AN ECONOMIC ANALYSIS OF THE ROLE OF RURAL WOMEN IN IMPROVING FARM INCOME AND LIVING STANDARDS.

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ABSTRACT

This study aimed to determine the contribution of women in diversifying sources of farm income, thereby improving the standard of living of the rural family, through their work in various primary and secondary agricultural production activities. Rural women in Iraq constitute a large part of the family's farm work. In addition to her paid work on other farms. Despite the significant role of rural women's contribution to production processes. However, the percentage of their participation in some agricultural operations is less than that of men due to their limited control over production and marketing decisions. This is reflected negatively in their ability to generate income. The research used cross-sectional data for a random sample that included (384) women from separate rural areas in Baghdad governorate to determine the effect of the working hours of women and men in addition to the number of animals owned by women on the size of the total farm income through the use of the OLS model, the ordinary least squares method with the double logarithmic formula. The results showed that increasing the number of working hours for women positively affects the increase in farm income. Moreover, the size of the parameters of women's work in animal production activity (0.16) and industry (0.15) were more influential than men's work (0.08). As for the plant production side (0.26), its effect was less than that of men due to the existence of some activities that are specific to women rather than to men. Therefore, the research recommends the need for programs related to developing the skills of rural women in all agricultural activities, providing health and educational care for women, and empowering women financially and technically to increase their contribution to income generation and improve the standard of living for the family.

Keywords: Farm labor, secondary agricultural activities, rural women empowerment, food industries, off-farm labor.

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تحليل اقتصادي لدور المرأة الريفية في تحسين الدخل المزرعي والمستوى المعيشي

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المستخلص

يهدف البحث الى تحديد مساهمة المرأة في تنويع مصادر الدخل المزرعي وبالتالي تحسين المستوى المعيشي للأسرة , عن طريق عملها في مختلف الانشطة الانتاجية الزراعية الاولية والثانوية , فالمراة الريفية في العراق تشكل جزءً كبيراً من عنصر العمل العائلي المزرعي فضلاً عن عملها بأجر في المزارع الاخرى. وبالرغم من الدور الكبير لاسهام المرأة الريفية في العمليات الإنتاجية إلا إن نسبة مساهمتها في بعض العمليات الزراعية اقل من الرجل وكذلك عدم امتلاكها السيطرة في اتخاذ القرارات الانتاجية و التسويقيه وهذا ماينعكس سلباً في قدرتها على توليد الدخل . استخدم البحث بيانات مقطعية لعينة عشوائية ضمت (384) امراة لمناطق ريفية متفرقة في محافظة بغداد لتحديد اثر ساعات عمل المراة والرجل فضلاً عن عدد الحيوانات التي تمتلكها المراة في حجم الدخل المزرعي الكلي من خلال استخدام انموذج OLS طريقة المربعات الصغرى الاعتيادية (الصيغة اللوغارتمية المزدوجة). وقد بينت النتائج ان زيادة عدد ساعات عمل المراة يؤثر ايجاباً في زيادة الدخل المزرعي , وان حجم معلمة عدد ساعات عمل المرأة في النشاط الانتاجي الحيواني (0.16) والصناعات (0.15) كان اكبر تأثيراً من عدد ساعات عمل الرجل بمقدار (0.08) , اما في الجانب النباتي فقد كان تاثيرها بمقدار (0.26) وذلك بسبب وجود بعض الانشطة التي تختص بها النساء دون الرجال , لذا يوصي البحث بضرورة وجود برامج تخص تطوير مهارات النساء الريفيات في جميع الأنشطة الزراعية و توفير الرعاية الصحية والتعليمية للمراة وتمكين المراه مالياً وفنياً من اجل زيادة مساهمتها في توليد الدخل وتحسين المستوى المعيشي للأسرة. .

الكلمات المفتاحية : العمل المزرعي، الأنشطة الزراعية الثانوية، تمكين المرأة الريفية، الصناعات الغذائية، العمل خارج المزرعة.

