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FARM LABOUR HOMOGENEITY ALFALFA(*MEDICAGO SATIVA L.*) PRODUCTION IN DIYALA PROVINCE AS A CASE STUDY

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Abstract

There are several assumptions in the literature of agricultural production, especially with regard to the models of agricultural family, which is the homogeneity of agricultural work (labor), so the aim of the research to test the imposition of homogeneity between family and rented work to identify the nature of the relationship between the two variables through estimating the demand and substitution elasticities through production functions and transcendental costs. To achieve the aim of the research, data were collected from a random sample of Alfalfa farmers in Diyala province 30 farmers. The transcriptional logarithmic function was estimated using FRONT 4.1 using the Maximum Likelihood method. The cross elasticity was found to be 0.97. The cross elasticity between them was found to be 0.97. The function of transcendent costs and inputs functions (rented labor, family labor, expenses, fertilizers) were estimated using Evewis9 program and using SURE method. The elasticity of demand and replacement, elasticity of demand, showed that the demand for family and rented work is flexible. Allen-Wzawa's elasticity of 1.18 and Morishima's elasticity of 0.12 indicated the substitution relationship. The results also indicated that the technical and cost efficiency averaged 88.90% at the sample. The research concluded that there is no homogeneity between the rented work and the family work. The research recommended the use of caution when estimating models of farm work and the development of a policy that takes the development of jet farming in Diyala province.

Key words: Homogeneity, Translog Cost Function, Sur, Elasticity substitution.

Introduction

Farming is one of the most important productive economic resources necessary for the promotion of agricultural production. Therefore, achieving economic efficiency depends on the efficient use of the work variable that interacts with the rest of the production variables to determine the optimal resource combination within the production process. The economic theory dealt with the study of the work of the value theory as the basis of value is due to the volume of work done in the production of goods through the study of the theory of distribution of production elements of labor and capital and determine their prices, thus know the extent of those elements in the value of production and then estimate or derive demand functions on the human labor component (Shehata and Mahmud, 2006).

The demand for labor in economic theory is a derivative demand for goods and services and not a final demand (Douglas *et al*., 2008). Note that the demand for labor depends on the prices of other elements of production, the rise in wage mechanization increases the demand for human labor and technological change may lead to the replacement mechanic work instead of human labor, resulting in a decrease in demand for labor (Connel and Stanley, 1995). It is possible to increase production in smaller quantities from the labor resource, that the increase in the worker wage does not affect much the contribution of the worker wage to profit and that the response to the decline in demand is less when wages rise (Ali, 2017).

There are several assumptions in the agricultural production literature, especially with regard to the models of agricultural family is the homogeneity of agricultural work, this homogeneity between family and rented work is common in agricultural labor research this differs from ending on the farm size and the region nature, (Squire and Strauss in 1986). This assumed that family and rented work are ideal alternatives that can be added directly. This implies that each added unit of family and rented work has a similar effect on production, costs and profits. This assumption continued until 2008 When Blanc *et al*., Explained that both family and rented labor have different

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effects on agricultural production processes. There is a justifies for this that the family work on the know of the land nature, time management, agricultural operations and the relationship between the worker personnel compared to the worker.

The worker who does not have this knowledge and therefore the family work is more impact than the rented work but because of the welfare or job security or no incentives for family work or no partnership of children or women in the family work therefore the impact of rented work is more, so the farm work is no homogeneous, therefore refuse the idea one demand curve for farm work and we must look at the rented and family work separately (Key and Mcbride, 2007). The research deals with the rented work within the variable costs,but family work within fixed costs. The family work should not be seen as fixed cost considering that if the number of family members 8 members were previously working on the farm regardless of the size Production and therefore are paid costs whether they produce or not, but today these eight workers some of them are linked to off-farm jobs such as taxis, army, police or work within the traditional business, so he works inside the farm when the actual need is generated and therefore his work becomes related to the level of production. Therefore, the problem of research lies in the low efficiency of the work and its low productivity with the presence of surplus without contributing to the increase of GDP and this force labor surplus overloads on the producer and negatively affects production, costs and profits, especially that the harvest of the alfalfa (*Medicago Sativa L*.) perennial feed crop needs a lot of work, which it's remains in the ground for about 3-4 years, it's production estimated in Iraq about 907 thousand tons and constitutes 64.5% of the production of feed crops (Central Bureau of Statistics). Its productivity is still low in Iraq, although its productivity can be increased to 800-1000 kg/e. (Guo *et al*., 2007) the world cultivated area is estimated at about 40 million hectares, mostly concentrated in America and Argentina (Cash *et al*., 2009). World production (470) million ton (FAO, 2006). The aim of the research is to test the homogeneity between family and less work and to identify the nature of the relationship between the two elements by estimating the demand and substitute elasticity, economies of return to scale for the projects.

