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الآثارالاقتصادية لمرض الحمى القلاعية على الثروة الحيوانية في مصر"دراسة حالة محافظة اسيوط"

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المستخلص

تعد مشكلة الأمراض الحيوانية العابرة للحدود وخاصة مرض الحمى القلاعية ، من أهم المشكلات التي تواجه أصحاب المزارع في محافظة أسيوط - مصر ، وتؤثر بشكل مباشر على إنتاج الثروة الحيوانية . وتم تقسيم العينة الي ثلاث فئات حيازية ، الفئة الحيازية الأولى (أقل من 5 رؤوس) ، و الفئة الحيازية الثانية (5 وأقل من 10 رؤوس) ، و الفئة الحيازية الثالثة (أكثر من ١٠ رؤوس) ، وتبين من البحث أن نسبة الاصابة بين الحيوانات بسبب مرض الحمي القلاعية يكون الأعلي في الفئة الثالثة وأقل نسبة في الفئة الأولي حيث تراوحت نسبة الاصابة بين 85 % الي 50 % ، وكانت نسبة النفوق في الفئة الحيازية الثالثة الأعلي أيضاً بنحو 5 % من الحيوانات ، والفئة الاولي الاقل بنحو 3 % من الحيوانات . وللتعليم أهمية وتأثير كبير في الحد من انتشار المرض ، حيث تبين من الدراسة أن معدل الإصابة والنفوق كان منخفضًا كلما أرتفعت مستويات التعليم ، وفي محافظة أسيوط تسبب المرض في خسائر منها المباشرة وتمثلت في نفوق الحيوانات والتي وصلت إلى أقصى حد لها (للأبقار والجاموس) و (الأغنام والماعز) في عامي 2018 و 2019 ، بنحو 22 و 24 رأساً على الترتيب ، وهناك زيادة ذات دلالة إحصائية في قيمة حجم الخسائر حيث قدرت بنحو 15328 ألف جنيه سنويا بما يعادل نحو 4.677٪ من متوسط قيمة الخسائر والبالغة نحو 327.7 ألف جنيه ، مما يدل علي أن للمرض أثر في زيادة قيمة خسائر الثروة الحيوانية في محافظة أسيوط. أما الخسائر الغير مباشرة فتتمثل في تكاليف التطعيمات ضد المرض، حيث تم تقدير أعلى قيمة للفئة الحيازية التي تحتوي على (10) رؤوس فأكثر ، تليها فئة الثانية (5 وأقل من 10) رؤوس ، ثم الفئة الأولى أقل من (5) رؤوس ، وقدرت إجمالي تكاليف التطعيمات لعينة البحث بحوالي 28.438 ألف جنيه مصري. وفقاً لاراء المربين والمالكين

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The Economic Impacts of Foot and Mouth Disease-on Livestock in Egypt "A Case Study of Assuit Governorate"

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ABSTRACT

The problem of trans boundary animal diseases (***TADS***), especially foot-and-mouth disease, is one of the most important problems facing farm owners in Assiut Governorate - Egypt, and it directly affects livestock production. The sample was divided into three holding categories, the first holding category (less than 5 heads), the second holding category (5 and less than 10 heads), and the third holding category (more than 10 heads), and it was found from the research that the infection rate is due to fever disease Thrush is higher in the third category and lowest in the first category, where the rate of infection ranged between 85% to 50%, The mortality rate in the third holding category was also higher by about 5% of animals, and the first category was the lowest by about 3% of the animals. Education has a great importance and impact in limiting the spread of the disease, as it was found from the study that the rate of infection and death was low the higher the levels of education, and in Assiut Governorate, the disease caused direct losses, including the death of animals, which reached its maximum extent (for cows and buffaloes) and (sheep and goats) in the years 2018 and 2019, by about 22 and 24 heads, respectively, and there is a statistically significant increase in the value of the volume of losses, which was estimated at 15,328 thousand pounds annually, equivalent to about 4.677% of the average value of losses, which amounted to about 327.7 thousand pounds, which indicates The disease has an impact on increasing the value of livestock losses in Assiut Governorate. As for the indirect losses, they are represented in the costs of vaccinations against the disease, where the highest value was estimated for the holding category that contains (10) heads or more, followed by the second category (5 and less than 10) heads, then the first category was less than (5) heads, and the total The cost of vaccinations for the research sample is about 28,438 thousand Egyptian pounds. According to the opinions of breeders and owners.

