

The Possibility of Achieving the Self-Sufficiency of Red Meat in Egypt

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Abstract: The study has shown that self-sufficiency of red meat can be achieved through adopting four different scenarios. The most important economic effects resulted from these four proposed scenarios are represented in that the increase in the amount of net meat will contribute in reducing the size of food gap of meat by about 41%, 0.6%, 24%, 18% and it will contribute in reducing the amount and the value of meat by about 56%, 8%, 33%, 25% in the first, second, third and fourth scenarios, respectively. Therefore, the study recommends that the state shall adopt the four proposed scenarios, especially the first and the third. The first scenario contributes to increase meat production through increasing the weights of all cattle and buffalo. However, the third scenario contributes to an increase in meat production through increasing the buffalo production of Egypt, compared to the increase in meat production through increasing the buffalo production of Egypt in the second and fourth scenarios.

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Introduction:

The issue of producing meat in Egypt makes the most important main obstacles before the authors of the Egyptian policy. This issue has become a major and lieutenant obstacle to all governments and different systems whether in terms of managing the resources to import feed or animals and their products or attempting to manage self-sufficiency for meat and different animal products. Moreover, overcoming this problem would be whether by vertical or horizontal expansion. Horizontal expansion usually needs to increase the number of animals and increase the feed in addition to increase the agricultural area, the matter that needs several years of hard work and exorbitant material resources. However, vertical expansion contributes to increase the productivity of animals through the diets featured by food additives and supplies which contribute, in their turn, to improve the performance of animal and raise the efficiency of its food and productivity. A good example of food additives is medical plants and herbs as their effects are endless in terms of increase birth weights and help in ovulation. Also, they are anti-disease and reinforced for immune system as well as increase the rates of digestion and increase the intake. These medical plants and herbs include fenugreek seeds, caraway, nigella sativa and chamomile flower which are added at not remembered rates. About 200 gm fenugreek seeds for milking buffalo or 50 gm nigella sativa contribute to improve growth rates and food conversion efficiency and thus raising the economic efficiency of animal and increasing the material and targeted return for breeders ⁽¹⁾.

Problem of Study:

Egypt has witnessed in the recent years several crises which have contributed directly to the decline in the numbers of big ruminants (cattle and buffalo). These crises include the diseases coming with the imported animals and also the climate changes that affect the fertility of Egyptian buffalos, in addition to the economic, financial and world crises and raising the prices of feed due to exploiting grains and soybeans in producing bio-fuels ⁽²⁾. In addition to many reasons including the failure to give the livestock sector an importance in the agricultural and economic policies, the absence of the concept that producing meat starts with mother, the state's trend to temporary solutions that depend on importation either in the live or frozen method in order to reduce the size of food gap of red meat, which would result in raising the value of deficit in the commodity balance of meat and the trade balance.

Aim of Study:

The study aims mainly to increase the ratio of self-sufficiency of red meat by increasing the amount of the supplied meat of the Egyptian cattle and buffalo. This matter would result in reducing the size of food gap of red meat and reducing the size the value of deficit in the trade balance through using the unconventional diets, or raising the reproductive efficiency of the Egyptian buffalos by controlling the phenomenon of slippage.

Research Method and the Sources to Obtain Data:

The study has depended on the quantitative and qualitative techniques of analysis in order to achieve its desired objective, in addition to some scenarios proposed by the study. These scenarios contribute directly to increase the ratio of self-sufficiency of red

meat in Egypt. Moreover, the study has relied on the data published from the records of the Ministry of Agriculture and Land Reclamation and the Central Agency for Public Mobilization and Statistics, in addition to some websites.

First: - the Economic Importance of the Agricultural and Livestock Production and Red Meat Production in Egypt:

It is shown that the average of the value of the agricultural, livestock and red meat production has reached to about 142.8 billion pounds, 44.2 billion pounds and 18.8 billion pounds. The value of animal production contributes by about 35.2% of the value of

agricultural production. However, the value of red meat contributes by about 41.3% of the total value of livestock during (2000-2011) ⁽⁴⁾. By using the equations of general time trend as illustrated in table No (1), it is shown that the value of agriculture and livestock production and red meat has increased during study period at an annual increase average estimated at 10.1 billion pound, 3.8 billion pounds and 2.02 billion pounds, at growth rates reached about 8.1%, 8.6% and 10.8% of the total average of the value of each of them, respectively. The significance of the relations estimated statistically has been fixed at the level of significance 0.01.

