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Research Article

INVESTIGATE THE ELIMINATION OF ENERGY SUBSIDIES ON RAPESEED PRODUCTION COSTS IN THE IZEH COUNTY

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ABSTRACT
The present study attempts to investigate the impact of reduce energy subsidies of machinery of the cost of rapeseed production in Izeh county. Estimated model shows the most cross-price elasticity is related to chemical fertilizer and the lowest related to energy. Also, according to research results, targeted subsidies lead to increased energy production costs and reduced profitability. This means that price policies are not adequate approach to optimize the use of these inputs and complementary and compensatory policies with price policies, should be applied for fore mentioned input prices of subsidies input. Due to the high energy consumption of machines in production, it is suggested along with the policy of reducing energy subsidies for the cost of machinery or at least prevent its increase some acts has been taken and in this regard, the introduction of modern machinery with high efficiency in energy use be emphasized.

INTRODUCTION
Energy subsidies in Iran with the aim of assisting domestic production have long been common. In a way that goes beyond economic growth, and without regard to productivity, production energy consumption is increasing. Energy consumption in the period 1967 to 2010, from 7.11 million tons of crude oil equivalent reached to 157.1 million tons of crude oil. Based on the energy balance sheet, in 2011, energy consumption was 2592.63 million barrels of oil equivalent, which 45.8 million barrels of it, used in agriculture. Also look at the growth rate of energy consumption, while in this period the average annual GDP growth of Iran was 4.22percent.
On the other hand, in Iran like many countries owning energy resources, its subsidy energy distribution caused the use of energy resources has led to high that this high use has traditionally been accompanied by low productivity (Bastanzad and Neely, 2005). However, the effort to reduce energy use and better use of this valuable resource as targeted subsidies is considered with the government that the agricultural sector is not an exception (Mousavi *et al.*, 2012). Today, the agricultural sector to meet the growing need for food for a growing world population and to provide enough and adequate food, to a large extents dependent on energy consumption. Within agricultural inputs, fertilizers, pesticides, excreting plant pests and improved seeds, machinery because of great importance in agricultural production and a very high share of its subsidies to all subsidize for production, are of special importance (Najafi and Farajzadeh, 2009).
Subsidizing this input, with current shape and in generality, for many years in our country is going, But existence of related problems referring to subsidizing inputs such as non- optimal consumption, environmental degradation, increasing the fiscal burden of the government, contrabandand direct connection of such payment with use of inputs, this process for achieve the goals of subsidizing policy is doubtful.
In addition, recent government policies aiming fortargeting production and consumption subsidize on the one hand andneed to prepare agriculture sector for accession to the WTO and the need to reform the subsidy policies on the other hand, clarify the double importance of studying the economic effects of subsidies on agricultural inputs of agricultural production for planners and policy makers.
In the same way, in the past couple of decades, several attempts to calculate and remove energy subsidies in different forms and provide practical and scientific solutions to optimize energy consumption in agricultural production have been done. Arya and Colleagues (2013) conducted a study to evaluate optimization of energy subsidies on agricultural products made in Iran. In this study, the increase in energy prices rise in the four scenarios of increasing prices to the border price level, release rate of the

dollar, 38 rise for percent of all energy, increase oil, gas and electricity prices to the level of world prices on agricultural prices wereinvestigated. The results showed, in the first scenario, the rising energy prices, agricultural activities in the production of wheat and other agricultural products are reduced. The latter, like the former, changes in production growth is negative. Overall, the results showed that in four scenarios, the growth of honey and bee products is positive and other products have negative growth. Kahaiandeh *et al.*, (2012), conducted a research aiming to remove fuel subsidies in the agricultural sector in Nigeria.In this study, to evaluate the positive relationship between the removal of fuel subsidies and agricultural prices, Spearman test was used. The results show that the removal of fuel subsidies in addition to increasing the appropriation of budget of agricultural sector leads to increase agricultural production. The obtained results showed the removal of fuel subsidy has a negative effect on agricultural production costs.

Bashirabady and Naqvi (2011) conducted a study to estimate the energy demand in agriculture sector of Iran. In this study, using the vector error correction model, gasolineand electricity demand functions in the agricultural sector for the period 1947-2007 and 1986-2007 wereestimated. The results show that the main factors affecting the demand for gasoline are cultivation area of crops and the price and the main factors affecting the demandfor electricity, added value of the sector, the air temperature and electricity prices.

Mohammadi and Faizabadi (2009), in a study, investigated the effect of electricity subsidies removal on production and costs economic sectors in Razavi Khorasan Province. For this purpose, three scenarios of sudden removal, and the gradual removal and elimination of a 5-year period were considered. The obtained resultsusing a general equilibrium model show with the removal of electricity subsidies the cost of production index and costs of economic sectors areincreased and increasing in electricity prices as a result of the removal of subsidy on electricity and constant prices of other carriers, the greatest production growth related to the electricity sector.

