in Coffee can be raised by reorganizing the farms with proper adjustment of resources. So as to increase profits of Coffee plantations. Technical knowhow must be provided to optimize the use of resources for maximizing returns.

Badal and Singh (2000) studied resource productivity and allocative efficiency of Maize crop in Bihar. The data was collected through a survey of 180 farmers from 12 villages spread across three districts of Bihar namely, Samastipur, Vaishali and Hazaribagh during the agricultural yea 1996-97. The linear, quadratic, square root, semi-log and Cobb-Douglas functions was attempted to exhibit the relationship between input and outputs of sample farms for Maize and its competing crops i.e., Rice and Wheat. The study concluded that resource use efficiency for different inputs varied widely across the crops and there was scope to reallocate the resource in order to achieve optimal allocation of inputs. High Yielding Varieties (HYVs) of Rabi Maize offered a greater scope for input-use for an enhanced productivity compared to any other crop of the season.

Tholkappian C (2014). In this research organic farming is labor intensive, but its cost of cultivation is lower due to saving on chemical fertilizers, irrigation, seeds and agrochemicals. The yield on organic farmer has been reported lower but it is more than compensated by the price premium received and yield and profit stability observed on the organic farming.

## III. Objectives

- To examine the level of productivity for different resource use on different size farms in Madathukulam block of Tiruppur District

## IV. Methodology

A three stage stratified random sampling technique was adapted to the study. Survey method was adopted to conduct the enquiry. The data was collected by personal interview method approaching the selected farmers at the spot with the help of interview schedules keeping in view the convenience of the farmers for investigation. A sample of two hundred and fifty farmers in the study area. Statistical technique was used for comparison and interpretation of the data.

## V. Result and Discussion

Physical size of the farm unit is the important factor in the study of farm organization and management. The following table shows the number of sample farms, total cultivated area and the average size of farms by size group wise for the study area.

**Table 1.1: Number of Farms, ultivated Area and Average Size of Farms of the Study area (Hectare)**

| SI. No | Size Group | No. Farms | Cultivated Area | Size of Holding | Percentage | Percent of Average |
|---|---|---|---|---|---|---|
| 1 | Marginal (0-1) | 59 | 40.34 | 0.68 | 23.60 | 2.82 |
| 2 | Small (1-2) | 89 | 145.78 | 1.63 | 35.60 | 6.76 |
| 3 | Semi-Medium (2-4) | 65 | 193.30 | 2.97 | 26.00 | 12.32 |
| 4 | Medium (4-10) | 26 | 173.56 | 6.67 | 10.40 | 27.65 |
| 5 | Large (10 and above) | 11 | 133.91 | 12.17 | 4.40 | 50.45 |
| **Total** | | **250** | **686.89** | **24.12** | **100.00** | 100.00 |
| **Average** | | **-** | **-** | **2.74** | **-** | |

**Source:** Primary Data

The above table reveals that the average size of holding cases to 2.74 hectare. This indicates the characteristics of the sample villages dominated by small holdings. In an over whelming population of the cultivators i.e. 59.20 per cent fall within 0 to 2 hectares size group while only 4.40 per cent cultivators who were under 10 and above hectares size group. It was observed that the percentage of area under cultivation under 10 above hectares size group was 4.40 per cent. 50.45 per cent of the cultivated area while 59.20 per cent of the cultivators were in the size groups 0 to 2 hectare. Only 9.58 of the total cultivated area. It indicates the uneven distribution of land the study area.