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introduction:

In an attempt to study the reality of trans boundary animal diseases *(TADS)* is and the extent of their spread in animal production farms, it was possible to make a questionnaire for the reality in Egypt and to choose Assiut Governorate as one of the governorates and regions that suffer from the spread of animal diseases to study(***Ministry of Agriculture, 2017***) and know the reality from soon. So that the future can be explored in light of the spread of the Corona pandemic due to the similarity of many the trans boundary animals diseases (***TADS***) with that disease in terms of origin and degree of spread. It is noted that the percentage of animal numbers in the governorate is small compared to the number of animals in Egyp, where this percentage is estimated at 6.46% in 2017(***Department of Agriculture . Assiut,2017***) here the total number of animals in the governorate and Egypt is about 1148 and 17,769 thousand heads, The percentage of animal numbers in the governorate decreased with the decrease in the number of animals Egypt, where this percentage is estimated at 6.11% in 2020, where the total number of animals in the governorate and the Republic is about 0.503 and 8230 thousand heads, respectively. (***FAO, 2020 – and Ministry of Agriculture , 2020***) respectively.

The objective of the study:

This research aims to:

1 - Study the reality closely.

2 - Knowing the most important problems and other factors that impede increasing production in animal production farms.

3 - Knowing the most prevalent diseases in Egypt and the rates of infection through the questionnaire.

4 - Knowing the most important losses caused by animal diseases in farm animals.

5 - Measuring the impact on livestock at the level of micro and production units.

6 - Identifying the impact of education for breeders and owners of farm animals on the protection of livestock.

MATERIAL AND METHODS

Study Area

Abu Tig and Dayrut district centers in Assiut Governorate - Egypt were chosen because they represent the first and second places in terms of relative importance in the number of animal heads (cows - buffaloes - sheep - goats) at the governorate level.

Study Design and Sampling

For experiences and data obtained for you by analyzing them using the program (SPSS v16.0). Where the quantitative analysis was used through the simple linear regression equation to find out R square values and F values. The sample size was determined by the Stephen Thompson equation ***(Steven K. Thompson: Sampling, 2012).***

1: Selection and description of the field study sample.

In the light of the statistical principles, this part of the study was adopted to obtain the primary field data from the original community for the study through the questionnaire sheet or form that was designed for this purpose. The questionnaire sheets are applied on the owners and breeders of livestock. The sample size of 150 individuals was determined by the Stephen Thompson equation (***Steven K. Thompson: Sampling , 2012***). In Assiut governorate, the Abu Tig and Dayrout districts were chosen because they represent the first and second ranks in terms of

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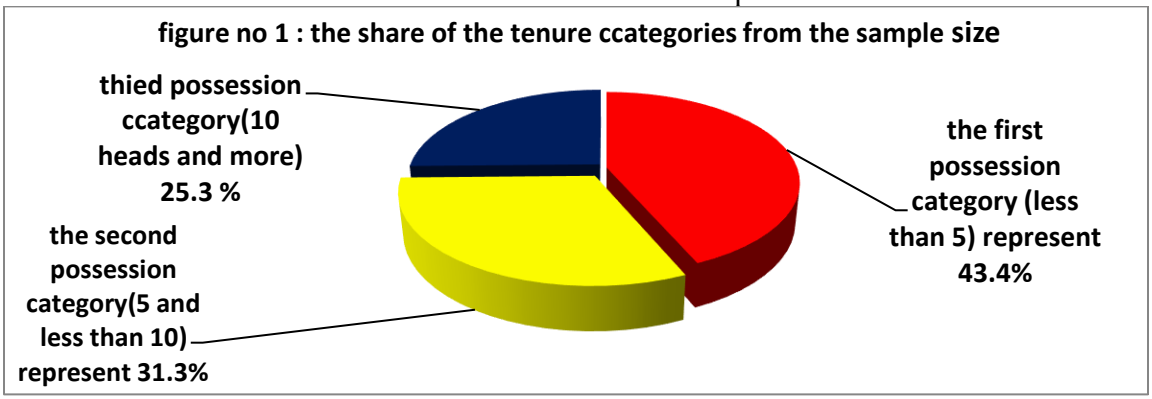
relative importance in the number of animal heads holdings, as they represent about 22.5%, 18.8% of the total Animals holdings (cows - buffaloes - sheep – goats) (*Department of Agriculture,2020*.) at the governorate level, respectively. The village of Al-Nakhila was chosen from the Abu Tig district because it represents the first rank in terms of the relative importance of the number of the animal holdings, as the village represents about 44.2% of the total animal holdings at the level of the district, and the village mesara is from the Dayrout District, as it represents the first rank in terms of the relative importance of the number of holdings, as the village represents about 19.4% of the total animal holdings at the district level. The sample of 150 holders and breeders from the two selected districts was randomly distributed at a rate of 80 individuals for the Abu Tig District, Al-Nakhila Village. And 70 items for the district of Dayrout, the village of Mesara. Table No. (1) in the appendix indicates the description of the sample items. Three types of first holdings have been included less than (5) heads, numbering 65 individuals, representing 43.4% of the total sample, with 25- and 40-members A response from the centers of Dayrout and Abo Tej, respectively. The second holding category consists of (5 and less than 10) heads, numbering 47 individuals, representing 31.3% of the total sample, with 21 and 26 individuals from the district of Dayrout and Abo tej, respectively. The third holding category, which is (10 or more) heads, numbering 38 individuals, representing 25.3% of the total sample, is 24 and 14 items from the district of Dayrout and Abo tej, respectively.