Table (1): - The equations of general time trend for the each value of: agricultural production, Livestock, red meat, during the period (2000 – 2011)

Value in million pounds, Quantity in thousand tons

The statement	A	B	Growth rate	T	F	R ²
The value of agricultural production	58925	10136.8	8.1	13.85	192.07	0.95
The value of livestock production	19608	3786.6	8.6	11.56	133.6	0.93
The value of red meat	5527	2022	10.8	16.87	284.7	0.69

Source:- calculated by reference (7)

Second: - the Development of Food Gap, Self-sufficiency Ratio and the Average of Per Capita of Red Meat in Egypt ⁽⁵⁾.

The Size of Food Gap: -

It is shown that production and consumption increase from about 705 thousand tons and 934 thousand tons in 2000 to about 988 thousand tons and 1333 thousand tons in 2011 at a rate of increase estimated at 283 thousand tons with an increase estimated at 40.1%, 42.7% for each of them, respectively. Moreover, it is shown that the size of the Egyptian food gap has increased from about 229 thousand tons in 2000 to about 345 thousand tons in 2011 with an increase estimated at 50.7%. This increase is due to the growing population, and thus the size of demand on red meat increases.

Self-sufficiency Percentage: -

The percentage of self-sufficiency has reached its maximum 85.5% in 2002, and then it started to decline until it reached about 74% in 2011 with a decline estimated at 11.5 %. This decline is due to the decline in the size of the produced amount compared with the total of the size of the consumed amount of red meat.

The Average of Per Capita: -

The rate of per capita of red meat ranges, during study period, between minimum amount reached to about 9.1 kg/year in 2001, and between a maximum amount reached to about 13 kg/year in 2007. However, the average of per capita of red meat has reached to about 9.4 kg/year in 2011. By comparing this rate, which reaches to 16 kg/capita, to the amount globally recommended by the World Health Organization, it is shown that this rate has been

declined by about 6.6 kg/year with a decline estimated at 41.3% compared to the average of per capita during 2011.

Third: - the Factors affecting on producing Red Meat in Egypt

It is indicated that the most important factors affecting on producing red meat in Egypt (Y_1), as clarified in the interim regression equation, are represented in the produced amount of green fodder thousand tons (x_{1i}), the produced amount of concentrated feed thousand tons (x_{2i}), the price of the produced unit of red meat pound/kg (x_{3i}) and the value of livestock loans million pounds (x_{4i}) as shown in the following equation: -

$$Y_1 = -485 + 0.120_{(3.1)}x_{1i} + 49.3_{(3.6)}x_{2i} + 0.4_{(2.8)}x_{3i} + 0.4_{(0.81)}x_{4i} \quad F = 16.8 \quad R^2 = 0.81$$

Moreover, the results of the equation indicate that the increase in feed production by thousand tons leads to an increase in the production of red meat by 12.5 thousand tons. The significance of this increase has been fixed significantly, indicating that the process of fattening to produce meat still depends on green fodder. The equation has shown that the increase in the price of produced kilo by about one pound leads to an increase in the produced amount of red meat by about 49.3 thousand tons, which points to the importance of product price in increasing red meat production. Also, the equation refers to that the increase in the production of concentrated feed by thousand tons contributes to increase the production of red meat by 0.4 thousand tons. The significance of

these increases, which are statistically estimated, has been fixed. However, the increase in the value of the loans provided to livestock production by one billion pounds contribute to increase red meat production by 40 tons, but the significance of this increase statically estimated does not have been fixed. Finally, the value of coefficient of determination indicates that about 81% of the changes in red meat production are due to the change in these factors. The significance of the relation, statically estimated, has been fixed at the level of significance 0.01.