It was seen that for marginal farmers, coefficient relating to variables like bullock labour was significant, while human labour, machinery power, seed and manure was not significant. With fertilizers, pesticides and irrigation showing negative significance, hence with more variables either being non or negative significance, elasticities of productions was seen to be decreasing. Again the coefficient relating to variables for small farms related to human labour, manure and fertilizers was significant. While bullock labour, machinery power and seed was insignificant. Pesticides and irrigation were negatively significant, therefore elasticities of production in small farms was seen to be increasing. In the semi-medium group of farms, the coefficient relating to

variables for bullock labour, machinery power, manure and fertilizers was significant, while one variables i.e., human labour was not significant and another two variables pesticides and irrigation was negatively significant and hence the production elasticity variable was constant. As for the medium farms, coefficient relating to variable for human labour, machinery power, seed, pesticides and irrigation was insignificant while some variables like bullock labour, manure and fertilizer was negatively significant, hence the elasticity of production was increasing. The large farms coefficient relating to variables for manure was highly significant, but human labour, machinery power, seed, pesticides and irrigation were negatively significant while bullock labour and fertilizers were insignificant, therefore elasticity of production was decreasing. Overall, coefficient relating to variable of human labour, fertilizers and pesticides were significant but irrigation were negatively significant with bullock labour, machinery power, seed and manure been insignificant. Therefore elasticity of production was constant. The returns to scale in production was increasing for small and medium, semi-medium and large farms. Because the sum of X's value was greater than 1 in all cases except for the marginal farmer.

**Table 1.2: Elasticity of Production, Standard Error and Coefficient of Multiple Determinations for Farm Business as a whole Size Group wise**

| Sl. No | Size Group (in hectares) | Human Labour | Bullock Labour | Machinery Power | Seed | Manure | Fertilizers | Pesticides | Irrigation | $R^2$ | Return Scale |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Marginal (0-1 hectare) | | | | | | | | | | |
| 1 | Regression Co-efficient | 0.216 | 0.478*** | 0.241 | 0.447 | 0.156 | -0.308 | -0.041 | -0.195 | 0.887 | (0.904) Decreasing |
| 2 | SE | 0.331 | 0.227 | 0.218 | 0.149 | 0.194 | 0.305 | 0.191 | 0.154 | - | - |
| | Small (1-2 hectare) | | | | | | | | | | |
| 1 | Regression Co-efficient | 0.467* | 0.127 | 0.099 | 0.003 | 0.306** | 0.768* | -0.127 | -0.511* | 0.756 | (1.132) Increasing |
| 2 | SE | 0.079 | 0.090 | 0.159 | 0.094 | 0.064 | 0.135 | 0.132 | 0.112 | - | - |
| | Semi-Medium (2-4 hectare) | | | | | | | | | | |
| 1 | Regression Co-efficient | 0.152 | 0.376* | 0.410* | 0.068 | 0.257** | 0.354* | -0.188 | -0.413* | 0.957 | (1.016) Constant |
| 2 | SE | 0.075 | 0.075 | 0.103 | 0.050 | 0.085 | 0.073 | 0.115 | 0.093 | - | - |
| | Medium (4-10 hectare) | | | | | | | | | | |
| 1 | Regression Co-efficient | 0.315 | -0.559 | 0.236 | 0.300 | -0.220 | -0.382 | 1.053 | 0.418 | 0.952 | (1.161) Increasing |
| 2 | SE | 0.738 | 0.231 | 0.280 | 0.346 | 0.200 | 0.205 | 0.517 | 0.600 | - | - |
| | Large (10 and above hectare) | | | | | | | | | | |
| 1 | Regression Co-efficient | -0.853 | 0.830 | -1.951*** | -0.917 | 1.038** | 3.097 | -1.641*** | -0.692 | 0.954 | (-1.089) Decreasing |
| 2 | SE | 0.301 | 0.273 | 0.727 | 0.460 | 0.254 | 0.982 | 0.616 | 1.700 | - | - |
| | All Size Group (Overall ) | | | | | | | | | | |
| 1 | Regression Co-efficient | 0.490* | 0.140 | 0.025 | 0.038 | 0.127 | 0.285** | 0.345** | -0.443** | 0.988 | (1.007) Constant |
| 2 | SE | 0.088 | 0.093 | 0.182 | 0.093 | 0.086 | 0.102 | 0.139 | 0.148 | - | - |