Distribution of the sample members according to the demographic characteristics of the study sample.

Table (2) in the appendix indicates that the sample consisted of 70 individuals from Dayrut district, including 67 males, 3 females, and 80 females from Abu Tig district, including 77 males and 3 females, with a total of 150 individuals. As for the marital status, the study showed that 16 individuals from the marital status were single, of whom 134 were married, and with regard to educational characteristics, there were 25 individuals from the sample who were uneducated, 35 had intermediate education certificates, and 39 had above-average education certificates There are 51 singles who hold higher education degrees. As for work, there are 54 women working in agriculture, 55 women working in government and private jobs, and 41 women running private projects for an additional source of income with animal ownership.

figure no 1 : the share of the tenure ccategories from the sample size



.Source: *Table No. (1)*

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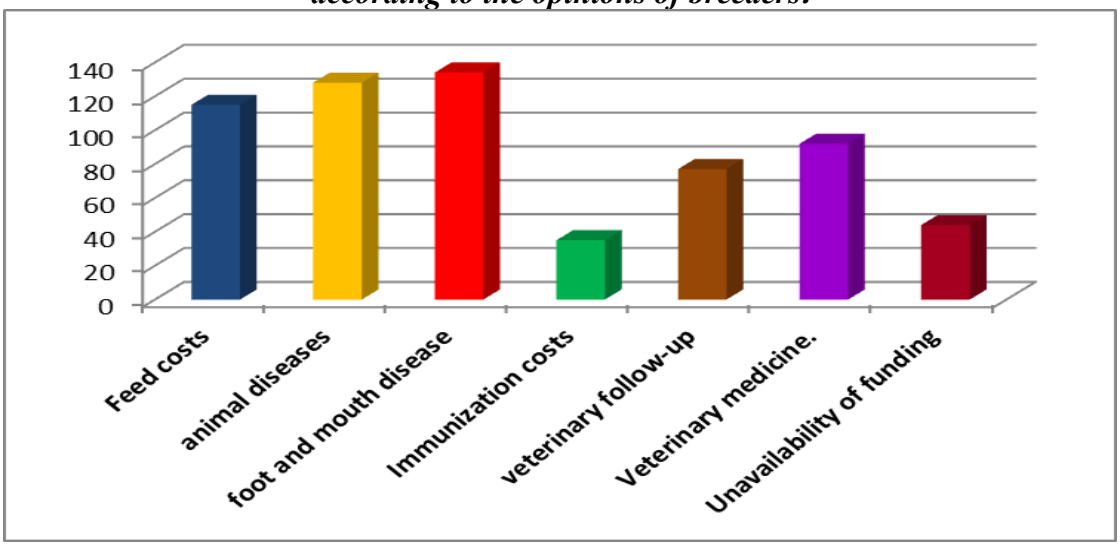
RESULTS and Discussion

The most important problems facing meat and dairy animal breeders, according to the opinions of breeders.

Figure No. (2) indicates the most important problems facing breeders and livestock holders in the studied sample in Assiut Governorate, and it is an obstacle to increasing their production from their animal holdings. At the forefront of these problems in terms of the opinions of educators is the problem of repeated infection with foot and mouth disease, as the first and main problem for a number of educators amounted to 134 breeders, representing 89.3% of the sample size. The problem of the spread of various animal diseases comes in second place according to the opinions of breeders, as their number reached 128, representing 85.3% of the sample size. The problem of high feed costs comes in the third place according to the opinions of breeders, as their number reached 115 breeders, representing 76.7% of the sample size. The problem of the high prices of veterinary medicines comes in the fourth place according to the opinions of educators, as their number reached 92 breeders, representing 61.4% of the sample size. The problem of lack of follow-up comes from the veterinary units in the fifth rank, according to the opinions of educators, as their number reached 77, representing 51.3% of the sample size. The problem of the lack of necessary funding for livestock breeders comes in the sixth place, according to the opinions of the breeders, as their number reached 44, representing 29.3% of the sample size. The problem of the high costs of immunization and vaccination against the epidemic diseases comes in seventh place according to the opinions of educators, as their number reached 35, representing 23.4% of the sample size.