Materials and Methods

To achieve the aims of the research, the data was obtained from its field sources as (30) alfalfa farmers for 2017. The province, As for the method of analysis, the transcendental functions of:

• First: the transcendental logarithmic production function suggested by researcher Aigner and others (1977), characterized by the separation of residuals Ei into two parts with a covariance equal to zero, the first part represents inefficient Ui, second part represent other error Vi (Radam *et al*., 2008). In many applied studies, the random limit model of production takes the estimate of the translog formula (Ajibefun, 2002):

$$LnQ = B_0 + \Sigma_{j=1} B_j LnX_{ji} + \Sigma_j < \Sigma_{k=1} B_j K LnX_{ji} LnX_{ki} + Vi - Ui \quad ...1$$

• Second: The function of transcendental costs (Translog): many studies have tended to use the function of the transcendental costs of logartim, where they called it Translog, as it is used today extensively in standard studies to study the behavior of the producer, to verify the nature of the process of substitution between the elements of production and the nature of the functions Demand for production elements, an extension of taylor's logseries (Christensen, 1973). This model does not place restrictions on substitution elasticity as it is characterized by the fact that the elasticity of substitution changes depending on the change in production elements and allows for increased marginal production before the final decline of the function. because this function to allow multiple inputs and outputs and does not assume any restriction on the elasticity of substitution and size economies, it achieves the model of total cost decrease (Ali and others, 2018). The benefits of this function measure the price and cross demand elasticity and the substitution elasticity between the inputs, the function is characterized by its flexibility where it leads to variable values of elasticities unlike other classical functions. It is considered one of the best functions and the general version of the cost function is the general formula of the cost function:

$$TC = f(pi,y) \quad ...2$$

TC: total costs; pi: inputs prices; y: output

This function represents the relationship between the lowest cost and a certain production level under the given prices, according to economic theory, the cost function in equation 2 possesses the known characteristics of being a function related to the first and second partial derivatives

Table 1: The area and production of alfalfa in the province and its price rates.

Value	Item
360	Area dunums
842	Production tons
2338.9	Productivity kg/dunum
72.2	Average price 1,000 ID/ton

Source: From the work of the researcher relying on the Directorate of Agriculture Diyala.

as it is not decreasing and homogeneous of the first order in prices and can Rewritten in the log, (Weill, 2013)

$$\text{Ln } c = g(\ln pi, \ln y) + ei \quad ...3$$

Ln c: is the function of logarithmic costs such as the process of reducing the total cost to a minimum. The actual total cost cannot be less than the planned cost where the difference between them represents the limit of random disturbance.

$$Ei = vi + ui$$

Ui: is the inefficiency of cost as it reflects the deviation of the actual cost of the firm its optimal level as it follows a half-normal distribution.

Vi: represents random error and is subject to normal distribution.

By applying the Taylor series to function 3, we obtain the transcendental cost function as follows (Moss *et al.*, 2003).

$$\ln c = \alpha_0 + \sum_{i=1} \ln p \quad ...4$$

Results and Discussion

Before the quantitative analysis and estimation of functions, it is necessary to review some of the indicators of the production of alfalfa for the sample and diyala province to find out the reality of crop production:

The alfalfa of important forage crops, which are suitable for most of the soil and atmosphere of Diyala province, a crop that remains in the soil 3-4 years, gives a yield of green forage rich wiht protein and nutrients beneficial to the health and productivity of animals, it's grown in Diyala province with an area of 360 dunums and a production of 842 Tons (productivity was 2338.9 kg / dunuam) note that this statistic for 2015 and there are no statistics before it with the competent authorities note that there are areas planted in different areas of the province, especially when livestock breeders and from these figures we conclude that there is insufficient attention to this important crop, which is the issue of important basic forages, which contributes significantly to the variable costs of livestock production, this attributed to the decline in livestock production, although the atmosphere and soil of the province are suitable for the cultivation of this crop.

Table 2: Some of the alfalfa production indicators in the research sample.

