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Is the Tobacco Production Profitable in District Swabi: An Empirical Analysis

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ABSTRACT

Tobacco is the country's most valuable cash crop, contributing for a large portion of the country's agricultural output. This study intends to observe to evaluate the cost and benefit of the tobacco production in Swabi district, KP, Pakistan. During 2018-19 academic year, data was collected from three villages in Sikandari, Dagi, and Lahor using a random sampling technique. The total number of samples for analysis was 100. To estimate tobacco production, cost, and profitability, the Cobb-Douglas production function was employed. The total average Cost of per acre tobacco production was Rs. 151370while total revenue per acre was Rs. 457600. It was found that the average marketing costs were Rs. 82360 per acre, fertilizer costs were Rs. 12000 per acre, nursery costs were Rs. 4110 per acre, land rent was Rs. 37000 per acre, land preparation was Rs. 4000 per acre, irrigation costs were Rs. 3200 per acre and cultural costs were Rs. 6000 per acre. In the period of analysis, the average net income (net profit) from tobacco was Rs. 306230 per acre and the gross income was Rs. 343230 per acre. It is recommended that if the farmers use quality seeds, the latest technology, usage of chemical fertilizers, irrigation, insecticides, and weeding the tobacco profitability will be increased and a handsome contribution in our GDP. It is also be noted that in the research area, inputs such as marketing costs and land rent are quite expensive; therefore, the government may compensate farmers by lowering the prices of inputs such as fuel wood, rent, fertiliser, pesticides, and so on.

Keywords: Tobacco Production, Random Sampling, Cobb-Douglas Production Function, Net Revenue, Cost, Gross Income.

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Introduction

Tobacco is cultivated as a marketable commodity all over the world, with developing countries producing 90% of the world's tobacco. Tobacco crop is grown in Pakistan, Zimbabwe India, and Malawi which are all low-income food-deficit regions (zafeiridou *et al*. 2018). In 2018 China is the major producer of tobacco in the world with 2.24 million tonnes produced while the other main tobacco producer countries are Pakistan, USA, India and Brazil. Pakistan emerged as the top-ten raw producer with the 1.75 percent of the world annual tobacco yield (FAOSTAT, 2020).

The agriculture sector is dominant mostly in developing countries. In Pakistan have a favourable climatic condition, due to climatic conditions, Pakistan is growing different varieties of tropical crops like tobacco, oilseeds, wheat, rice, sugarcane, etc. Pakistan's agriculture is based on big and small farmers. Most farmers are using old techniques for cultivation and growing tobacco, sugarcane, maize, wheat, vegetables, etc. In Pakistan, certain areas are specified for a specific type of agriculture product, due to environmental variation, climatic conditions, water availability, physical condition, and other natural resources.

At the time of independence Pakistan having to tobacco cultivation but later on government started trail and in the first phase grown tobacco crop at twenty acres but with the pasasage of time its production increased. Before 1948 a country not a produced a quality tobacco product and the government of Pakistan imported these products. In 1948, Pakistan being imported the tobacco product but later on in 1969 became self-sufficent (PTC, 2017).

The study region is linked to the tobacco crop, which is an economically important crop in this area, and tobacco producers comprise the majority of the farmers. Wheat, maize, barley, sugarcane, sugar beet, oilseed, vegetables, and other crops are also grown in the area. Tobacco is a major cash crop in the country, accounting for a large portion of the country's agricultural output. The major commercial commodity is Virginia, which is primarily produced in Pakistan's KP province (Nishtar & Lateef, 2006). Reportedly, " Tobacco" crop labor demanding, round about 80 thousand people are engaged in its cultivation and 50 thousand in different tobacco industries and around one million works in its trading (Faraz, 2003). China is the world's leading tobacco producer, while Pakistan is the 9th/10th largest producer. Other large producers are Brazil, Zimbabwe, India, Indonesia, and Turkey. In Pakistan, tobacco grows 0.25% of the total irrigated land, The tobacco sector employs 350,000 people directly or indirectly, generates Rs. 300 billion in annual revenue, and provides a living for 1.2 million people. Tobacco is also a major source of income to the Government in form of tax income i.e. generate around Rs.89 billion tax from tobacco (Dawn, 2019). The government has earned Rs.362.37 as foreign exchange in the year 2001-02 (Qamar *et al.*, 2006). Due to rich soil and more conducive climatic conditions, Khyber Pakhtunkhwa produces quality tobacco such as Flue curved Virginia, which is recommended for cigarettes, snuff, smoking, cigar, and hookah. About 73% of all types of tobacco are produced in KPK, while Punjab produces 20%, Baluchistan and Sindh 5 %. District Swabi is famous for Flue curved Virginia tobacco production due to suitable environmental conditions. According to Saleem and Iqbal (2020), tobacco farming has accounted for less than 0.25% of total agricultural land in the nation over the last two decades. Shahzad et al. (2018) reported that KPK has gained global praise for producing the most tobacco per hectare (3354 kg per hectare) in comparison to the global average (FAO, 2014).

