التغيرات المناخية والميزة النسبية في قطاع الثروة الحيوانية في مصر

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المستخلص:

استهدفت هذه الدراسة قياس آثار التغيرات المناخية على الميزة النسبية لقطاع الإنتاج الحيواني في مصر. ولقد توصلت الدراسة إلى أن مصر تتمتع بمزايا نسبية في إنتاج لحوم الدواجن والبيض والأسماك والألبان لكنها لا تتمتع بميزة نسبية في إنتاج مزارع تسمين العجول (البقر والجاموس) بسبب أن معظم المدخلات في هذا القطاع وأهمها الأعلاف . مستوردة.

وقد تبين أن الأبقار الأجنبية exotic Cow تتمتع بأعلى ميزة نسبية في إنتاج الألبان ، كما تتمتع أبقار الألبان البلدي native dairy Cow في نظم الإنتاج التقليدية بميزة نسبية نتيجة لأن المنتجات الأخرى غير الألبان non-milk returns 45% من إجمالي العائد بسبب أن الأعلاف غير التقليدية الرخيصة تمثل المصدر الرئيسي للمنتجين . وفيما يتعلق بالإنتاج الداجن، فقد أظهرت الدراسة أن المزارع كبيرة السعة تتمتع بميزة نسبية أعلى من نظيرتها صغيرة السعة . وقد أظهرت الدراسة أيضا أن أكثر نظم الإنتاج تنافسية هي مزارع الدواجن كبيرة السعة ومزارع إنتاج الألبان من الأبقار الأجنبية ، حيث قدر مؤشر تكلفة الموارد المحلية DRC بنحو ٠,٢٣ و ٠,٢٥ على الترتيب ، ويعزى ذلك بشكل رئيسي إلى أن أسعار المساواة لكل من البيض والألبان تكون غالبا ضعف أسعارها المحلية . كما أظهرت الدراسة أن مزارع إنتاج الأسماك تتمتع أيضا بميزة نسبية عالية إلى حد ما ، ويعزى ذلك إلى ارتفاع معامل تحويل الغذاء في هذه المزارع.

ويتطبيق تحليل الحساسية sensitivity analysis من خلال ثلاثة سيناريوهات

أظهرت الدراسة أن ارتفاع تكلفة الوقود (السيناريو الأول) بسبب التغيرات المناخية المتوقعة سوف تؤدي إلى انخفاض المزايا النسبية في النظم الانتاجية ، المختلفة بنسب تتراوح ٠,١٠% (مزارع إنتاج الألبان من الأبقار الأجنبية) و ٤٣,٨% (مزارع إنتاج البداري ذات السعات الصغيرة). كما أظهرت الدراسة ان ارتفاع تكلفة الاعلاف (السيناريو الثاني) سوف تؤدي إلى انخفاض المزايا النسبية في النظم الانتاجية المختلفة بنسب تتراوح بين ٢,٥% (مزارع تسمين الجاموس) إلى ٣٣,٧% (مزارع إنتاج البداري ذات السعات الصغيرة).

واخيرا أظهرت الدراسة ان تحسين الانتاجية (السيناريو الثالث) سوف تؤدي إلى ارتفاع الميزة النسبية في النظم الإنتاجية المختلفة بنسب مختلفة تتراوح بين ٥,٥% (مزارع إنتاج الأسماك) و ٢١,٤% (مزارع إنتاج البداري ذات السعات الصغيرة) وذلك فيما عدا تسمين عجول الجاموس ، حيث أظهرت الدراسة أن مصر مازالت لا تتمتع فيها بميزة نسبية حتى في ظل افتراض تحسين مستوى الإنتاجية .

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Table (13): DRC, Private and Social Profitability under the third scenario.

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	DR C	Comp. Adv.	Ranking	LE/ton	Profit/Loss	Ranking	LE/ton	Profit/Loss	Ranking
Exotic dairy cow	0.22	Yes	2	1,981	profit	7	2,750	profit	6
Crossbred dairy cow	0.58	Yes	7	1,460	profit	9	2,060	profit	7
Buffalo dairy cow	0.65	Yes	8	1,601	profit	8	1,815	profit	8
Native dairy cow	0.63	Yes	9	1,380	profit	11	1,525	profit	9
Fattened head: native	0.97	Yes	10	5,204	profit	1	791	profit	10
Fattened head: buffalo	1.08	No	11	3,898	profit	3	-2,505	loss	11
1000 Broiler: large scale	0.44	Yes	5	3,557	profit	4	4,758	profit	3
1000 Broiler: small scale	0.55	Yes	6	2,119	profit	6	3,315	profit	5
1000 layers: Large scale	0.20	Yes	1	4,438	profit	2	11,734	profit	1
1000 layers: small scale	0.26	Yes	3	3,015	profit	5	10,353	profit	2
10000 tilapia fingers	0.39	Yes	4	1,459	profit	10	3,848	profit	4