Value	Item
126	Area dunums
1801	Production ton
14.29	Productivity ton/dunum
86458	Total costs 1,000 dinars
128,310	Total revenue 1,000 dinars
41852	Profit 1,000 dinars
1.48	Return on the invested dinar
5089	Number of manual working hours
10.4	Seed amount kg/dunum
104	Compost quantity kg/dunum

Source: From the work of the researcher based on the questionnaire.

The sample research, it included 126 dunums in more than one area of the province with a production of 1801 tons, which means the productivity of the dunum was 14.29 tons and this productivity is good, due to the management methods and the suitability of soil to grow this crop, the sample achieved a total profit estimated at 41852. This reflects the economic efficiency of this farm, which requires manual work, dunum need 40 hours work as range.

• First: the transcendent logarithms production function.

Other functions such as C-D constant elasticity and are also more difficult to use under constraint assumptions, thus the formulas become untenable and limited so there was a need for the emergence and development of a number of formulas such as the transcendent logarithmic production function, it is characterized by the need for fewer constraints which are Attractive to include arbitrary linear and square distal variables of factors of production (Ali, 185, 2014). It does not require the average productivity and marginal production of input to be constant to each other, the function takes several forms depending on the number of inputs (190, 2012, Deberton). The TL submissive production function is often used to describe the random border model (SFA). In order to estimate the transcendent logarithm function of the alfalfa crop production in Diyala province to know the nature of the relationship between family and rented work, the function was described as follows:

$$LY = a_0 + a_1 LF + a_2 LH + b_1 LF^2 + b_2 LH^2 + b_3 LFLH \quad ...5$$

Y: Production of the alfalfa per ton.

F: The number of hours of rented work per hour.

H: The number of hours of family work per hour.

By use FRONT 4.1 Program the estimation pass three stages (Herrero and Poscco, 2002.4) which the government's actions are also a source of support for the government's work. It is the use of the usual OLS method it's the best unbiased linear estimate of model coefficients except y's intercept that is biased. And then usual COLS to obtain unbiased linear parameters and then obtain maximum probability estimates for random border parameters using maximum likelihood method

Table 3: The parameters of the Transcendental production (TL) function.

ML	COLS	OLS	Parameters
0.13	0.13	0.13	a_0
0.20	0.29	0.29	a_1
-0.11	-0.11	-0.11	a_2
-0.95	-0.95	-0.95	b_1
0.19	0.19	0.19	b_2
0.97	0.97	0.97	b_3
0.16	0.16	0.19	Sigma-squared
-0.15		-0.15	Loglikelihood function = -0.152
Source: From the work of the researcher using FRONT 4.1			

according to the production function Superior logarithmic, table 3.

The parameters of the substandard logarithm function obtained in the ML method, table 3, the signal of the parameter of the rented work was positive and conforms to the economic theory logic by a 1% increase in the rented work, the alfalfa production will increase by 0.20% this is true because the rented work it is a variable cost related to the level of production and the farmer do not rent a work only if there is a real need for it therefore increasing it leads to increased production. the of family work parameter is negative contrary to economic logic, this means that the increase of family work by 1%, production will decrease by 0.11%, may be attributed to the nature of crowded family work in small areas or called disguised unemployment as it performs production processes with more family labor.

The cross-elasticity between family and rented work (b_3) was positive and (0.97), which illustrates the substitute relationship between the two elements, may sometimes be illogical, but this is the reality of the demand for work as the family work is replaced by rented work, increased family work leads to the decrease of the rented work, invert is true. The rented work has more effect than family work and this is consistent with Blanc, who explained that family work and rented work have different effects on production and are not similar substitutes that have the same effect on production, even costs and therefore profits, the rented work effect in production back to more the exploitation of this element is efficient because the farmer gives direct and selfish monetary cost as opposed to family work, so there will be more control and pressure on the rented work than the family work to improve its exploitation.

Table 4: Technical efficiency of the research sample.

Technical Efficiency (TE)	Cost Efficiency (CE)	Values
0.22	0.70	Lowest
0.90	0.99	Top
0.90	0.88	Average
Source: From the work of the researcher based on the efficiency table obtained using FRONT4.1.		

When calculating the share of the contribution of the two elements of family and rented work through the following law (Shehata, 2006):

$$S_i = \frac{ai}{a_1 + a_2 + B_1 + B_2 + B_3}$$

Share of rented work was 74% while the share of the family work in the production process was 28%, which confirms that illustrated that the farm work will not be homogeneous.