The tobacco crop is classified into varies type. The system of classification is extremely complex and is based on the use of tobacco, the method of curing and the soil as well as the climatic condition in which it is grown. Mostly the production of a specific type is localized to a particular geographical region. For international and commercial purpose there are varies wide classes of tobacco, these are given below. The climatic and agro condition are favorable for all kind of tobacco, which is discussed in table 1. In Pakistan the type of tobacco where it is grown & consumption are mentioned in the below table.

Table 1: *Different varities of tobacco grown in Pakistan*

S. No	Types	Popular name	Area where grown	Usage
1.	Flue cured	Virginia	Khyber pukhtoon khwa(K.P.K),panjab	cigarette
2.	Dark sun cured	Naswari	Khyber pukhtoon khwa(K.P.K),panjab	Snuff
3.	Light sun cured	Hookah	Panjab, Sindh	Hookah
4.	Semi oriental.	White patta	Khyber pukhtoon	Chewing

			khwa(K.P.K)	hookah
5.	Light air cured	Burley	Khyber pukhtoon	Cigarette
			khwa(K.P.K), Swat	
6.	Dark air cured	White Virginia	Panjab	Cigarette

Source: Pakistan tobacco board Peshawar

Swabi is very popular for tobacco production and known as "the house of tobacco".District Swabi is the biggest tobacco market in Asia, produces about 55% of tobacco of the country's economy. Swabi is the top producer of tobacco in the country. According to the official agricultural Statistics (2017), the total area under tobacco cultivation was reported in 2016-17 were 17430 hectares while production was 42656 tons. The productivity of district Charsadda, Mardan, Bunir, Mansehra was 10510, 10682, 5090, 3680 tons respectively. Area-wise district Swabi is leading while quality-wise district Mansehra is leading. The major tobacco varieties like K399, Spiad 28, CS4302, Spaid 70 and Spaid 2310 are well suited for cultivation in irrigated and plain areas of the Swabi. These varieties are recommended by the agricultural research station Swabi. In the district of Swabi, tobacco is a very significant and necessary cash crop. District Swabi is famous for tobacco products due to environmental and agronomic conditions. In the production of tobacco district, Swabi is the leading one and also produces high-quality tobacco. Swabi district in Khyber Pakhtunkhwa produces 50% of the country's tobacco. Most of the farmers are engaged in tobacco production due to this a handsome revenue is generated and the needs of the farmers are fulfilled easily.

The current research focuses on the economics of tobacco cultivation in the Swabi district. Tobacco has been compared in terms of cost and revenue. Using Benefit Cost Retio (BCR) and the Gross Margin (GM) approach, this study looked at the factors that affect tobacco productivity. This research looked at how profitable tobacco is in comparison to other crops. The key factors for the low tobacco yield in the research area were also emphasised in this study. This research will also be useful in policymaking for tobacco growers in Pakistan, particularly in the district of Swabi.

The key motivation of the present study were to(i) Determine the profitability, total cost, and per acre yield of tobacco production. (ii) Determine the factors affecting tobacco production. (iii) Highlight the main causes of low productivity.

Literature Review

The appropriate literature review is an integral part of the research study. The main purpose of the literature review is to provide a necessary background about the research problem. A variety of studies have been conducted in Pakistan as well as abroad, however, only a few of these are used in the study's literature evaluation.