Figure No. (2): The most important problems facing animal breeders in Assiut Governorate, according to the opinions of breeders.



.Source : calculated and compilied from the sample survey

Percentage of infection with foot-and-mouth disease out of total animals, according to the opinions of breeders.

Table No. (3) indicates the estimation of the incidence of FMD out of the total farm animals according to the opinions of breeders, for each holding category separately, and the knowledge of the most common holding categories affected by FMD at times of spread and outbreak of the disease. The table shows that the third holding category (10 heads and more) comes first in terms of the highest incidence of infection, estimated at about 85%, and the

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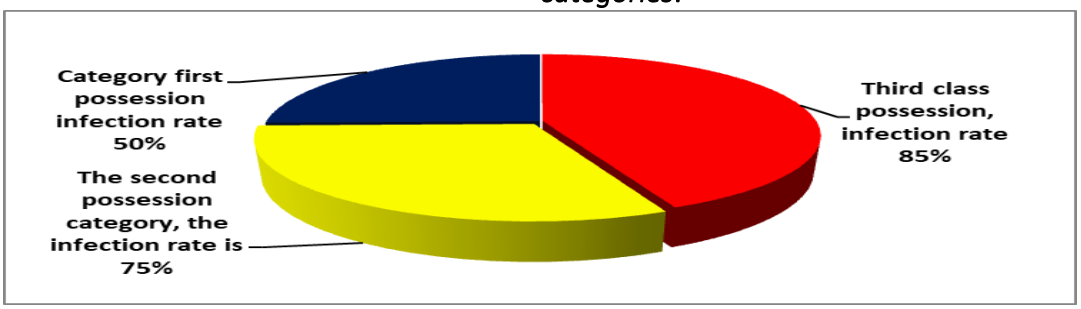
category represents 43.4% of the total items of the studied sample. The second possession category (from 5 and less than 10 heads) comes in the second place in terms of the incidence of the disease, and the rate of infection with it is estimated at about 75%, and the category represents 31.3% of the total items of the studied sample. The first possession category (less than 5 heads) comes in the third and last place in terms of the incidence of the disease, and the rate of infection is estimated at about 50%, and the category represents 25.3% of the total sample items.

Table No. (3): Percentage of infection with foot-and-mouth disease out of total animals, according to the opinions of breeders.

ranking	Incidence rate in the possessing category	% of the total sample	Possession class type	Category
1	%85	%43.4	Third Possession Category (10 heads or more)	The studied tenure categories
2	%75	%31.3	Second Possessive Category (from 5 to less than 10 heads)	
3	%50	%25.3	First Possessive Category (less than 5 heads)	

-Source : calculated and compilied from the sample survey.

Figure No. (3): Percentage of infection with foot-and-mouth disease according to the tenure categories.



.Source : calculated and compilied from the sample survey -

Mortality rate among the animals due mainly to foot and mouth disease, according to the opinions of breeders.

Table (4) and Figure (4) indicate the estimation of the death rate of animals due to FMD out of the total farm animals, according to the opinions of breeders, for each holding category separately and knowing the most losing tenure categories during the times of spread and outbreak of the disease, and the table shows that the third holding category (10 heads or more) come in the first place in terms of the highest mortality, and the percentage is estimated at about 5%, and the category represents 43.4% of the total items of the studied sample. The second tenure category (from 5 and less than 10 heads) comes in the second place in terms of mortality, the mortality rate is estimated at about 4%, and the category represents 31.3% of the total items of the studied sample. The first possession category (less than 5 heads) comes in the third and last place in terms of mortality, estimated at about 3%, and the category represents 25.3% of the total items of the studied sample.