**Source:** Computed Data

***Significant at 1% level of significance**

****Significant at 5% level of significance**

*****Significant at 10% level of significance**

The elasticities of production coefficient with test of significance and standard error for individual crops was presented in the Table 1.3. It was clear from Table 1.3 that for sugarcane crop, the coefficient relating to variables of human and bullock labour and pesticides was significant, four variables i.e., seed, manure, fertilisers and irrigation was insignificant while machinery power was negatively significant, hence with three variables of significance, elasticities of productions was increasing. While paddy was concerned, coefficient relating to

variables for bullock labour were significant. In case machinery power, seed, manure, fertilizer, pesticide and irrigation was insignificant and human labour been negatively significant, the elasticities of production was constant. Maize crop coefficient relating to variables for bullock labour and machinery power was significant, while pesticides showed negative significance with human labour, seed, manure, fertilizers and irrigation. As five variables was insignificant, the elasticity of production for Maize crop was constant. The returns to scale for production in Sugarcane was at an increasing level while for Maize and Paddy it was constant, because the sum of X's value was greater than 1 for Sugarcane while it was equal to 1 in the other two crops

**Table 1.3: Elasticity of Production, Standard Error and $R^2$ for Individual Crops**

| Sl. No | Crop | Human Labour | Bullock Labour | Machinery Power | Seed | Manure | Fertilizers | Pesticides | Irrigation | $R^2$ | Return to Scale |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Sugarcane | | | | | | | | | | |
| | Regression Co-efficient | 0.166*** | 0.234* | -0.019 | 0.177 | 0.093 | 0.005 | 0.306** | 0.051 | 0.979 | (1.013) Increasing |
| | SE | 0.100 | 0.074 | 0.122 | 0.141 | 0.078 | 0.120 | 0.120 | 0.188 | - | - |
| 2 | Paddy | | | | | | | | | | |
| | Regression Co-efficient | -0.160 | 0.341** | 0.063 | 0.022 | 0.237 | 0.251 | 0.000 | 0.252 | 0.948 | (1.006) Constant |
| | SE | 0.457 | 0.199 | 0.347 | 0.369 | 0.243 | 0.422 | 0.235 | 0.551 | - | - |
| 3 | Maize | | | | | | | | | | |
| | Regression Co-efficient | 0.098 | 0.255* | 0.262*** | 0.096 | 0.193 | 0.118 | -0.068 | 0.054 | 0.994 | (1.008) Constant |
| | SE | 0.095 | 0.090 | 0.151 | 0.122 | 0.154 | 0.084 | 0.096 | 0.038 | - | - |

Source: Computed Data

*Significant at 1% level of Significance

**Significant at 5% level of Significance

***Significant at 10% level of Significance

## . VI. Conclusion

The farmers of the study area in Madathukulam block of Tiruppur District displayed a high degree of entrepreneurship in the organisational and operational efficiency of farming as judged by the level of income on their farms. They had devoted a larger area to Sugarcane in their farms to ensure larger profits from their farm business. Besides this the farmers (specially small and marginal farmers) also had a good number of milch cattle for additional farm income. The stages of agricultural development i.e., traditional intermediate or modern in the study area would be worthwhile to consider the distinction among them. A traditional stage implied a way of living rather than a business proposition where production was subsistence oriented. The produce being mainly intended for family consumption. The input used in such situation i.e., crop varieties, seed, labour, fertilizer etc., was chosen mainly on the basis of what the farmer and his family likes and owns. In these circumstances, there was very little of market orientation or consequences of prices cost and returns. At the other extreme, a modern agriculture would imply careful selection of enterprises, crop varieties, fertilizers and pesticides by procuring them largely from the market. The bulk of the produce in such a case has to be sold in the market at a profit in order to obtain cash needed for purchasing inputs from the market. In modern agriculture, necessarily there was evidence of selectivity and careful decision making. Thus, the standard of

farming was considered as of the intermediate stage in development i.e., in between traditional and modern agriculture. The farming was commercial oriented as factor and product of market was relatively well developed.

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