Sajid et al., (2022) used questionnaire data and a sample of 140 tobacco farmers to investigate the profitability of tobacco production, input demand, and output supply. For the estimation using the profit function method. The data show that tobacco production is not very profitable at the farm level, and farmers are vulnerable to market price swings in input and output. Tobacco prices are a major indicator of output supply and demand for inputs in the research region, and farmers' responses to increased tobacco prices are positive yet inelastic.

Awan (2011) evaluated a research study to explore the effects of tobacco on health. they investigated that every year the use of tobacco products creates fatal diseases such as cancer, cardiopulmonary diseases, teeth decay, bad breath, and so many other diseases. As a result, they came to the conclusion that quitting smoking is the most effective way to avoid the oral health problems associated with tobacco use.

Saleem and Iqbal (2020) did research workto explore the impact of cigarette consumption in Pakistan. For the estimation using data of the fiscal year 2010 to 2011 to estimate the income, employment multiplier and output. The evidence shows that ciggerette industry is the large scale industry and generating

employment 1.1 perecent & 0.3% respectively. An ddition that decrease in the consumption of tobacco will leads to losses it the initial stage to the economy, however, the rearrangement of tobacco expenses will result in a significant contribution or increase in employment, income, and output.

Dwivedi (2014) studied the implications of the tobacco industry in India. The tobacco industry in India is of large commercial importance and the main foundation for the people employment. In 2012 the total value production was US $ 1.6 trillion. It is a labor-intensive crop and engaged sixty lakh people in farming, grading, curing, processing, marketing, manufacturing, packing, distribution, etc.

Muchuma (2017) evaluated that tobacco in Kenya is grown by about twenty thousand farmers on over fifteen thousand hectares of land. The annual estimated tobacco production was sixteen thousand tons per year. Data was collected through a questionnaire from 341 selected tobacco farmers. They were used for the analysis of Karl person's and re-test. The result shows that there was a strong positive association between the variables.

Ntibiyoboka (2014) found that tobacco contributes significantly to Tanzania's GDP, employment, and industrial raw materials. The analysis was based on a drop in tobacco income in the Mpanda district between 2010 and 2012. Low profit could increase poverty amongst smallholder producers in the research region, according to the study. Using a multivariate regression model to determine profitability and marketing. According to the findings, tobacco contributes the most to the country's GDP after paddy.

Ali *et al.* (2015) looked into the tobacco industry's economic importance, particularly in Pakistan's economy. Tobacco is Pakistan's most valuable cash crop. The tobacco industry is one of the country's most important sectors, paying its growers and contributing significantly to government taxes and overseas remittances. The tobacco industry employs around 11 million people, according to estimates. Pakistan's tobacco crop yield is higher per hectare than that of the United States and other affluent countries.

Masvongo *et al.* (2013) Agriculture is Zimbabwe's most important economic sector.Tobacco is becoming a more important income crop for small farmers. Data from a cross-sectional survey was obtained in 2010 and 2011. Data was analysed using descriptive statistics, gross margin analysis, break-even analysis, and the ordinary least square (OLS) technique. The study's findings suggest that tobacco farming provides smallholder farmers with a higher income.

Saddozai et al. (2015) investigated the stochastic frontier of tobacco production in the Pakistani district of Mardan. Primary data was collected during 2014-15 from three villages of the district Mardan. Multi stages sampling techniques were used and also obtained sample sizes of 121 tobacco growers. The result showed that all variables have positive relations with tobacco production except fertilizer which shows negative relation with tobacco production.

Saqib *et al.*, (2014) studied the burden of the tobacco crop in Pakistan. Data was collected from 9856 people through multistage stratified cluster sampling techniques. Overall, 19.1 percent of adults use tobacco products, with 12.4 percent using smoked tobacco and 7.7% using smokeless tobacco. In public locations, 86 percent of 19.1% of tobacco users were exposed to secondhand tobacco smoke. As a result, cigarette use in public places should be prohibited.

Hassan et al. (2015) calculated the cost and profit of tobacco production in Bangladesh's Rangpur district. The random sampling method was used to collect data from sixty-five tobacco growers. The study shows that most of the farmers used different varieties of Virginia tobacco and sold the produced amount to generate income. The finding of the study declared that Government should formulate micro and macro-level policies for the enhancement of tobacco products in the nation.