Rapeseed is one of the main products of the agricultural sector of Iran. Izeh County located in the North West of Khuzestan province and with over 400 hectares of rapeseed cultivation, includes approximately 65-70 % of the total production of the province. Thus, regarding the policy of liberalization of the energy input prices in the present study, it is have tried using the Translog Method the welfare effect of reducing energy subsidies on production costs of rapeseed is specified.

MATERIALS AND METHODS

Input demand function can be extracted from the profit or cost function. Translog cost function with respect to its flexibility is among the functional forms used in agricultural economics research that using it the input demand function can be achieved. Usually one of reasons of this function desirability is its cost function that no certain production function needs to be considered. In addition, the Translog cost function specification is a simple and easy emphasize of Twin Theory. This feature allows the use of other production functions beside of demand function derived from cost function (Mousavi *et al.*, 2012). The general form of Translog cost function can be drawn as follows:

$$\ln C = \alpha_0 + \sum_{i=1} \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1} \sum_{j=1} \gamma_{ij} \ln p_j \ln p_i + \alpha_y \ln Y + \frac{1}{2} y_{yy} (\ln Y)^{(2} + \sum_{i=1} y_{i\gamma} \ln p_i \ln Y \qquad (1\ )$$

In the above equation, c represents the total production cost, Y is production rate and $i, j = 1, \ldots\ldots\ldots\ldots, N$.

In this equation, ρ_1 is venom consumer prices, ρ_2 the price of water, ρ_3 machines energy consumption prices, ρ_4 the price of labor, ρ_5 price of phosphate fertilizers(Banda and verdogo,2007). According to the Peterson study, when this function compared to the prices of all variable inputs is homogeneous of degree one if the following condition is satisfied:

$$\sum_{j=1}^{N} \alpha_j = 1, and \sum_{j=1}^{N} \gamma_{jk} = 0 \forall k = 1, \ldots\ldots N \qquad (2)$$

In this relation, due to symmetry, $\gamma_{ij} = \gamma_{ji}$ it is possible to write:

$$\sum_{j=1}^{N} \gamma_{jk} = 0 \forall k = 1,.......N \qquad (3\ )$$

Now using the partial derivative of the cost function for the n-th input, it is possible to extract the derived demand in equation (2):

$$S_i = \alpha_i + \sum_{j=1}^{M} \beta_{ij} \ln \rho_j + \sum_{j=1}^{N} \rho_{ij} \ln X_j + \gamma_{it} t, \quad i = 1,..........M \qquad (4)$$

Where, S_i is the i- th input cost share, X_j the amount of j-th input, ρ_j j-th input price and t is the time (Singh and etal,2004). After estimation, the parameters and the substitution elasticity and cross- elasticity were calculated using the following equations :

$$A_{ii} = \left(\beta_{ii} + S_i^2 - S_i\right) / S_j^2 \; A_{ii} = \left(\beta_{ii} + S_j S_j\right) / S_j S_j \qquad (5\ )$$

Regarding the relationship between the price cross-elasticity of demand and elasticity of substitution of Allen we have:

$$E_{ji} = S_i A_{ji} \qquad E_{ij} = S_j A_{ij} \qquad (6\ )$$

So even if $A_{ij} = A_{ji}$, the cross elasticity of factor i and j not to be equal. Cross-elasticity demand (E_{ii}), a production factor, the relative change in the quantity demanded of that input as a result of relative changes in input prices. Cross- price elasticity of demand (E_{ij}), $-i \neq j$ the relative change in the quantity demanded from the input as a result of relative changes in the relative prices of input have measured.

In Iran for the energy carrier's prices of the past two decades, subsidies are paid and their current price level has remained constant, but the prices of other factors of production, capital and labor and consequently, the cost of production is not constant, thus the elasticity of energy demand with respect to price cannot be unchanged. Therefore the Translog model is a useful tool for analyzing energy market and helps to assess the response of agriculture sector to energy changes (Michael, 2006).

In this study, to estimate the effect of reducing energy subsidies of machineries on rapeseed production costs in Izeh County, 113 questionnaires using random sampling method and the Cochran formula were estimated as follows:

$$n = \frac{\dfrac{z^2 pq}{d^2}}{1 + \dfrac{1}{N}\left(\dfrac{z^2 pq}{d^2} - 1\right)} \qquad (7)$$

In this equation, *n* the number of samples required (200), N the number of community members (50), z values of the standard normal variable (1.96), p proportion of the population trait (0.5), Q the percentage of those without trait in the population (./5) and (d) the amount of allowable error (0.05) at the community.

RESULTS AND DISCUSSION

The present study was conducted to estimate the effect of energy price changes on machineries consumption and the cost of this inputs, first the input cost share functions for the five inputs of machinery, labor, water, pesticide and chemical fertilizer is estimated. Then, using the pre-mentioned functions listed in research method the cross and self-priceelasticityis calculated. The results of these calculations are reported in Table One.