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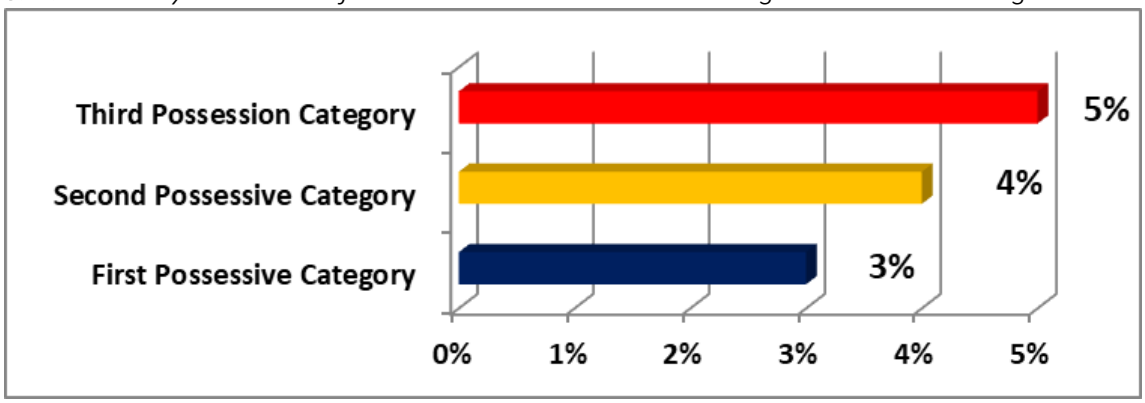
Table (4): Mortality rate among animals due to foot and mouth disease, according to the opinions of breeders.

ranking	Mortality rate in the holding category	% of the total sample	Possession class type	Category
1	%5	%43.4	Third Possession Category (10 heads or more)	The studied tenure categories
2	%4	%31.3	Second Possessive Category (from 5 to less than 10 heads)	
3	%3	%25.3	First Possessive Category (less than 5 heads)	

–Source : calculated and compilied from the sample survey.

Figure. 4: Mortality rate due to foot and mouth disease according to the tenure categories.



–Source : calculated and compilied from the sample survey.

The other most important losses caused by foot and mouth disease, according to the opinions of breeders.

Table (5) indicates the other most important losses that harm breeders and that are caused by foot and mouth disease, according to the opinions of breeders, and the losses represented in the first place come in the first place. The decrease in the liveweight meat production, as the third holding group was most affected by the owners of (10) heads or more, followed by the second holding group (5 heads and less than 10) and then the first holding group of less than (5) heads, representing this type of losses in terms of importance and damage For breeders, about 37.3% of the total sample size. And in the second place comes the losses represented by the decrease in milk production, where the most affected were also the owners of the third holding category, owners of (10) heads or more, followed by the second holding category (5 heads and less than 10), then the first holding group with less than (5) heads. This type of losses in terms of importance and damages for breeders represents about 30.0% of the total sample size. In the third place comes the losses represented by the weak daily growth rate of the animal, and the most affected were the owners of the second holding category (5 heads and less than 10), followed by the third holding group owners (10) heads or more, then the first holding group with less than (5) heads, and This type of losses, in terms of importance and damage to breeders, represents about 23.2% of the total sample size. And in the fourth place comes the losses represented by the loss and lack of communality of females, as the owners of the third holding category

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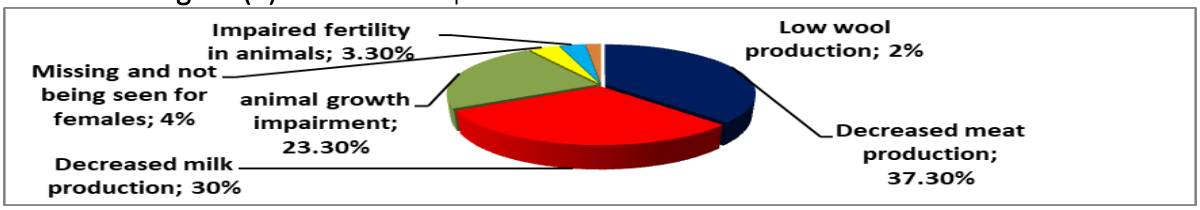
were the owners of (10) heads or more, followed by the second holding category (5 heads and less than 10), then the first holding group of less than (5) heads. This type of losses in terms of importance and damage for breeders represents about 4.0% of the total sample size. And in the fifth place comes the losses represented by the low fertility rate of the animal female, where the most affected were also the owners of the third holding category with (10) heads or more, followed by the second holding category (5 heads and less than 10), then the first holding group with less than (5) heads In terms of importance and damage to breeders, this type of loss represents about 3.3% of the total sample size. In the last place comes the low production of wool, and the first holding category less than (5) heads only, and represents 2% in terms of importance of the total sample..

Figure (5): The most important losses of foot-and-mouth disease.



–***Source : calculated and compilied from the sample survey***.

Table (5): the most important other losses due to foot-and-mouth disease, according to the opinions of breeders.