Ullah, *et al.*, (2015) evaluated a research study to analyze the economic profitability of tobacco production in district Swabi, KP, Pakistan. A well-designed questionnaire was used to obtain primary data and personal interview method during 2013. Sixty-five tobacco growers were selected from five villages

through purposive sampling techniques. To estimate the profitability of tobacco production, gross margin and net profit approaches were applied. The average total cost per acre was Rs. 348637.18, with gross income of Rs. 430348.54 and net profit of Rs. 81711.36. They suggested that the government give new tobacco seed kinds in order to increase the earnings per acre from the tobacco crop.

According to a World Health Organization report (2020). That the use of tobacco causes epidemic diseases and half of its users are killed. Every year more than eight million people are dying due to the use of tobacco smoking while 1.2 million non-smoker people are affected badly. In the World round, about 1.3 billion tobacco users belong to less developing countries.

Research Methodology

Research Site

The present study was carried out in district Swabi. This district is very popular for the production of tobacco in Pakistan. It is also called "the house of tobacco". The surrounding area of the 3 key villages of Sikandari, Dagi, and Lahor, which are the district's key tobacco-producing areas, was chosen for the survey. The majority of the farmers employed high-yielding tobacco seed varieties and sold the product on the market.

Following are the main criteria at the back of the selection of these villages:

- Because of the favourable tobacco-growing environment.
- The investigator is familiar with the communities' language, beliefs, way of life, and socioeconomic aspects.
- This type of research is conducted for the first time in the selected area.

Population and Sample

All the growers of tobacco crops in District Swabi are the population for this research. In three phases, a multi-stage sampling method was applied to select the required sample size of 100 growers. Three villages, Dagi, Maneri, and Lahor, were purposefully chosen in the initial round because they had farmers farming approved seed varieties. In stage 2, the growers in each village were recognised as either certified or traditional seed cultivators, resulting in 2 strata within every village. In the third step, select the desired sample size of 100 tobacco growers (Cochran, 1963).

Varaible Description

The foremost objective of the existing study is to find out the per acre cost of the tobacco production and how much revenue generated from the tobacco production in per acre and addition to explore the main factors much affecting the tobacco profitability. Total output is our dependent variable while land preparation cost, Fertilizer (DAP, NPK, Urea) cost, Weeding/insecticides cost, Irrigation and processing cost are the independent variables.

Nature of the Data

The study used both primary and secondary sources of information. Tobacco producers were individually interviewed and primary data was acquired by questionnaire. However the secondary data has been taken fron the Bureau of Statistics and Economic Survey of Pakistan veries issues.

Benefit-Cost Ratio (BCR)

To compare the profitability of tobacco output in the research area, the BCR was utilised. Westergard (2006) and Hassan., both employed these strategies (2015). For Using the appropriate interest rate, the expenses and benefits were discounted (13 percent). The following formula can be used to determine BCR:

$$\text{Benefit Cost Ratio} = \sum_{t=1}^{n=1} \frac{\frac{Bt}{(1+r)t}}{\frac{Ct}{(1+r)t}}$$

GM (Gross Margin) Analysis

The entire variable gross margin is gained when we Subtract total variable cost from total revenue.

$$GM = TR - TVC$$

Net Profit

Net profit we can estimate by subtracting the total cost from total revenue

Net Profit = Total Revenue-Total Cost

Analytical Approach

The data was analysed with the help of the following instruments.

- Frequencies and percentages to examine tobacco growers' demographic and socioeconomic features.
- To analyse the profitability of tobacco crop growers, BCR, net profit, and gross margin were employed.
- To analyse the determinants of tobacco production, regression analysis (log-linear Cobb-Douglas production) was used.
- The data was analysed using SPSS 16.0 and Microsoft Office Excel 2007.