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INTRODUCTION

The contribution of rural women to agricultural activity is an essential factor in achieving agricultural development (10). This is due to its influential role in increasing production, providing food, and improving the standard of living for the family. Therefore, activating the role of women in the various production processes enables them to be empowered economically and socially, which in turn leads to contributing to the well-being of the family and the progress of society through training women and providing them with technical and professional expertise so that they can find job opportunities for them and contribute to improving income (18). The agricultural system is an integrated set of activities performed by farmers in the field under cultivation conditions to maximize production and net income on a sustainable basis through types of agricultural systems and evaluate these possibilities to increase farm income through resource allocation (9) Income generation through women's participation has become a global issue in current time, as well as a great concern for the future (13). The percentage of women's contribution is related to their ability and objective factors. In addition to the significant role of rural women's contribution to production processes, the percentage of their participation in some agricultural operations and marketing work is very small (38, 29). This is a negative indicator of all her efforts. Also, the percentage of women who own land and farming holdings is very small because of some customs and traditions that still need to give women the right to own property, despite the laws and legislation stipulating women's right to inherit and own agricultural land. Women do not seek from their work to achieve self-benefit only but also to benefit the family by contributing to diversifying and increasing sources of income (11). Her work is optional to be within the boundaries of the house or farm. The woman's work inside the home and farm is productive (15). The work of rural women in Iraq is the main element because of its vital role in the various production processes. This contributes to increasing farm income, as women produce and manufacture more than (50%) of animal products and local food and contribute to plant production. The work and contribution of rural women depend primarily on their ability and ability to acquire skills and enable them to possess the necessary resources for the expansion and diversification of productive activities (22). In addition to the influence of this role on other factors, including the size of the farm, the availability of male workers, their social and economic status within the family, and the degree of mechanization in the farm, the number of their working hours decreases in farms with advanced mechanization and the increase in the use of mechanization, and therefore the number of their working hours increases in small farms (5).The participation of women and the type of activity they practice varies according to the economic and social characteristics from one country to another and from one region to another and with different levels of activities. Pre-harvest activities such as soil preparation and fertilization are reduced (16). As the percentage of rural women's contribution to it is around (40-50%). As for the hoeing and seedling work, it reaches 70%. Its post-harvest activities, such as grain storage, crop packing, and loading and unloading, increase, reaching the limits of (20-40%). And the most significant percentage of women's contribution is in raising (cows, sheep, goats and domestic birds), which reaches 80% as it carries out grazing and milking operations, cleaning barns and taking care of newborns. The percentage of her participation or contribution to the marketing operations could be much higher. The percentage of women's contribution is about 3.5% (26). Rural women generally work approximately 13 (hours/day) in raising and caring for livestock. Surveys showed, according to the latest report of the FAO (20), that rural women spend approximately 16-18 working hours, compared to 8-10 working hours per day for men (36). Women can directly manage agricultural activities on their own, whether agricultural or non-agricultural, to provide for the family's needs or economic purposes. Working with rural women requires developing a specific strategy to work with them to achieve a noticeable progress in the life of the rural community in general and the rural family in particular. Therefore, it has