The Enablers of Improving Self-sufficiency Ratio of Red Meat in Egypt

In order to improve the self-sufficiency ratio of the Egyptian red meat, the study suggests some scenarios contribute directly to increase the produced amount of cattle and buffalo meat. This matter results in an increase in the size of the supply of produced meat, a decline in the size of food gap of it and finally an increase in the ratio of self-sufficiency. The results of these scenarios can be illustrated as follow: -

The First Scenario: -

This scenario illustrates the importance to feed animals some unconventional diets which has achieved excellent results in the rates of converting fattening animals. These results exceed those which are achieved by traditional nutrition. This type of unconventional diets consists of rice straw treated with urea by injecting ammonia gas, as straw bales are stacked after being cut, then each 10 tons are covered by plastic. Injection is being done through equipped tanks, then ammonia is added by 35% of the weight of the waste used for two weeks and then it can be used as animal food. This method is distinguished by the ease digestion, resulting from ammonia reaction with cellulosic materials, in addition to increasing the nutritional value of waste because of the increase in protein percentage in the diet. Moreover, the study shows that this scenario contributes to increase the weight of small cattle and buffalo from about 126 kg to about 270 kg for cattle, and from about 55 kg to about 270 for buffalo. Also, it contributes to increase the weight of medium cattle and buffalo from about 275 kg to about 450 for cattle, and from about 264 kg to about 450 kg, as shown in table No (2). The results of table No (2) indicate that the total of the expected increase in cattle meat can reach about 108.2 thousand tons. Small cattle contribute by about 12.7 tons, while medium cattle contribute by about 95.5 thousand tons. Furthermore, the results of the same table refer to that the total of the expected increase in buffalo meat can reach about 135.5 thousand tons, which can be divided between 22 thousand tons of small buffalo, and 113.5 thousand tons of medium buffalo. The total increase in production can reach about 243.7 thousand tons

with an increase in production can reach about 24.7% of the total amount produced in 2011, amounting to about 988 thousand tons, and with a decline in the size of gap can reach about 18.3% of the total of gap size in 2011, amounting about 345 thousand tons. The table, also, shows that the total costs of feeding on rice straw for about 1.349 million head of cattle and buffalo can reach about 1.709 million pounds because of that there is an increase in cattle and buffalo weights, which reaches to about 144 kg/ small cattle, 175 kg/ medium cattle, 215 kg and 185 kg/ small and medium buffalo, as shown in table No (2).

The Second Scenario: -

This scenario depends on using a diet that can increase the productive efficiency of Egyptian buffalo through improving the reproductive and physiological efficiency of it in order to reduce the phenomenon of slippage of buffalo, which has increased recently with the climatic changes witnessed by Egypt and the world in the recent years. This diet contributes to reduce this phenomenon, which means reducing the wastage ratio of buffalo by 25% in the first year, and then it would start to be increased during the following years in order to eliminate or reduce this phenomenon. Moreover, this diet is distinguished by that it is balanced in both energy and protein, as it includes amounts of corn no less than 55% of the total diet. Also, it includes soybeans meal as a source of protein by 20% and bran by a percentage not exceeding 18%. Yeast can be added by about 10 kg/ head/ day, as it leads to an increase in animal's milk productivity. Furthermore, table No (2) shows that when using this kind of diet, it can contribute to improve the reproductive efficiency of buffalo and reduce the phenomenon of slippage by 25%. Thus, it would reduce the number of wastage of buffalo by about 138 thousand head, with a total increase in the amount of meat production by about 36.4 thousand tons, with an increase in the production. This increase can reach about 3.7% of the total amount produced in 2011, which amounts to 988 thousand tons, with a decline in the size of gap. This decline can reach about 10.6% of the total of gap size in 2011, which amounts to about 345 thousand tons. In addition, the table shows that the total costs of feeding on this diet, according to this scenario, are 621 thousand pounds because of the increase in the weight of each one of animal of buffalo by about 264 kg/ head, as shown in the table2.