% of the total sample	at the sample level	ranking	The most affected category	losses
37.3	**1**	1	Third Possession Category (10 heads or more)	Decreased meat production
		2	Second Possessive Category (from 5 to less than 10 heads)	
		3	Category first Possession (less than 5 heads)	
30	**2**	1	Third Possession Category (10 heads or more)	Decreased milk production
		2	Second Possessive Category (from 5 to less than 10 heads)	
		3	Category first Possession (less than 5 heads)	
23.2	**3**	1	Second Possessive Category (from 5 to less than 10 heads)	animal growth impairment
		2	Third Possession Category (10 heads or more)	
		3	Category first Possession (less than 5 heads)	
4	**4**	1	Third Possession Category (10 heads or more)	Missing and not being seen for females
		2	Second Possessive Category (from 5 to less than 10 heads)	
		3	Category first Possession (less than 5 heads)	
3.3	**5**	1	Third Possession Category (10 heads or more)	Impaired fertility in animals
		2	Second Possessive Category (from 5 to less than 10 heads)	
		3	Category first Possession (less than 5 heads)	
2	**6**	1	Category first Possession (less than 5 heads)	Low wool production
		--	----------	
		--	----------	
%100				**Total**

–***Source : calculated and compilied from the sample survey***.

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The effect of education among breeders and animal owners on the spread of foot and mouth disease, according to the opinions of breeders.

Table No. (6) and Figure No. (6) indicate the effect of education among breeders and holders on the incidence of disease among the animals, as it was found through the field study that holders of higher education (higher qualifications) are the most aware holders, and the incidence of disease was FMD in their holdings is estimated at about 50%, and the death rate due to infection is estimated at about 3%, and those with higher education represent 34% of the total sample size. The table also indicates that the holders with above-average education had an estimated 75% of FMD infection, and the mortality rate due to the disease was estimated at 4%. Those with above-average education represented 26% of the total sample size. The table also indicates that the holders of education - average, the rate of infection with FMD in their holdings is estimated at about 85%, and the death rate due to infection is estimated at about 5%, and the owners of education - average represent 23.3% of the total sample size. The table also indicates that for the uneducated holders, the incidence of FMD in their holdings was estimated at about 85%, and the death rate due to infection with the disease was estimated at about 5%, and they represented 16.7% of the total sample size. Which indicates the positive impact of education among the holders of holders in reducing the spread of foot and mouth disease. It was noted from the above that the rates of infection and death in animals decreased among the holders of higher education. Noting that those with average education had high rates of injury and death. This effect does not represent all categories of tenure owners, but most of the holders are in the degree of joint education.

Table (6): The effect of education among breeders and animal owners on the spread of foot-and-mouth disease according to the opinions of breeders.

mortality rate	disease incidence rate	% of sample size	educational status	Category
3%	50%	34	**high education**	educational features
4%	75%	26	**upper middle education**	
5%	85%	23.3	**Intermediate education**	
5%	85%	16.7	**uneducated**	
0.957	1.652	6.781	––	standard deviation
0.917	2.72	45.97	––	variance

–***Source : calculated and compiled from the sample survey***.

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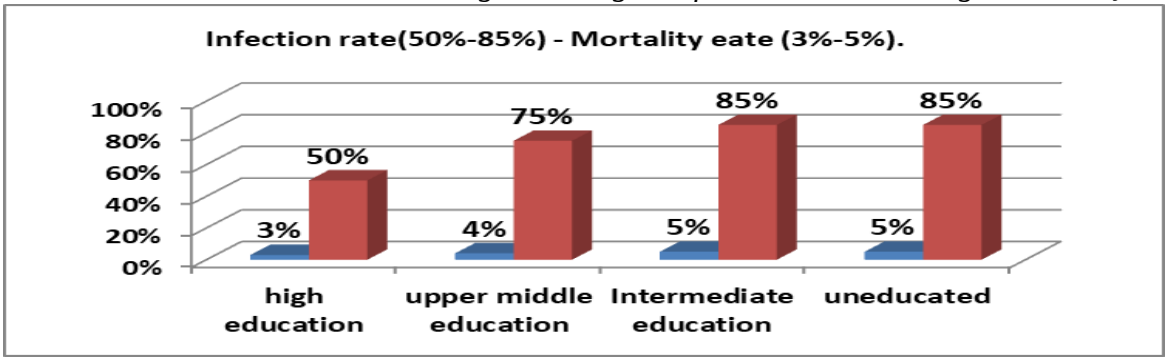
Figure (6): *Percentage of infection and death due to foot and mouth disease in animal production farms in Assiut Governorate, according to the degree of education according to* ***the survey***.