become necessary to pay attention to rural women at the local level (4) and provide an appropriate environment that helps women raise their level of productivity and the number of hours they participate in agricultural work by identifying the most critical factors affecting their participation and the impact of this participation in achieving development (40). Most rural women suffer from limited income. At the same time, they do not receive adequate and necessary external assistance from governmental or non-governmental organizations to implement the agricultural activities practiced by women and to help them in living conditions (24). Women also face a lack of training opportunities in the extension and agricultural fields, and the absence or lack of organization that concerns rural women at the people level in the agricultural departments due to the lack of agricultural extension agents at the field level, which weakens communication with rural women and the absence of extension programs, especially for rural women. This confirms that there is a weakness in the follow-up and evaluation of extension work in rural women (23, 28). However, agricultural research activities and Extension services often neglect women farmers, who face numerous problems that, to a large extent, limit their potential in agricultural and entrepreneurial development (25, 34). On the other hand, she is the first organizer of the family budget and her ability to manage the income properly, through which most of the requirements of her family members are provided, despite the limited income, and she is able to make sound and correct decisions to achieve a good standard of living (39) Therefore among the factors that affect income generation are diseases that affect both gender, which hinders their ability to work and thus leads to losses in production (30), Thus, a decrease in rural income adversely affects the prosperity of rural communities and economic growth (21), Although Iraq possesses the ingredients for establishing livestock projects, including cow breeding projects, which are one of the important tributaries in the global economy and provide products of great economic value (32). The smart farming style has contributed to promoting gender-based participation in the performance of the rural family. As many of the literature and scientific studies in the fields of management and organization of agricultural extension work emphasized the importance of specialization in agricultural extension work that many of the successful international experiments to achieve the objectives of agricultural extension work as a result of the adoption of specialized formulas in the performance of agricultural extension functions (33), along with, teaching farmers how to make appropriate decisions to address, resolve and overcome problems (35). The research aimed to determine the role and contribution of women in diversifying the sources of farm income, through their work in various productive activities, based on the hypothesis that the contribution of rural women in the production process achieves positive effects in increasing farm income. However, the rural environment, the weakness of gender-sensitive programs and policies, and the weakness of agricultural extension and training negatively affect the size of women's contribution (16).

MATERIALS AND METHODS

Multiple linear regression is considered one of the standard methods that help in the accuracy of inference to reach good results in scientific research using data to study the phenomenon of the subject of scientific research (17). Multiple linear regression is the creation of a statistical equation to express a relationship between two or more explanatory variables, or the other side expresses the effect of a dependent variable on several explanatory variables. After reaching the regression equation, we should clarify whether that equation is acceptable and can be interpreted statistically. There are three types of multiple regression models: standard regression, hierarchical regression, and gradual regression. Each of these models has two different aspects (27). The first lies in addressing the overlapping differences due to the correlation of the independent variables. At the same time, the second differs in terms of the order of entering the independent variables into the equation (19). Therefore, the method of ordinary least squares (OLS) was used, and in this research, the multiple regression coefficient was used to determine the different

factors and to identify the factors influencing income. Several formulas were used for the function (linear, semi-logarithmic, logarithmic) to reach the best estimates that are consistent and efficient below the used economic model (12).

$$LNY = B_0 + B_1LNX1 + B_2LNX2 + B_3LNX3 + B_4LNX4 + B_5LNX5 + B_6LNX6 + B_7LNX7 + Ui$$

Such as:

LNY = natural logarithm of total farm income from productive activities.

LNX1 = natural logarithm of the cultivated area(dunam).

LNX2 = the natural logarithm of the number of hours rural women work in plant production (hour/season).

LNX3 = the natural logarithm of the number of working hours of rural women in animal production (hour/season).

LNX4 = the natural logarithm of the number of hours rural women work in the food industry(Manufacture of cream, cheese, yogurt, jams and date honey) (hour/season).

LNX5 = the natural logarithm of the number of hours rural women work in handicrafts (hour/season).

LNX6 = the natural logarithm of the number of hours a man works (hour/season).

LNX7 = natural logarithm of the number of animals in the farm.

The standard problems are:

1. The problem of instability of heteroscedasticity:

This problem occurs when the hypothesis of the random variable variance is broken: the variance does not remain constant for all values of the independent variable (1).

$Var(u)=E(u-E(U))^2 =E(U)^2\ \sigma^2\ U$

The most important tests that detect this problem are:

a-Park test,

b-Breush – Pagan – Godfrey test.

2. The problem of multicollinearity indicates a linear correlation between a numbers of explanatory variables (6). And that one of the most important tests to detect this problem is the test (VIF) variance inflation factors (3).

3. Autocorrelation Problem:

This problem occurs when the explanatory variables are associated (1). And one of the most important tests to detect this problem is

a. Durbin Watson test (D.W): When the value of (D.W) = 2, the autocorrelation coefficient of the residuals is equal to zero, as it indicates that the estimated model does not contain autocorrelation (38). When the value of (D.W.) = 4, the autocorrelation coefficient of the residuals = -1. Thus, the estimated model has a negative correlation. As for the value of (D.W.) = 0, the autocorrelation coefficient of the residuals

b. Estimated model is positive.

c. Q-Statistic test for self-correlation.

d. Breush-Godfrey test.

