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Economic growth and income inequality-a case study in different villages of District Mohali

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Abstract
Agriculture economics means the evaluation of input output cost and the net returns obtained annually or seasonally. Agriculture economics and statistical mapping of the resources to study the efficiency of the resources comes under agriculture economics. Agriculture plays an important role in India's economy. Agriculture is the backbone of the Indian economy. According to the population census held in 2011 depicted that the 54.6% of the total population is engaged inside the agriculture activities.
Overall the role of agriculture in GDP of India is 17.8%. Various schemes have been launched by the GOI to promote the farmers through awareness camps, FPO's where farmer and producer engage to increase the income of the farmer. Agriculture is the backbone of the Indian economy.
So, in order to contribute toward the farmer up liftment a study made in the five villages of district Mohali they are: Battta, Bibipur, Fatehpur Thehri, Rora, Shakrullapur. The following paper on the basis of socio-profile of the farmers their agronomic practices the economics is prepared where net returns are observed in relation to input and gross returns according to different villages.
After the analysis we found that maximum number of the farmers lying under the category of less than 1 lakh the percentage of the farmers in this category is 41% and 31% of the farmers obtained the net profit in between 1-2 lakhs, about 17% of the farmers were receiving in between 2-3lakhs, and 11% of the farmers were in the category of 3-4 lakhs per hectare.
So, from this we can conclude that on an average a farmer can receive the average net profit of Rs. 1,49,400/ha. From such studies a farmer can analyse his overall input cost annually and the gross return from their differences he can estimate his net profit so it is a very convenient method to analyse farmer income efficiently.

Keywords: Inflation, gross national product, sustainable agriculture, etc.

Introduction
Agriculture is a process of energy conversion, the conversion of solar energy into food, feed and fiber through photosynthesis [1]. Energy use in agricultural production has become more intensive due to the use of fossil fuel, chemical fertilizers, pesticides, machinery and electricity to provide substantial increases in food production. However, more intensive energy use has brought some important human health and environment problems so efficient use of inputs has become important in terms of sustainable agricultural production [2].
Energy requirements in agriculture are divided into two groups being direct and indirect. Direct energy is required to perform various tasks related to crop production processes such as land preparation, irrigation, intercultural, threshing, harvesting and transportation of agricultural inputs and farm produce [3]. It is seen that direct energy is directly used at farms and in the fields. Indirect energy, on the other hand, consists of the energy used in the manufacture, packaging and transport of fertilizer, pesticide, seed and farm machinery [4].
Energy use patterns and contribution of energy inputs vary depending on farming systems, crop season and farming conditions. Calculating energy inputs of agricultural production is more difficult than in the industry sector due to the high number of factors affecting the production [5].
Economics focuses on studying causes of scarcity, ensuring acquisition, allocation and utilization of scarce resources, and determining how to maximize production efficiency. The rest of the process analyses proper distribution to and consumption of finished goods by the people.
A country's economic activity revolves around the production, trade, and consumption of products and services. Labour, land, machinery, and capital are crucial for production. They all work together to enhance productivity. Furthermore, the efficient use of resources and raw materials results in a higher standard of living.

Scarcity occurs when demand for products and services exceeds available resources, making it difficult for everyone to meet the needs of the people.

A functioning market involves the decision-making by buyers and sellers, including individuals, families, entities, and societies, to keep moving. These decisions depend on market changes, behavior and performance of an economy and policies made by the hierarchical authorities. Several factors, including laws, policies, culture, history, and geography, govern an economy [6].

What is Economic Growth?

Economic growth is an increase in the production of economic goods and services in one period of time compared with a previous period. It can be measured in nominal or real (adjusted to remove inflation) terms. Traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used.

Economic growth is an increase in the production of goods and services in an economy. Increases in capital goods, labor force, technology and human capital can all contribute to economic growth [10].

Material and Method

The study was conducted in the five villages of district Mohali Punjab where the farmers were personally interviewed and had an questionnaire session in which they were asked about their socio-profile, agricultural practices along with livestock management and other farm or own activities they were following.