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

Table (14): The impact of the third scenario on the DRC, Private and Social Profitability

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	DRC3	DRC	Changes %	LE/ton3	LE/ton	Changes %	LE/ton3	LE/ton	Changes %
Exotic dairy cow	0.22	0.25	-10.30%	2,240	2,193	2.14%	2,750	2,578	6.67%
Crossbred dairy cow	0.58	0.64	-9.00%	2,415	1,838	31.39%	2,060	2,355	-12.53%
Buffalo dairy cow	0.65	0.7	-7.10%	2,333	1,699	37.32%	1,815	1,767	2.72%
Native dairy cow	0.63	0.71	-11.30%	1,566	1,220	28.36%	1,525	1,238	23.18%
Fattened head: native	0.97	1.04	-6.30%	7,766	9,797	-20.73%	791	-12441	-106.36%
Fattened head: buffalo	1.08	1.15	-6.00%	6,566	7,551	-13.04%	-2,505	-16765	-85.06%
1000 Broiler: large scale	0.44	0.53	-17.20%	4,323	3,955	9.30%	4,758	3152	50.95%
1000 Broiler: small scale	0.55	0.7	-21.40%	2,344	2225	5.35%	3,315	1416	134.11%
1000 layers: Large scale	0.2	0.23	-11.30%	6,678	6,079	9.85%	11,734	11021	6.47%
1000 layers: small scale	0.26	0.29	-12.00%	4,789	4,541	5.46%	10,353	9498	9.00%
10000 tilapia fingers	0.39	0.42	-5.50%	1,987	1,761	12.83%	3,848	3150	22.16%

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

Table (11): DRC, private and social profits under the second scenario

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	DRC	Comp. Adv.	Ranking	LE/ton	Profit/Loss	Ranking	LE/ton	Profit/Loss	Ranking
Exotic dairy cow	0.28	Yes	1	1,666	profit	2	2,519	profit	4
Crossbred dairy cow	0.75	Yes	6	682	profit	5	1,249	profit	6
Buffalo dairy cow	0.81	Yes	7	764	profit	4	1,015	profit	7
Native dairy cow	0.86	Yes	8	379	profit	7	519	profit	8
Fattened head: native	1.14	No	10	572	profit	6	-4,037	loss	10
Fattened head: buffalo	1.18	No	11	-740	loss	10	-5,346	loss	11
1000 Broiler: large scale	0.67	Yes	5	1,003	profit	3	2,190	profit	5
1000 Broiler: small scale	0.94	Yes	9	-867	loss	11	312	loss	9
1000 layers: Large scale	0.28	Yes	2	2,167	profit	1	9,517	profit	1
1000 layers: small scale	0.36	Yes	3	334	Profit	8	7,728	profit	2
10000 tilapia fingers	0.52	Yes	4	317	Profit	9	2,699	profit	3

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

Table (12): The impacts of the second scenario on the DRC, private and social profit

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	DRC 2	DR C	Changes %	LE/ton 2	LE/ton	Changes %	LE/ton2	LE/ton	Changes %
Exotic dairy cow	0.28	0.25	12.20%	1,666	2,193	-24.03%	2,519	2,578	-2.29%
Crossbred dairy cow	0.75	0.64	16.30%	682	1,838	-62.89%	1,249	2,355	-46.96%
Buffalo dairy cow	0.81	0.70	14.70%	764	1,699	-55.03%	1,015	1,767	-42.56%
Native dairy cow	0.86	0.71	20.50%	379	1,220	-68.93%	519	1,238	-58.08%
Fattened head: native	1.14	1.04	9.50%	572	9,797	-94.16%	-4,037	-12441	-67.55%
Fattened head: buffalo	1.18	1.15	2.50%	-740	7,551	-109.80%	-5,346	-16765	-68.11%
1000 Broiler: large scale	0.67	0.53	26.40%	1,003	3,955	-74.64%	2,190	3152	-30.52%
1000 Broiler: small scale	0.94	0.7	33.70%	-867	2,225	-138.97%	312	1416	-77.97%
1000 layers: Large scale	0.28	0.23	21.30%	2,167	6,079	-64.35%	9,517	11021	-13.65%
1000 layers: small scale	0.36	0.29	24.10%	334	4,541	-92.64%	7,728	9498	-18.64%
10000 tilapia fingers	0.52	0.42	23.60%	317	1,761	-82.00%	2,699	3150	-14.32%