The Jarque-Bera test is used to find out the normal distribution of residuals (39).

The research used cross-sectional data for a random sample that included (384) women from separate rural areas in Baghdad governorate to determine the impact of the women's and men's working hours in addition to the number of animals owned by the woman on the total farm income by using the OLS model, the ordinary least squares method (double logarithmic formula) and by using Statistical program Eviwes10.

RESULTS AND DISCUSSION

It is clear from Table 1 that the total number of total working hours for rural men and women for the research sample amounted to about (5428) hours/day all the research sample. The percentage of men's working hours in the field of plant production amounted to about (41.93)% during the season, and the percentage of Women's working hours in the field of plant production amounted to about (27.54)% during the season The most significant percentage of women's working hours was in the food industry field at (10.50)%. Followed by the number of working hours in the field of animal production by about (14.85)%. As for the percentages of working hours in the handicrafts (5.18)%.

Table 1. The total number of working hours for rural men and women in the various agricultural activities of the research sample for the agricultural season (2021-2022)

Number of working hours for rural men and women	No. of hours season agricultural	Relative importance%
Total working hours of women in the field of plant production	1495	27.54
The total number of hours a man works in the field of plant production	2276	41.93
Total working hours of women in the field of animal production	806	14.85
Total working hours of women in the food industry	570	10.50
Total working hours of women in the field of handicrafts	281	5.18
The total number of hours worked	5428	100

-Source: The researcher's work is based on the questionnaire.

Participation of rural women in income-generating activities is not an unfamiliar issue in Iraq. Most of the women in rural areas are directly involved in agricultural activities, which may be recognized or not. There were a number of factors that determined the involvement of rural women in influencing income, Table 2 shows the results of Effects of selected factors on income earning: The regression result (estimated values of the co-efficient and related statistics) is presented above. It turned out that the value of the constant limit (C) was about (2.79), which means that the average total farm income from productive activities is of this amount when the rest of the explanatory variables.

Table 2. Factors affecting income in the studied household's agricultural season (2021-2022)

Variable	Coefficient	St.d	t - Statistics	Prb.
C	2.790207	0.796067	3.504990	0.0002
LNX1	0.113903	0.048170	2.364621	0.0052
LNX2	0.268776	0.089651	2.998025	0.0040
LNX3	0.163907	0.044211	3.707400	0.0003
LNX4	0.158020	0.064516	2.449330	0.0045
LNX5	0.077778	0.040026	1.943212	0.0027
L NX6	0.084359	0.044526	1.894601	0.0004
LNX7	0.069289	0.023225	2.983360	0.0030
R-squared	0.722		Akaike info crite .1.386	
Adjusted R-squared	0.716		Schwarz Criterion 1.468	
R(Pearson test)	0.85			
Log likelihood	258.232-		Hannan- Quinn criter1.419	
F-statistic	139.577		Durbin-Watson stat1.84	
Prob (F-statistic)	0.0000		N=384	
Total farm income= LNY				

-Source: The researcher's work based on the outputs of Eviews10

Lnx1=Cultivated area: -

This parameter of the explanatory variable appeared with a positive sign. It is identical to the economic logic, that is, when there is an increase in the cultivated area by 1%, which leads to an increase in total farm income for the agricultural season by (0.11), with the rest of the variables included in the model remaining constant. At the same time, the T-test indicated the significance of this variable at the level of 1%.

Lnx2=The number of working hours of rural women in plant production:

This parameter of this explanatory variable appeared with a positive sign, and it corresponds to the economic logic when there is an increase by 1% that leads to an increase in farm income for the agricultural season by (0.26), with the rest of the variables included in the model remaining constant. While the T test indicated the significance of this variable at the level of 1%.