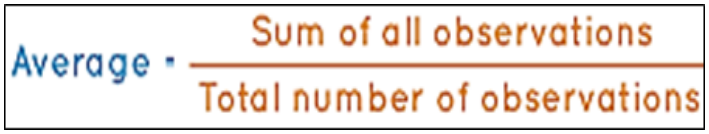
The five villages in which the survey was conducted are: Batta, Bibipur, Fatehpur Thehri, Rora, Shakrullapur. The no. of respondents from all the villages were 125 and the distribution from each village is as follows:

Batta: 25.
Bibipur: 23.
Fatehpur Thehri: 26.
Rora: 23.
Shakrullapur: 28.

Further they were categorised on the basis of input cost, gross returns and net returns.

The formulas and methods used to determine the various calculations are as follows:

1. **Average cost formula:** Ration of total cost of production/number of units produced.
2. **Mean formula:** Sum of the terms/number of terms or observations.
3. **Average input cost:** Total cost/number of goods or entity produced.
4. **Net profit formula:** Gross returns-total input cost.



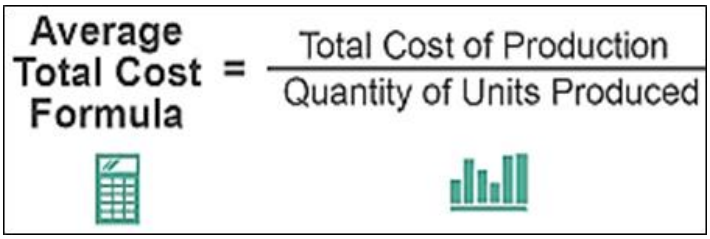


Fig 1: Picture showing the questionnaire session with the farmers

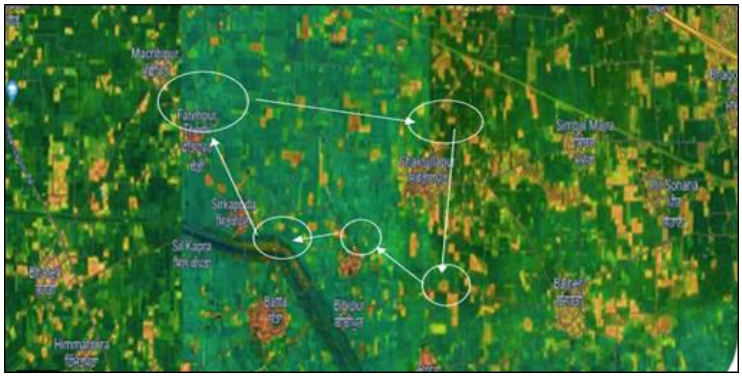


Fig 2: Represents all the five villages in the map

Result and discussion

Total input cost

On the basis of the collected data the farmers are categorised into three on the basis of input cost applied by the farmers according to their land in which are less than one lakh, in between 1-2 lakh, and the third category lies in between 2-3 lakh. The table shows the classification of the farmers on the basis of input cost and no. of farmers inside each category.

Most of the farmer lies in the first category as maximum no. of farmers are lying in the marginal and small farmer category so their land holding is between1-2 ha. Or below it. According to the study about 57% of the farmer are investing cost under one lakh, 28% farmers lies in the 1-2 lakhs category they invest their input cost about 1,50,000 approx. while the no. of farmers in between 2-3 lakh is about 15% of the farmers.

The average input cost of the farmers is nearly the same from all the villages with only minor changes in the input cost.

Fig 3: Intraction with individual farmer from Fatehpur Thehri village

Table 1: Annual input cost

Annual input cost	Batta (25)	Bibipur (23)	Fatehpur thehri (26)	Rora n= (23)	Shakrullapur (n= 28)	Overall (125)
Less than 1 lakh	16	15	14	12	14	71 (57%)
1-2 lakhs	6	5	8	7	9	35 (28%)
2-3 lakhs	3	3	4	4	5	19 (15%)
Average input cost	98, 000	97, 000	1, 11, 000	1, 15, 000	1, 17, 000	Rs. 1, 07, 600