Source : calculated and compilied from the sample survey .

DISCUSSION

The effect of the disease on the development of livestock numbers in Assiut Governorate.

Tables No. (7, 8) indicate a general decreasing trend that is not statistically significant in the number of cows and buffaloes, estimated at 7.69 thousand heads annually, which represents about 1.49% of the average of about 513 thousand heads. As for sheep and goats, the same tables also indicate a general decreasing trend with statistical significance (0.01%) in the number of sheep and goats estimated at 19.08 thousand heads annually, representing about 3.12% of the average of about 612 thousand heads.

Table. (7): *The economic impact of foot-and-mouth disease on the number of animals in Assiut Governorate according to the estimates of breeders during the study period (2006-2020)*

disease state		Assiut Governorate (thousand heads)		Number of dead animals (Assiut)		The value of dead animals In thousand Egyptian pounds
	the years	buffalo and cows	sheep and goats	buffalo and cows	sheep and goats	
++	2006	540	623	16	19	290
++	2007	522	651	15	20	281
+	2008	530	682	16	20	294
+	2009	513	652	15	19	277
+	2010	519	652	16	19	291
+	2011	479	657	14	20	266
++	2012	562	744	17	22	315
++	2013	505	704	15	21	284
+	2014	492	652	15	20	281
+	2015	666	731	21	22	357
++	2016	670	776	20	23	360
++	2017	668	614	20	18	343
+	2018	423	451	22	19	406
+	2019	367	333	21	24	439
+	2020	245	258	19	20	432

Sources: -www.fao.org.(2020)

-WWW.OIE.org.(2020)

-Ministry of Agriculture and Land Reclamation, Egypt, Livestock Statistics Bulletin. Miscellaneous Issues 2020.

-The survey form prepared for this purpose.

(+) The status of the disease and its non-outbreak (++) The status of the disease being present and the outbreak.

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Table (8): Equations of the time trend of the development of animal numbers in Assiut Governorate during the studied period (2006-2020). (thousand heads).

Period	variable	The equation	R^2	F	annual rate of change%
2006-2020	Cows and buffaloes	$\hat{y}$ = 574.91 - 7.69X_1 (-1.153)	0.093	1.329	-1.49
	sheep and goats	$\hat{y}$ = 764.63 - 19.08X_1 *(-2.527)	0.329	6.368**	-3.12

ŷ is the estimated value of the dependent variable. X_1: time element = (1. 2.3. ...)

* Significant at 5% , ** Significant at 1%, The numbers in parentheses refer to the calculated (t) value.

-Source: calculated from Table 7.

Economic losses resulting from the outbreak and spread of the disease in Assiut Governorate, according to the opinions of breeders.

Direct losses:

Large Ruminants animals (i.e., cows and buffaloes): the numbers of dead animals is varied in Assiut Governorate. Table No. (7) indicates the highest losses in the numbers of dead cows and buffaloes in 2018, and it was estimated at 22 heads of livestock. Its minimum reached about 14 heads in 2011, with an annual average of about 16.6 heads during the study period (2006-2020).

Small ruminants animal (i.e., sheep and goats): The number of animals from the dead small ruminants in Assiut governorate is varied. The same table also indicates the highest losses in the numbers of dead sheep and goats in 2019 and it was estimated at 24 heads. It reached its lowest level in 2017 and was estimated at 18 heads, with an annual average of about 20.3 heads during the study period (2006-2020).

Total value of dead animals:

Table No. (7) shows a change in the value of the numbers of dead animals, and its lowest value was in 2011, estimated at 266 thousand Egyptian pounds, and the highest value of the total losses of dead animals in 2016 was estimated at 439thousand Egyptian pounds. With a average annual of 327.7thousand Egyptian pounds during the studied period (2006-2020), according to the estimates of breeders and landlords.

Table No. (9) shows that by estimating the multiple linear regression equation for the relationship between the effect of the presence of disease and the size of losses using the dummy variable, the dummy variable takes one value for each year of disease presence. And the value of the dummy variable is zero in the year of absence in Assiut Governorate. Where it was found that there was a statistically significant increase at a significant level (0.01%) in the value of the estimated size of losses by about 15,328 thousand pounds annually, equivalent to about 4.677% of the average value of losses, which is estimated at 327.7 thousand pounds.. The adjusted coefficient of determination R^{2-} indicates that about 73% of the changes are due to the influence of independent factors and the rest to other factors not measured in the model.