Lnx3=The number of working hours of rural women in animal production:

This parameter of the explanatory variable appeared with a positive sign, and it corresponds to the economic logic when there is an increase by 1% that leads to an increase in farm income for the agricultural season by (0.16), with the rest of the variables included in the model remaining constant. While the T test indicated the significance of this variable at the level of 1%.

Lnx4=The number of working hours for rural women in the food industry:

This parameter of the explanatory variable appeared with a positive sign, and it is identical to the economic logic when there is an increase by 1% that leads to an increase in income for the agricultural season by (0.15) with the stability of the rest of the variables included in the model. While the T test indicated the significance of this variable at the level of 1%.

Lnx5=The number of hours rural women work in handicrafts:

This parameter of the explanatory variable appeared with a positive sign. It corresponds to the economic logic when an increase by 1% (one hour) leads to an increase in income by (0.07), with the remaining variables in the model remaining constant. At the same time, the T-test indicated the significance of this variable at the level of 1%.

Lnx6=Man working hours:

This parameter of the explanatory variable appeared with a positive sign, and it corresponds to the economic logic when there is an increase by 1% (one hour) that leads to an increase in income for the agricultural season by (0.08), with the rest of the variables included in the model remaining constant. While the T test indicated the significance of this variable at the level of 5%.

Lnx7=Number of animals:

This parameter of the explanatory variable came with a positive sign, and it conforms to the economic logic when there is an increase of 1% (an increase of one head animal) that leads to an increase in income for the agricultural season by (0.06) with the rest of the variables included in the model remaining constant. While the T test indicated the significance of this variable at the level of 1%.

R^2 is the coefficient of determination:

The quality of model fit (determination coefficient) was about (0.72). It shows that all the explanatory variables explained 78% of the fluctuations in the dependent variable (total farm income from production activities). Therefore, it is considered the most important and influential factor in increasing farm income. As for the remaining 28%, it is due to other variables and factors that were not included in the model, and the random variable could not explain them, which is that they do not own their agricultural lands and are unable to obtain loans. Also, she is unable to belong to women's associations or participate in educational seminars and workshops.

As for the tests (Akaike info criterion), (Schwarz criterion), (Hannan-Quinn criterion): It came with low values, respectively (1.386), (1.468), and (1.419). It indicates the quality of the multiple regression model of rural women's contribution to increasing total farm income.

D-W Test: Durbin-Watson test value was about (1.84), and this indicates that there is no self-correlation between the explanatory variables.

Pearson test (R): It measures the strength of the correlation between the dependent variable and the explanatory variables, as its value reached about (0.85) and indicates a strong direct correlation.

Tests for standard problems of the estimated model:

1. **Testing the autocorrelation problem by means of LM :** The Breush-Godfrey test table 3 shows that the probability F value is (0.0000), which is greater than 5%. Therefore, the model does not suffer from the problem of autocorrelation

the Breush-Godfrey test table (4) shows that the probability F value is (0.0000), which is greater than 5%. Therefore, the model does not suffer from the problem of autocorrelation.

Table 3. Breush-Godfrey test for serial correlation LM test

F-statistic	**75.34196**	**Prob. F(2,374)**	**0.0000**
Obs*R-squared	**300.5187**	**Prob .Chi-Square(2)**	**0.0000**

-Source: From the researcher's work based on the outputs of Eviews10

1.Testing the problem of Heteroskedasticity instability: There are several tests to detect the problem of instability of variance, including the Breush-Pagan-Godfrey test. The probability F value came according to the chi-square distribution (0.078), which is greater than 5%. This means that the data of the research sample does not suffer from the problem of instability of variance homogeneity shown table4.

Table 4. Heteroskedasticity Breush-Pagan-Godfrey test

F-statistic	1.846118	Prob. F(7,376)	0.0774
Obs*R-squared	12.75925	Prob .Chi-Square(7)	0.0782
Scaled explained SS	15.08637	Prob .Chi-Square(7)	0.0349

- **Source: From the researcher's work based on the outputs of eviwes10.**

2. Multicollinearity problem test

It is clear from table 5 of the test of variable inflation factors that the values of VIF centered are less than 5, as this indicates that the model is free from the problem of multicollinearity.