The Third Scenario: -

This scenario is limited to the milking mothers of Egyptian buffalo. In this scenario is taken into account to vaccinate the milking animals early after about two months of giving birth in order to ensure eliminating the phenomenon of slippage within the herd, in addition to good nutrition and giving an

attention to health care and regular immunizations. But the decrease in the produced amount of milk by about 15 – 20% is taken on this method. According to this scenario, it is expected that the number of animal's heads would be increased to reach 552 thousand heads. This matter would result in an expected increase in the amount of production, amounting to 145.7 thousand tons, with an increase in the production reaches to 14.7% of the total of the

produced amount in 2011, which amounts to 988 thousand tons, and with a decline in the size of gap, amounting to about 42.2% of the total of gap size, in 2011, that reaches to 345 thousand tons. In addition, this scenario shows that the total of costs has reached to about 1.484 million pounds. Also, the total of the costs of the wastage of dairy has reached to about 1.318 million pounds, as shown in table No (3).

Table (2): - The expected increase in the production of red meat and the cost of fattening according to the of the first and second scenario

Scenario	Type	Age	The expected increase in weight per thousand tons	The number per thousand hea	Total increase in weight per thousand tons	Total costs in pound ^(*)	Notes
The first	Cows	Small	144	88	12675	88870	*The cost of feeding the rice straw
		Average	175	545	95528	669796	
		Total	319	633	108203	758666	
	Buffalo	Small	215	102	21945	153864	
		Average	185	614	113535	796053	
		Total	400	716	135480	949917	
Total			719	1349	243683	1708583	
The second	Buffalo	Average	138	552	36432	621000	*The cost of feeding the yeast

Source:- The first scenario:- calculated from the results of a reference number (9)

The second scenario:- calculated from the results of a reference number (6)

The Fourth Scenario: -

This scenario depends on using a range of salts ⁽³⁾ being mixed in the diet during nutrition. These salts contribute to decline the ratio of wastage of Egyptian buffalo heads by about 75%. According to this scenario, the expected increase in the amount of meat of buffalo may amount to about 109.3 thousand tons, with an increase in production, which can reach to about 11.1% of the total of the produced amount in 2011, which amounts to 988 thousand tons, and with a decline in the size of gap, in 2011, amounting to about 345 thousand tons. In addition, the total of the costs can reach to about 1.863 million pounds, as shown in table No (3).

Table (3): - The expected increase in the production of red meat, according to the third and fourth scenario

Scenario	Type	Age	The expected increase in weight per thousand tons	The number per thousand head	The weight of the animal	Total increase in weight per thousand tons	Total cost per thousand pound	Costs of lost Dairy in per thousand pound
Third	Buffalo	Average	552	552	264	145728	1484	13184
Fourth	Buffalo	Average	552	414	264	109296	1863000	-

Source:- The third scenario:- calculated from the results of a reference number(4),(5)

The Fourth scenario:- calculated from the results of a reference number (3)

The Economic Effects of the Proposed Scenarios: -

Studying the economic effects of applying the proposed scenarios, as illustrated in table No (4), shows that there is an increase in meat production by about 122 thousand tons, 18 thousand tons, 73 thousand tons and 55 thousand tons. This increase contributes, in its turn, to reduce the size of gap by about 41%, 6%, 24% and 18%, and reduce the amount and the value of the imports by about 56%, 8%, 33% and 25% in each of the four scenarios, respectively. Moreover, studying the results of the rate of return on costs shows that there is an achievement of a return through applying the different scenarios. But this return has increased in

the first scenario by about 1.92 pounds and 1.73 pounds. Also, this return has increased, for the third scenario, by about 1 pound and 0.81 pounds compared to the second and the fourth scenarios, respectively, as shown in table No (4).

The Most Important Findings and

Recommendations

The most important findings of the study are limited to: -

- Increasing the value of the agricultural and livestock production and red meat, and also increasing the production, consumption and the size

of the gap of Egyptian meat during study period (2000-2011).