Model of the Study

For easy estimation and interpretation of the result is a main advantage of the Cobb Douglas production function. For ease of estimation, the Cobb Douglas production function was changed into a logarithmic version. Hassan et al., (2015), Rahman et al. (2011), Kaboja and Temu (2013), and Khattak and A. Hussain (2013) have all employed the log-log Cobb-Douglas production function (2006).

$$\text{Ln } Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \varepsilon_i$$

Where

Ln= natural logarithm

Y = total tobacco output

β_0= intercept term or constant value

X1= land preparation cost

X2 = Fertilizer (DAP, NPK, Urea) cost

X3 = Weeding/insecticides cost

X4 = Irrigation

X5 = processing cost

ε_i = Error term

Results and Discussion

Table (2) indicates the major components of TC of tobacco production and the land rent cost which is fixed cost (FC) and the variable cost (VC) including nursery cost, fertilizers, pesticides, irrigation, cultural practices, and marketing cost. The total nursery cost including land preparation, seed, fertilizer, weeding,

pesticides, and frost protection was Rs. 4110 per acre with a share of 2.71% in total variable cost. Land rent was Rs. 37000 per acre with a share in total cost was 24.44%, land preparation cost was Rs. 4000 per acre with share 2.64% in total cost, fertilizers cost including DAP, NPK was Rs. 12000 per acre with share 7.92% in total cost, cultural practices cost including hoeing, weeding, ridges, bullocks plough was Rs. 6000 per acre with share 3.96% in total cost, pesticides cost was Rs. 2700 per acre with a share in total cost was 1.78%, irrigation cost was Rs. 3200 per acre with share 2.11% in total cost and marketing cost including leaves picking, transport to the furnace, stringing, loading, fuelwood cost, fireman cost, curer cost, grading cost, binding cost, and transportation cost was 82360 per acre with a share in the total cost of tobacco production was 54.40%. So the total average cost of tobacco production was Rs. 151370.

Table 2: *Per acre cost of tobacco production in distract Swabi*

Variable cost	**Units**	**Quantity**	**Rates(Rs)**	**Total cost**	**% share in TC**
Land preparation	M.Ds	3	500	1500	0.99
Seed	Kgs	_	_	1000	0.66
Fertilizer	Kgs	3	80	240	0.15
Weeding	M.Ds	2	500	1000	0.66
Pesticides	Rs.	_	_	270	0.17
Frost protection	Rs.	_	_	100	0.06
Nursery cost	Rs.	_	_	**4110**	**2.71**
Land rent	Rs.	_	_	**37000**	**24.44**
Land preparation	**Tractor Hrs**	**4**	**1000**	**4000**	**2.64**
DAP	Bags	1	4000	4000	2.64
NPK	Bags	2	3500	7000	4.62
Application cost	M.Ds	2	500	1000	0.66
Fertilizer (total)	**Rs.**			**12000**	**7.92**
Hoeing/weeding	M.Ds	8	500	4000	2.64
Ridges	Acre	1	1000	1000	0.66
Bullocks plough	Acre	1	1000	1000	0.66
Cultural practices cost	**Rs.**	**_**	**_**	**6000**	**3.96**
Pesticides cost	Rs.	3	400	1200	0.79
Application cost	M.Ds	3	500	1500	0.99
Pesticides cost	**Rs**	-	-	**2700**	**1.78**
Water charges	Rs.	_	_	1200	0.79
Labor cost	M.Ds	4	500	2000	1.32
Irrigation cost	**Rs.**	**_**	**_**	**3200**	**2.11**
Leaves picking	Rs.	4	1800	7200	4.75
Transport to furnace	Rs.	4	500	2000	1.32
Stringing	Rs.	4	1000	4000	2.64
Loading	Rs.	4	500	2000	1.32
Fuel wood cost	Mn	80	650	52000	34.35
Fireman cost	Rs.	_	_	4000	2.64
Curer cost	Rs.	_	_	6000	3.96
Grading cost	M.Ds	4	500	2000	1.32
Binding cost	M.Ds	2	500	1000	0.66
Transportation cost	Bale	36	60	2160	1.42
Total marketing cost	**Rs.**	**_**	**_**	**82360**	54.40
TC				**151370**	**100.00**

Source: Self Survey

The total revenue (TR) of tobacco output per acre of land is shown in Table 3. For tobacco producers, the crop is among the most significant income sources. The average revenue generated from tobacco was Rs. 457600 per acre. Which includes bi-product Rs. 4000 per acre with a share in total revenue is 0.87% and main product (bundles) Rs. 453600 per acre with a share in total revenue is 99.12%.