In order to know the nature of the marginal substitution should estimate the marginal rate of substitution between family work h and rented work f (Shehata, 2006):

$$MRTS_{f\ for\ h} = \frac{a_1 + b3lnh}{a2 + b3lnf}$$

The marginal rate substitution of family and rented work was 1.94 it's indicates the substitute between the two types of farm work, which means that the replacement of one unit of rented work must be waived for 1.94 units of family work. The significant of the variables are necessary and important in the estimates of OLS method, but it is not a necessary requirement that these parameters be statistically significant when estimated in ML because the parameters of this method are efficient, coherent to the limits of error ui and small for population estimates taken from it (Ali, 2014, 191). While the superior logarithmic function reached the maximum probability of -0.15 in a clear indication that there are other variables affecting technical efficiency positively through the effect on the random variable. It is many because the research was limited to family work and rented work to show their impact.

Technical efficiency

The transcendent logarithmic production function, whose parameters were estimated according to OLS, COLS and ML methods, was used to estimate the technical efficiency of TE for sample farmers as an average sample according to the SFA stochastic analysis method and using FRONT4.1, the highest value For technical efficiency reached 90. this farm is close to the level of full efficiency as it was able to achieve the highest production among the fields of production of alfalfa with a limited number of inputs this farm has to produce this amount of production using only 90% of the inputs or less. While the lowest efficiency level is 22%, the result of this field achieved this value to reach the efficiency stage entails producing the current amount of output or more using only 22% or less of the current inputs.

Table 5: The shares of production elements after treated in a (Cochrane-Orcutt).

D.W	R^2	S.E	Fertilizer	Expenses	Family Labour	Rented Labour	Intercept	Equation of share
1.859	0.118	0.049	0.956	-0.027	0.0003	0.07	0.02	SF
				-1.300664	*0.090085*	*0.962236*	*0.393112*	t value
1.841	0.191	0.014	1.007	-0.011	0.001	0.0003	0.16	SH
				-0.828969	*0.124438*	*0.090085*	*5.685424*	t value
1.677	0.077	0.059	0.947	0.07	-0.11	-0.027	0.559	SM
				1.240314	*-0.828969*	*-1.300664*	*4.872358*	t value
			-1.91	0.947	1.007	0.956	0.26	SR

Source: From the work of the researcher using eviews 9. And sure way. The fourth row and the fourth column were calculated, *i.e.* the fertilizer quota equation, so that it would be used later to find the demand and replacement flexibility, as C1 +C5 +C8 +C10 should be equal to one, *i.e.* the sum of the parameters column, while the sum of the balance row is equal to zero *i.e.* C11 + C12 + C13 + C14 =0.

The average technical efficiency at the sample level was 90%, this result indicates that alfalfa farmers can increase their production by 10% without increasing any amount of economic resources used in the production process, which means that the sample loses some economic resources and therefore bears the costs of Additionally equivalent to 10% of resource costs and also means that farms can produce the same previous output with about 10% less resources than the resources used, the efficiency average indicates that there is a deviation in actual production at optimal production by 10% and farmers can achieve it if used, generally the sample is as efficient in production alfalfa, reflecting the efficiency of rented and family labor.

• Second: Trans log cost function

The transcendental cost function is an extension of the Taylor-Logarithm series, by applying this series according to equation 4 we obtain the transcendent cost function of the alfalfa crop, from this function can derive the production inputs proportion functions or so-called. The Cost - Share Equations using Shepherd Lemma rule where the share of input production in the total costs (Bilkis, 2012):

$$\frac{\delta lnTC}{\delta \ln Pi} = Si + \sum_{j}^{n} \gamma ij\ lnPj + byilnY + \varphi t\ Pi\ t \qquad ...6$$

Si: Input sharing quotas are represented by total costs. The quota equation should be estimated under the following restrictions:

The total shares of production elements should be equal to one:

$\Sigma\gamma_{ij} = 0$

$\Sigma b_{Yi} = 0$

$\Sigma\varphi_t P_i = 0$

$\Sigma a_i = 1$

Relative changes in resource prices will leave input quotas unaffected:

$\Sigma\gamma_{ij} = 0$

Symmetry means that the natural characteristics of neoclassical production theory are realized:

$\gamma_{ij} = \gamma_{ji}$

Four production elements were used(family work H, rented labour F, fertilizer L and Expenses M), to find the share of each elements was divided by the total costs, which must be the sum of these shares equal to one, prices were taken in the logarithm divided each by the fertilizer price, the shares of production elements under the symmetry and homogeneity constraints were as follows:

SF=C(1)+C(2)×LNPF+C(3)×LNPH+C(4)×LNPM

SH=C(5)+C(3)×LNPF+C(6)×LNPH+C(7)×LNPM

SM=C(8)+C(4)×LNPF+C(7)×LNPH+C(9)×LNPM

As: SH represents the family labour share, PM family labour price, SF of rented labour share, PF rented price, SM expenses share and pm expense price.