- Decreasing the percentage of self-sufficiency by about 11.5% during study period, and also decreasing the average of per capita of meat by about 41.3% during 2011 compared to the amount which is globally recommended.
- It is shown that the most important factors affecting on meat production in Egypt are represented in the produced amount of green fodder, the produced amount of concentrated feed, the price of the produced unit of meat pound/ kg and the value of livestock production million pounds.
- In order to improve the ratio of self-sufficiency of red meat, the study has identified four scenarios. Each scenario contributes by an increase in the weight of animal. This increase can reach about 719 thousand tons of cattle and buffalo, for the first scenario, 138 thousand tons, 552 thousand tons and 552 thousand tons of buffalo for the second, the third and the fourth scenarios, respectively.
- The most important economic effects of applying these four proposed scenarios are represented in that the increase in the amount of net meat will

contribute to reduce the size of food gap of meat by about 41%, 6%, 24% and 18% and reduce the amount and the value of imports of meat by about 56%, 8%, 33% and 25%. It is shown that the value of the return on the invested pound has reached 1.94 pounds, 0.02 pounds, 1.02 pounds and 0.21 pounds, respectively, in the first, the second, the third and the fourth scenarios. In the light of these results, the most important recommendations of the study aim at increasing the ratio of self-sufficiency of red meat in Egypt, which requires an increase in meat production through the state's adoption of the four proposed scenarios, especially the first and the third. The first scenario contributes to increase meat production by increasing the weights of cattle and buffalo, while the third scenario contributes to increase meat production by increasing the Egyptian buffalo production, compared to increasing meat production through increasing the Egyptian buffalo production in the second and the fourth scenarios.

Table (4): - The economic returns of the proposed scenarios

The statement	Unity	The first	The second	The third	The fourth
The increase in meat production(Standing)	Thousand tons	244	36	146	109
The increase in meat production(The net)	Thousand tons	122	18	73	55
Gap feed 2011	Thousand tons	298	298	298	298
The ratio of coverage the meat gap	%	41	6	24	18
The amount of meat imports in 2011	Thousand tons	218	218	218	218
The ratio of imports coverage	%	56	8	33	25
The value of the increase in meat production	Thousand pounds	5026	750	3001	2252
The value of meat imports in 2011	Million dollars	853	853	853	853
The value of imports tons of meat in 2011	Dollar/ tons	3913	3913	3913	3913
The decline in the value of imports	Million dollars	477	7	286	215
The ratio of decline in the value of imports	%	56	8	33	25
The cost of fattening	Thousand pounds	1709	621	1484	1863
The ratio of Revenue / Cost	pound	2.94	1.21	2.02	1.21
The return on investor pound	pound	1.94	0.02	1.02	0.21

Summary:

The issue of producing meat in Egypt makes the most important main obstacles before the authors of the Egyptian policy. This issue has become a major and lieutenant obstacle to all governments and different systems. Egypt has witnessed in the recent years several crises which have contributed directly to the decline in the numbers of big ruminants (cattle and buffalo). In general, the study aims, mainly, to increase the ratio of self-sufficiency of red meat by increasing the amount of supply of the meat of the Egyptian cattle and buffalo. This matter results in reducing the size of food gap of red meat and reducing the value of deficit in trade balance by using some unconventional diets or raising the reproductive

efficiency of the Egyptian buffalo by controlling the phenomenon of slippage. Moreover, in order to achieve the aim of, the study has depended on the data published from the records of the Ministry of Agriculture and Land Reclamation and the Central Agency for Public Mobilization and Statistics, in addition to some websites. Also, the study has depended on using the quantitative and qualitative techniques of analysis, in addition to proposing a range of scenarios. The most important results of these scenarios are increasing the ratio of self-sufficiency of red meat in Egypt as follows 122 thousand tons, 18 thousand tons, 73 thousand tons and 55 thousand tons, reducing the size of food gap of meat by about 41%, 6%, 24% and 18%, and also

reducing the amount and the value of imports by about 56%, 8%, 33% and 25%, respectively, for the four proposed scenarios. In the light of these results, the most important recommendations of study are limited to the necessity of the state's adoption of the four proposed scenarios specially the first and the third scenarios. The first scenario contributes to increase the production of cattle and buffalo, while the third contributes to increase meat production by increasing the Egyptian buffalo production, compared to increasing meat production through increasing the Egyptian buffalo production in the second and the fourth scenarios.

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