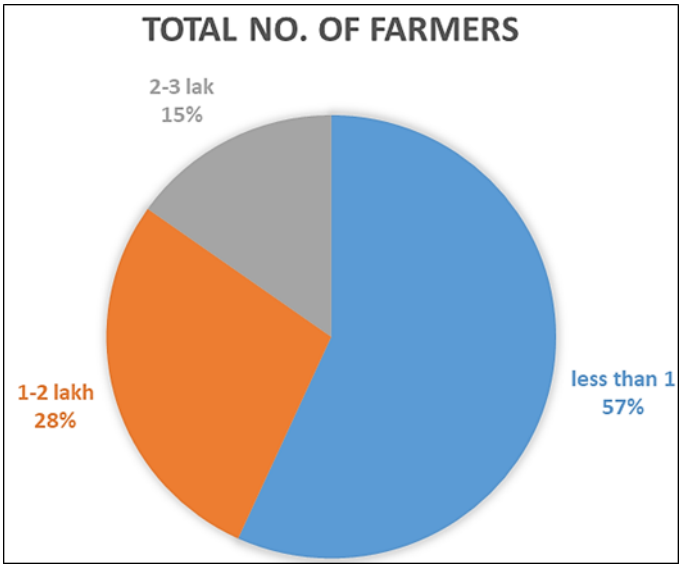


Fig 4: Distribution of farmers according to their input cost

Gross return

After the application of the farm inputs the total output in terms of yield or production determine the gross return it includes both straw and grain in case of wheat and paddy. Straw and grain production both plays a important role in the economics of the farmer so on the basis of the annual gross return.

Below a table is represented on the basis of gross return and farmers are categorised accordingly. There is 60% of the farmers lies in the first category in which the farmer recieves the annual gross return less than two lakhs.28% of the farmers lies in the category where the annual gross return is between 2-4 lakhs, and only 16% of the farmers receive the gross return in between 4-6 lakhs.

Table 2: Average gross return of the villages

Annual gross return	Batta (25)	Bibipur (23)	Fatehpur thehri (26)	Rora (23)	Shakrullapur (28)	Total (25)
Less than 2 lakhs	15	16	16	13	15	75(60%)
2-4 lakhs	7	4	7	7	10	35(28%)
4-6 lakhs	4	3	3	3	3	16(12%)
Average gross return	Rs. 2,54,000	Rs. 2,21,000	Rs. 2,30,000	Rs. 2,41,000	Rs. 2,41,000	Rs. 2,37,400

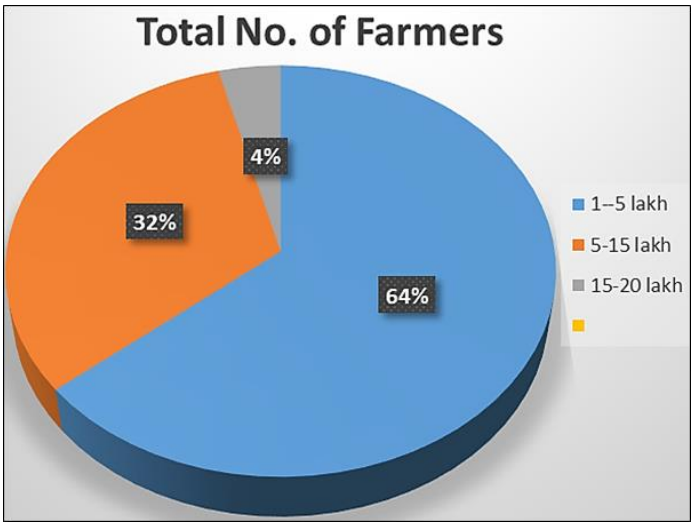


Fig 5: Percent of farmers depicting gross return

Net profit

The net economic returns of the crops were calculated as gross returns minus the cost of all variable inputs, which include the cost of labour, machinery, irrigation, seed, fertilizer and chemical (Khan *et al*., 2009) [9]. The cost of family labour was counted equal to the cost of permanently hired labour.

The net profit or net return is the difference between the annual gross return and net input cost. So, after the analysis of the gross return and input cost we are able to estimate the net profit of the farmers obtained at the end of the year. A table on the basis of net profit gained annually by the farmers is shown.