Share's functions compose a system of superficially uncorrelated regression equations SURE, they are correlate to the limits of random error by the three equations simultaneously, a method proposed by Zillner called the diverse regression method, therefore the model was estimated using Repetition SURE method under the constraints of symmetry and homogeneity, a generalization of the linear regression model, which includes a set of equations each with a special dependent variable and different explanatory variables, each equation with linear regression can be estimated separately but

Table 6: Own Price Elasticity for production elements.

Value	Code	Elasticity
19.3	$_{ff}\sigma$	Own Elasticity of the rented labor
6.5-	$_{hh}\sigma$	Own Elasticity of the family labor
0.35-	σ_{mm}	Own Elasticity of expenses
30.2	$_{rr}\sigma$	Own Elasticity of fertilizer

Source: From the work of the researcher based on the parameters of the functions of the production elements and equations of demand Elasticity.

Table 7: Allen-Uzawa partial Elasticity of Substitution (AES).

Value	Code	Elasticities
1.18	$_{fh}\sigma$	AES Elasticity between rented and family labour
-0.038	$_{fm}\sigma$	AES Elasticity between rented labour and expenses
160.4	$_{fr}\sigma$	AES Elasticity between rented labour and fertilizer
0.87	$_{hm}\sigma$	AES Elasticity between family labour and expenses
46.8	$_{hr}\sigma$	AES Elasticity between family labour and fertilizer
9.77	$_{mr}\sigma$	AES Elasticity between fertilizer and expenses

Source: From the work of the researcher based on the parameters of the functions of the production elements and equations of demand Elasticity.

enjoys by estimation sufficient by taking the simultaneous correlation between errors Random is taken into account through the repetition zillner application of equation systems, that its coefficients are feature by inconsistency, bias, efficiency and approximate property. Using Eviews9 and SURE, the production component shares were estimated. The model had a autocorrelation as well as low R^2, so it was treated in a (Cochrane-Orcutt) table 5.

Table 5, weak relationship between the prices and the share stakes of production elements in costs through R2 values, which were the weakest in the share of expenses equation. D.W. values. It was 1.8, 1.8, 1.6, respectively. The estimated production component stakes also showed the signification of most of their parameters, although the signification in the transcendental cost functions is not relatively important, because what is important here is to use the function parameters in calculating the price and cross demand elasticity as well as substitution elasticity. The estimated results indicated that the increase in the rented labor price by 1% will increase the share of labor by cost 0.07%, while the increase in the family labor price of by 1% will increase the family labor share in total costs by 0.001%. This means that rented labor is the most cost-effective.

Elasticity of Demand and substitution

The relationship between the elements of production is determined by the substitution Elasticity, if the Substitution Elasticity is positive, it shows the possibility of Substitute between the elements. They are Substitute elements that can Substitute the other in the production,

Table 8: Substitution Elasticity between production elements.

Value	Code	Elasticity
0.12	$_{fh}\xi$	Cross- Elasticity between rented and family labor
-0.024	$_{fm}\xi$	Cross- Elasticity between rented labor and expenses
23.46	$_{fr}\xi$	Cross- Elasticity between rented labor and fertilizer
0.57	$_{hm}\xi$	Cross- Elasticity between family labor and expenses
7.51	$_{hr}\xi$	Cross- Elasticity between family labor and fertilizer
1.6	$_{mr}\xi$	Cross- Elasticity fertilizer and expenses

Source: From the work of the researcher based on the parameters of the production elements share functions and equations of demand Elasticity.

but if those Elasticities are negative, then the two elements are complementary to each other in the productive process, the relationship is independent when Elasticity is equal to zero. The partial Substitution Elasticity can be calculated between the elements of the production Partial Elasicitituien of Substitution. Uzawa, 1962 proved that the Substitution Elasticity used by 1938 Allen can be written as follows according to the two formulas (Allen and liu, 2005):

1. Allen-Uzawa partial Elasticity of Substitution (AES)

$$\mathbf{Aes_{ij}} = \frac{\propto \mathbf{ij} + \bar{si}\bar{sj}}{\bar{si}\bar{sj}} \quad ¡\neq j \qquad ...7$$

2. Morishima Partial Elasticity of Substitution (MES)

$$\mathbf{Mes_{ii}} = \frac{\propto_{ij} + \bar{si}\bar{si}}{\bar{sj}} = \frac{\propto_{ii} + \bar{si}^2 - \bar{si}}{\bar{sj}} \quad ,i \neq j \qquad ...8$$

Own Price Elasticity calculate as:

$$\sigma ii = \frac{\gamma ii + Si2 + Si}{\mathbf{Si2}} \qquad ...9$$

Calculated Elasticity's of Substitution and demand for production elements at average table 6.