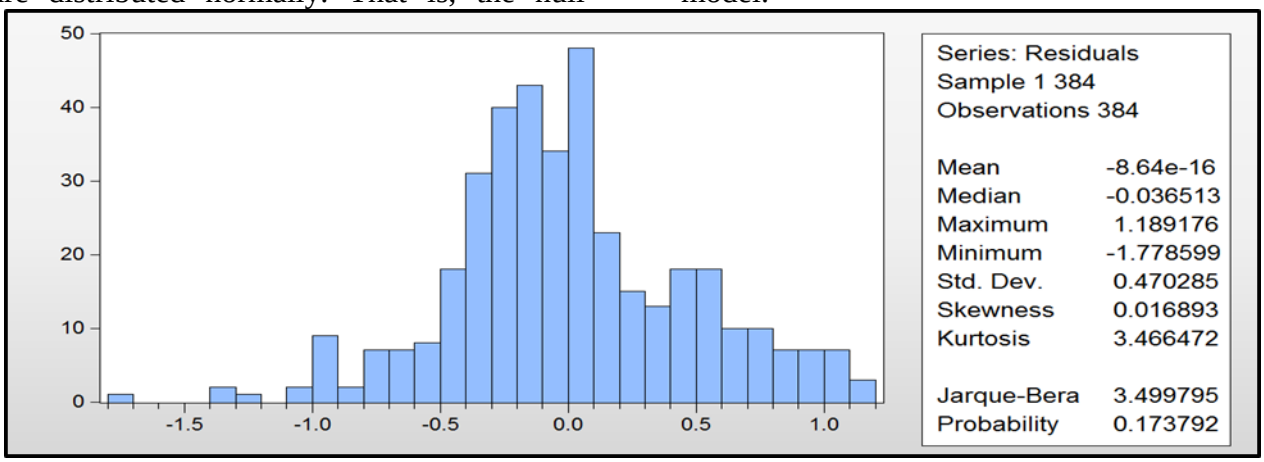
Table 5. test (VIF) variance inflation factors for the problem of multicollinearity

Variable	Coefficient Variance	Uncentered VIF	centered VIF
C	0.339966	579.4745	NA
LNX1	0.003060	27.94373	4.195902
LNX2	0.001642	137.9191	1.722401
LNX3	0.002541	201.5963	1.563813
LNX4	0.004141	282.6463	1.078442
LNX5	0.001583	122.1806	1.069571
LNX6	0.009080	53.78892	4.188998
LNX7	0.000460	4.661299	1.481795

- **Source: From the researcher's work based on the outputs of eviwes10.**

3. Normal distribution test for residuals:

It is clear from figure 1 that the probability value of the (Jarque-Bera) test is (0.1737). It is greater than the probability (0.05) and also not significant. This means that the residuals are distributed normally. That is, the null hypothesis must be accepted, which states that there is no problem, and the alternative hypothesis, which states that there is a problem, must be rejected. And this indicator is considered good for the quality of the model.



Figar1. Jarque-Bera test

- **Outputs of eviwes10.**

CONCLUSION

We conclude from the research that one of the most important sources of income for rural families is a mixture of farm income and income from outside the farm, as well as rural women owning animals that provide income and work to raise and enhance the self-sufficiency of rural families and improve their standard of living. Thus, the interest of rural women in the secondary activities of food industries and handicrafts is greater because of their access to cash returns than in plant productive activities, in which the cash returns go to the head of the family. On the other hand, the secondary productive activities work to improve their income, which ensures the improvement of the family's living situation. The fact that rural women do not receive wages makes them lose their passion for working in agricultural lands. Therefore, the activity from which you get paid is a motive for work and progress. Thus, the research recommends that there should be programs for developing the skills of rural women in all agricultural activities to increase the effectiveness of rural development, providing special health care for rural women in particular and the family together in general. On the other hand, training helps to improve and develop the competencies and capabilities

of individuals of both sexes. It also helps them improve their decisions, so the training is a positive adjustment stage in some specific directions.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DECLARATION OF FUND

The authors declare that they have not received a fund.

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