Here the farmers are categorised into four categories where

the maximum no. farmers comes under the first category where they receive net return less than 1 lakh and there is such 41% farmers. 31% of the farmers lies between 1-2 lakh of net return and 17% of the farmers were there who recieves the net retun in between 2-3 lakhs and the minimum no, of the farmers are lying in the category of the 3-4 lakhs.

Table 3: Net profit

Net profit	Batta (25)	Bibipur (23)	Fatehpur their (26)	Rora (23)	Shakrulla pur (28)	Total (125)
Less than 1 lakh	12	9	11	14	12	51(41%)
1-2 lakhs	7	6	9	5	9	38(31%)
2-3 lakhs	4	6	4	3	4	22(17%)
3-4 lakhs	2	2	2	1	3	14(11%)
Average net profit	Rs. 1,34,000	Rs. 1,19,000	Rs. 1,38,000	Rs. 1,10,000	Rs. 1,42,000	Rs. 1,49,400

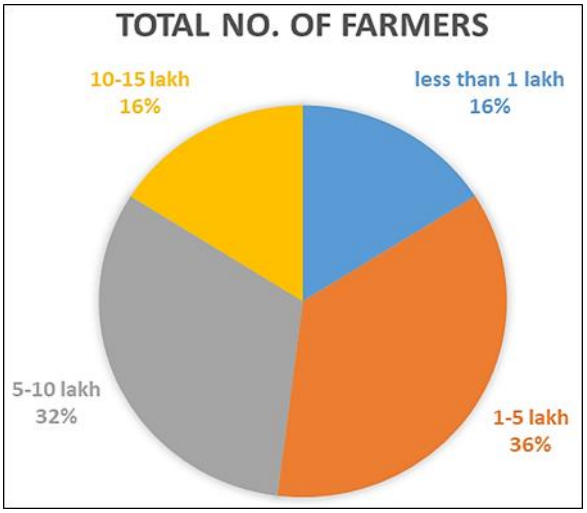


Fig 6: Pie chart representing net profit of farmers

Discussion

Each agricultural input can be classified as direct and indirect energy source. Direct energy sources of the farms were human power, tractor and/or other implement/machinery used for the particular operation and electric/diesel motor to run water pump, while indirect energy sources included seed of high yielding varieties, fertilizer and chemicals used in production process. (Ozkan *et al*., 2004; Canakci *et al*., 2005; Hatirli *et al*., 2006) [7].

The output of tractor, self-propelled machines and diesel engine was calculated by the product of fuel consumed by tractor, machines or diesel engine, time consumed in operation. (Khan and Singh, 1997) [7].

The materials like seed, chemicals fertilizer, and other chemicals used in crop production were transformed to energy equivalent by multiplying the quantity of the material used in the plots with the energy value of each material (Khan and Singh, 1996; Khan and Singh, 1997) [8].

Conclusion

The net returns obtained after the deduction of the input cost results from gross returns is the actual benefit farmers are receiving. So, there is an inverse relation if the input cost is reduced then the net returns will also increase. There are two factors responsible for the production one is the amount of applied inputs and the other is environmental factors.

We can say the output is completely dependent on inputs applied: that is seed quality, tillage, irrigation, fertilisers, other chemical sprays to control the diseases and the harvesting. If all these intercultural practices are carried with advanced technologies the cost of production can be reduced but it may not result into the sustainable agriculture.

As the result obtained here shows that by calculating input and gross return cost a farmer can estimate his net return by simply their differences. As the average net profit so obtained depicts that the 41% of the farmers recieves net profit of les than 1 lakh 31% of the farmers are in between 1-2 lakhs, 17% of the farmers are between 2-3 lakhs and in between 3-4 lakhs profit is obtained by only 11% of the farmers.

So, to attain sustainability goals inside agriculture one has to use the resources optimally and enhance the production maximum to fulfil the growing demands of the increasing population. And this can be achieved by the annaul economic ananlysis by each and every farmer. Due to which the constraints can be identified to further maximise the profits of the farmers.

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