Table 6 shows Own demand Elasticities, the results showed that the Own Elasticity of the rented labor 19.3, which means that the increase in the value of the element leads to an increase in the share of the other element, indicates that the increase in worker's wage 1% increases his cost participation by 19.3%, from which it is clear that the demand for rented labor is elastic. The Elasticity of family labor is 6.5, which is less than the rented labor Elasticity, so the it's demand was elastic but it's less elastic than the rented labor, the relative change in the rented wage leads to a greater relative change in the amount demand, greater than the response in the family labor. As a family labor is inherent to the production process, as long as it is not paid direct costs, it's response is relate with factors other than price. While the Elasticity of expenses amounted to 0.35, the demand for them is inelastic or the relative change in the price of expenses leads to a less change in the quantity demand, because the necessary production requirements needed by the plant at certain times and quantities. The elasticity of fertilizer was 30.2, the demand for it was also elastic, increased the price of fertilizer, leading to increased participation in total costs.

The high values of Elasticity also came because of the division of the input price the lower share which has a share in production costs that is low, therefore the entry of that share into the law of Elasticity has led to a rise in the values of

some Elasticities.

Table 7, Allen-Uzawa's Elasticities between rented and family labor 1.18 increase in the price of rented labor to family labor by 1%, the ratio of the family labor component to the worker's wage increase by 1.18%. This shows the increase for family labor demand as a result of a substitute relationship between them. Allen-Uzawa's partial substitution Elasticity between rented labor and expenses has reached -0038, indicating that the increase in the rented labor price to the price of expenses by 1%, the ratio of rented labor to expenses will increase by 0.038%, which shows the decrease in demand for the rented labor. Allen substitution Elasticity between rented labor and fertilizer 160.4, between family labor and expenses 0.87 and between family labor and fertilizer 46.8, this means that an increase in the value of family labor and fertilizer by 1%, the ratio of the element of family labor to expenses and fertilizer will decrease by 0.87, 46.8, the Allen Elasticity of the For fertilizer and expenses, the amount of 9.77, which means that the increase in the value of fertilizer to expenses by 1%, the fertilizer element to expenses will be reduced by 9.77%.

Morishima's substitution Elasticity for production elements illustrated by table 8. All came positive except the Elasticity of the rented labor and expenses, which amounted to 0.12, 23.46, 0.57, 7.51, 1.6 indicates the possibility of substitute among the production elements especially family and rented labor, the increase in the price of one of them will result increase in the demand for the other element.

Cost efficiency

The cost efficiency of the farm is the ratio between the actual costs of producing a certain level and the minimum costs for producing that level as shown in the following equation (Coeil., 1998. p 184):

$$CE = \frac{f(pi, yi)exp(vi + ui)}{f(pi, yi)exp(vi)}$$

Economic efficiency is inverted by cost efficiency: EE=1/CE, when calculating cost efficiency based on cost function variables using FRONT4.1, the minimum was 0.70, while the maximum limit was at the one the average amount of 0.88 (Table 4). This means that the sample incurs an additional cost of 12%, it's can produce the same production using 88% of the resources, note no farm has been found to produce on the border efficiency curve.

Conclusions and Recommendations

The research concluded that there is no homogeneity between rented and family labor, the rented labor is more influential in the production of alfalfa through the TL function. The increase in rented and family labour by 1%, this would increase their share in total cost by 0.07, 0.001% respectively. It was also found the rented and family labor faced an elastic demand curve, but family labor was less responsive than rented labor, substitution Elasticities indicated a substitute relationship between them. Alfalfa farmers in Diyala province achieve technical efficiency and cost efficiency averaging 90%, 88%, or farmers can use 90% of the resources to achieve the same level of production and they incur an additional cost of 12%. The research recommends that caution be exercised on the development and appreciation of farm work models, the attention and attention to rented labor through training and development and the development of a policy that takes into account the development of alfalfa in Diyala province.

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