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Table. (9):): The multiple Regression equation and measuring the effect of foot and mouth disease on livestock mortality losses in Assiut Governorate during the studied period (2006-2020).

Period	variable	The equation	R^{2-}	R	F	annual rate of change%
2006-2020	**Total value of losses**	$\hat{y} = 233.02 + 10.81X_1 + 15.328x_2$ **(5.487) (0.898)	0.739	0.859	**16.953****	**4.677**

$\hat{y}$ is the estimated value of the dependent variable.

X_1 -The dummy variable takes the value 1 years of disease presence and the value zero years of non-existence.

X_2 The value of losses as a result of the spread of foot-and-mouth disease per year.

* Significant at 5% , ** Significant at 1% , The numbers in parentheses below the regression coefficients refer to the calculated (t) value.

***Source: calculated from Table 7*.**

indirect losses.

The costs of immunizations against foot and mouth disease, according to the opinions of breeders.

Table (10) shows the value of immunizations against foot-and-mouth disease by private breeders according to their opinions. The table shows that the cost of vaccination for the first holding group was less than (5) heads, estimated at about 3588 Egyptian pounds, and for the second holding group of (5 and less than 10) heads, the cost of vaccinations against foot and mouth disease was estimated at about 8175 Egyptian pounds, and for the third holding group (10) Heads The cost of vaccinations against foot and mouth disease was estimated at about 16675 Egyptian pounds, according to breeders' estimates.

***Table. (10):** Costs of immunizations against foot and mouth disease by breeders, according to their opinions.*

Possessive Categories	Repetition	Sample vocabulary distribution		The value of fortifications is an Egyptian pound
the first Less than (5) heads	**65**	cows	72	1800
		Buffalo	41	1025
		sheep and goats	61	763
	total	--	174	**3588**
the second From (5 and less than 10) heads	**47**	cows	169	4225
		Buffalo	158	3950
		sheep and goats	--	--
	total		327	**8175**
the third (10) heads or more	**38**	cows	391	9775
		Buffalo	276	6900
		sheep and goats	--	--
	total	--	667	**16675**
total	**150**		1168	**28438**

-Source : calculated and compilied from the sample survey.

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CONCLUSION

Through the foregoing, it is clear that the problem of transboundary animal diseases (TADS) (FMD), is one of the most important problems that meet is, especially foot and mouth disease the breeders with holdings in Assiut Governorate, and it directly affects their animal production. The third holding category (10 heads or more) is considered the most affected holdings under study by foot and mouth disease. Education is of great importance and impact on reducing the spread of the disease, as it was found from the study that the rate of infection and death was low among those with the highest degree of education. Foot and mouth disease in Assiut Governorate - Egypt causes losses, including direct and indirect death of animals, including immunizations against the disease.

supplement tables

Table No. (1): *Description of the sample vocabulary for the year 2020.*

The total distribution of the sample items		Abu Tig	Dayrut	**% of the total sample**	**Repetition**	**Possessive Categories**
		Al-Nakhila	mesara			
72	cows	**40**	**25**	%43.4	65	**the first Less than (5) heads**
41	Buffalo					
61	sheep and goats	%61.5 % of category	%38.5 % of category			
169	cows	**26**	**21**	%31.3	47	**the second From (5 and less than 10) heads**
158	Buffalo					
--	sheep and goats	%55.3 % of category	%44.7 % of category			
391	cows	**14**	**24**	%25.3	38	**the third (10) heads or more**
276	Buffalo					
--	sheep and goats	%36.8 % of category	%63.2 % of category			
1168	--	--	--	%100	150	**total**

Source : calculated and compilied from the sample survey.

Table No. (2): *Distribution of sample members according to the social and demographic characteristics of the research sample for the year 2020.*

Abu Tig - Al-Nakhilah		Dayrut - Mesara		Statement	
%	number	%	number		
96.3	77	95.7	67	male	Type
3.7	3	4.3	3	female	
100%	80	100%	70	Total	
7.5	6	14.3	10	Unmarried	social characteristics
92.5	74	85.7	60	Married	
--	--	--	--	divorced	
--	--	--	--	Widower	
100%	80	100%	70	Total	
16.3	13	17.1	12	uneducated	educational features
26.3	21	20	14	Intermediate education	
23.7	19	28.6	20	upper middle education	
33.7	27	34.3	24	high education	
100%	80	100%	70	Total	
38.7	31	32.8	23	Farmer	the work
35	28	38.6	27	employee (government, private)	
26.3	21	28.6	20	Runs a private project	
100%	80	100%	70	Total	

-Source : calculated and compilied from the sample survey.

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