Table 1: Price elasticity and cross elasticity

Inputs		**Labor**	**Water**	**Poison**	**Phosphor**	**Machine**
Machine	Coefficient	0.005	-0.007	-.003	-.01	-.02
	T	0.5	-1.11	-0.67	-0.51	-6.09
Phosphor	Coefficient	0.007	-0.0004	-0.002	-0.03	0.024
	T	0.32	-0.02	-0.2	-0.65	3.2
Poison	Coefficient	0.001	-0.0006	-0.004	0.0001	0.003
	T	1.27	-0.69	7.03	0.03	6.29
Water	Coefficient	0.01	-0.012	-0.0072	-0.017	0.026
	T	1.26	-4.22	-1.74	-1	9.8
Labor	Coefficient	-.00042	-0.0003	-0.0005	0.003	0.001
	T	-0.17	-0.2	0.45	0.58	1.96

Despite the lack of significance of some self- price calculated elasticity for inputs entered into the model, it is clear that the sign of the self-price elasticity for five inputs entered in model is negative and expectable. As the table shows, about all the variables of chemical fertilizer, pesticides and water, machinery and labor, self- price elasticity is less than one.Being lower than one of all strains showed non-elasticity of inputs to changes in its price.

This means that the demand for these inputs is not much affected by the prices. Failure to pay the real price of inputs by farmers for some inputs (such as water), government subsidies on certain inputs (such as chemical fertilizers and pesticides) perhaps one of the reasons of non-elasticity of this input relative to their prices. Among the inputs which entered into the model, the most precious traction with number 0.03 is related to fertilizer input. This means that this input among used inputs used in crop cultivation attracts the greatest influence from input price. In contrast, the lowest elf-price elasticity relates to labor input with the 0.004 number which shows the low influence of price on thisinput demand.In the table above, in addition to self-price elasticity it is possible to deal with cross elasticity. This elasticity reflects the change in demand for an input based on changes in the prices of other inputs. The obtained sign for this kind of stretch represents technically substitutive and complementarilyrelationship between inputs.

Based on the marks obtained it is possible to say that between machines input and three inputs poison, water and fertilizer, weak complementary relationship is established. This means that the increase in the prices of these inputs can partially reduce the demand for energy for machinery and desired crop production inputs. But the only substitutive relation is obtained between machinery input and labor input that it seems greatly logical. This means that lower prices for inputs may reduce the demand for machinery input and reduces demand for energy.

Currently, the average cost of machinery per hectare is equal to 2414545 RLS that means about 48% of the value of fuel and about 1173636 RLS. Considering the price of 2,500 Rials subsidized gasoline, the consumption per hectare to a liter of gasoline will be about 469.5. Now, the total cost of about 13790273 Rials per hectare is determines that share of the cost of machinery isabout 17.5 per cent and energy cost share is about 8.5 percent.

Considering the global price of $ 2.94 for a barrel of gasoline, almost the free gasoline price per liter would be about 19,400 Rials. So now the equivalent of 16,900 Rials per liter of gasoline subsidies is paid to the agricultural sector.

Therefore, removal of 50 percent of the price per liter of gasoline the subsidy will be about 10,950 Rials. Considering the price elasticity results for the Machinery equal to about 0.07,this price increase will reduce demand for machinery about 0.01, That the number is not significant. Therefore, taking into account the cost of fuel consumption per hectare is about 5141025 RLS which is about twice the cost of the machines in the current case and due to the constant being of other cost of machinery; other general machinery costs will be equal to 6381934 RLS which about 46 percent of total production costs will be included. In the initial state, the average per hectare gave farmers a profit of 40118818RLS. The price increases will reduce income (36151429 RLS) , which represents a decline of about 10 percent

Table 2: Subsides decrease effect on production, income and profit

Before remove subsides	After remove subsides	Machine subsidy decrease
17.5	46	Machine share of costs (%)
13790273	17757662	Cost in Hectare(Rial)
40118818	36151429	Net profit
-------	10	Profit decrease (%)

The results of the above table shows that the increase in energy prices will lead to reduced profits for farmers.

Conclusions and Recommendations

In the present study attempts to investigate the impact of reduce of machinery energy subsidies on the cost of production of rapeseed in Izeh County. Estimating model results showed that the highest price elasticity is related to the cost of chemical fertilizer and the least is related to labor input. The results of cross- elasticity indicate that the machines energy with inputs poison, chemical fertilizer and water in complementary way and with labor inputs in substitutive way can be used also according to research results, targeted subsidies lead to increased energy production costs and profitability reduce.

This means that price policies are notadequate strategies to optimize the use of these inputs and complementary and compensatory policies with price policies for the aforementioned input should be applied.

Due to the high energy consumption of machines in production, it is suggested that along with the policy of reducing energy subsidies for the cost of machinery or at least prevent its increase and In this regard, the introduction of modern machinery with high efficiency in energy use be emphasized.

Since input of chemical fertilizer with water has the highest self-price elasticity thus, the price of these inputs can cause greater changes in the extent of their use. Therefore, appropriate policies to reduce the use of these input is necessary. In the study subsidies optimization increases production costs for farmers. Therefore it is recommended to reduce the subsidy in a gradual way.

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