Table 3: *Revenue of tobacco production in District Swabi (Rs. Per acre)*

Revenue	Unit	Quantity	Rate(Rs)	Total Revenue	% share in TR
Bi product (stalk)	Rs.	_	_	4000	0.87
Main product (Bundles)	No of Bundle	36	12600	453600	99.12
TR	Rs.	_	_	457600	100.00

Source: Self Survey

Table (4) indicates the profitability of tobacco production. The average gross margin is Rs. 343230 per acre and Net profit Rs. 306230 per acre was obtained in the study area. The Benefit-Cost Ratio was 2.36. So it indicates that tobacco is more profitable than others crops.

Table 4: *NR (net profit), GM and BCRof tobacco production (per acre)*

Indicator	Tobacco production
Net profit	306230
Gross margin	343230
Benefit-Cost Ratio	2.36

Self-survey

Table (5) presents the estimated results of the econometrics model. The F statistic value indicates the model's overall significance or goodness of fit. The result reported that our calculated value is F (310.42) greater than tabulated value F (5, 94)2.25 (F calculated value > F tabulated value) at a 0.05 level of significance. It demonstrates the significance of the whole model. The model's R2 value is 0.94, indicating that the explanatory variable accounts for 94 percent of the variation in the dependent variable (yield). In the model all explanatory variables like land preparation, irrigation, weeding/insecticides, and processing cost (labor, Fuel) show positive relationship with the dependent variable (Yield) except fertilizers which show a negative relationship.

Table 5: *Estimation of Cob-Douglas production function*

Variable	Coefficient	Std. Error	t- Statistics	Significance
C	_	0.370	3.898	0.000
Land preparation	0.278	0.068	4.830	0.000
Fertilizer	-0.113	0.073	-1.974	0.051
Weeding/insecticides	0.316	0.078	4.855	0.000
Irrigation	0.217	0.073	4.197	0.000
Processing(Labour +fuel) cost	0.324	0.073	5.447	0.000
R Square = 0.943	F = 310.42			
Adj-R square =0.940	Prob (F-Stat) =0.000			

Source: SPSS results

Conclusion

In our economy, the agriculture sector is quite important, contributing significantly to the country's GDP. In Pakistan, agriculture contributes roughly 23.8 percent of the country's GDP. The purpose of this study

was to determine the cost and profitability of tobacco cultivation in the Swabi district. It is reported from the study that the major tobacco varieties grown in district Swabi are SPAID 28, SPAID 70, K399, SPAID 2310, CS3402, and White Patta but most of the people grow Spaid 28 and White patta because it is recommended by the research station Swabi. Per acre cost of tobacco, production was Rs. 151370 including land preparation, land rent, fertilizer, irrigation, insecticides, cultural practices, and marketing cost. Total revenue generated from per acre tobacco production was Rs. 457600 including main product (bundles) and bi-product (stalks). Results of the estimated model indicate that explanatory variables like land preparation, irrigation, weeding/insecticides, and processing cost show a positive relationship with dependent variables (yield) except fertilizers. Coeffcient of correlation is 0.94 percent, indicate that 94 percent of the change in independent variables (yield) is explained by explanatory variables. It means that model is a good fit.

It is recommended that if the farmers use quality seeds, the latest technology, usage of chemical fertilizers, irrigation, insecticides, and weeding the tobacco profitability will be increased and a handsome contribution in our GDP. It is alsopoint out that the inputs like marketing cost and land rent are quite expensive; therefore, the government may compensate farmers by lowering the prices of inputs such as fuel wood, rent, fertiliser, pesticides, and so on.

Policy Implication and Future Research

A comparison of the production cost and revenue, as well as enhanced tobacco varieties, was conducted in the current study. This is a guide for agriculture economists and farmers who want to plant the most profitable tobacco kinds. This will assist the government in formulating plans to enhance cultivated land in order to boost tobacco output in the Swabi district. Farmers should be encouraged to plant certified seeds and use them for commercial purposes rather than for existing farming by policymakers. The current study also serves as a blueprint for conducting similar studies in the remaining districts. The research can be expanded to include not just other crops, but also vegetables and fruits from other parts of Pakistan.

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Conflict of Interest

Authors have no conflict of interest.

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