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

Appendix

Table (9): DRC, private and social profits under the first scenario

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	DRC	Comp . Adv.	Ranking	LE/ton	Profit/Loss	Ranking	LE/ton	Profit/Loss	Ranking
Exotic dairy cow	0.25	Yes	1	1,814	Profit	2	2,639	profit	4
Crossbred dairy cow	0.65	Yes	5	1,160	Profit	5	1,713	profit	6
Buffalo dairy cow	0.70	Yes	6	1,326	Profit	4	1,573	profit	5
Native dairy cow	0.72	Yes	7	1,033	Profit	6	1,158	profit	7
Fattened head: native	1.12	No	9	2,334	Profit	3	-3,379	loss	10
Fattened head: buffalo	1.16	No	10	1,054	Profit	9	-4,655	loss	11
1000 Broiler: large scale	0.63	Yes	8	1,365	Profit	10	2,575	profit	8
1000 Broiler: small scale	1.01	Yes	11	-1,251	Loss	11	-55	loss	9
1000 layers: Large scale	0.26	Yes	2	2,859	Profit	1	10,160	profit	1
1000 layers: small scale	0.33	Yes	3	1,149	Profit	8	8,480	profit	2
10000 tilapia fingers	0.47	Yes	4	768	Profit	7	3,175	profit	3

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

Table (10): The impacts of the first scenario on the DRC, private and social profit

Livestock types	Domestic Resource Cost			Private Profitability			Social Profitability		
	After	Before	Changes %	LE/ton (after)	LE/ton (before)	Changes %	LE/ton (after)	LE/ton (before)	Changes %
Exotic dairy cow	0.25	0.25	0.10%	1,814	2,193	-17.28%	2,639	2,578	2.37%
Crossbred dairy cow	0.65	0.64	1.80%	1,160	1,838	-36.89%	1,713	2,355	-27.26%
Buffalo dairy cow	0.7	0.7	-0.10%	1,326	1,699	-21.95%	1,573	1,767	-10.98%
Native dairy cow	0.72	0.71	0.10%	1,033	1,220	-15.33%	1,158	1,238	-6.46%
Fattened head: native	1.12	1.04	7.30%	2,334	9,797	-76.18%	-3,379	-12441	-72.84%
Fattened head: buffalo	1.16	1.15	0.50%	1,054	7,551	-86.04%	-4,655	-16765	-72.23%
1000 Broiler: large scale	0.63	0.53	19.40%	1,365	3,955	-65.49%	2,575	3152	-18.31%
1000 Broiler: small scale	1.01	0.7	43.80%	-1,251	2,225	-156.22%	-55	1416	-103.88%
1000 layers: Large scale	0.26	0.23	13.50%	2,859	6,079	-52.97%	10,160	11021	-7.81%
1000 layers: small scale	0.33	0.29	14.80%	1,149	4,541	-74.70%	8,480	9498	-10.72%
10000 tilapia fingers	0.47	0.42	12.30%	768	1,761	-56.39%	3,175	3150	0.79%

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

increasing egg rate by 30 egg/layer/lot and fish production system through increase the final weight of fish by 25 grams.

The impacts of improving the previous productivities at farm level on the comparative advantages and profitability of livestock products are measured in (table 13- Appendix). The results in the table can be summarized as follows: (i) The livestock and poultry products achieve private profit. (ii) The livestock and poultry products, except the buffalo meat production, achieve social profit. (iii) The livestock and poultry products, except buffalo meat production, enjoy comparative advantages.

The changes in the DRC, private and social profits of livestock and poultry products under the third scenario are presented in (Table 14- Appendix). The results shown in the table show: (i) The DRC of milk, broiler meat, egg and fish products have been increased significantly (i.e., by 5.50% to 21.4%). (ii) The private profits of some livestock products have been increased significantly by different ratios (from 2.14% for milk produced from exotic dairy to 37.32% for buffalo dairy cow, but the private profits of the native cattle and buffalo meat have been decreased). (iii) The social profits of all livestock products have been increased significantly by different ratios (by 2.72% to 134.11%), except crossbred dairy cow has been decreased by 12.53%.

6- Conclusion :

This paper has aimed to estimate the impact of increases in the world prices of feed ingredients because of the climate and environment changes on the comparative advantages of livestock products in Egypt.

The Egyptian livestock sector enjoys comparative advantages in producing broiler meat, egg, fish and milk production. But, in the case of Fattened calves, the native cattle and buffalo production systems do not enjoy comparative advantages. In producing red meat. This is because of high input cost in terms of purchased young stock (cattle) and imported feed ingredients. In the case of dairy cows, exotic cow enjoys the highest comparative advantage in producing milk among the dairy cows, because of the high yield of milk per cow. The native dairy cow in traditional system

has comparative advantage because the non – milk returns represents 45 % of the total returns and the cheap forages are the main source of the nutrition. For layer and broiler, large scale production systems have more comparative advantages than the small ones. The most competitive systems is the large scale production system of layer and exotic dairy cow which yield DRC equals to 0.23 and 0.25, respectively. This is due mainly to fact that the average border price of egg and milk is almost double the local one. The fish production in Ponds enjoys quite high comparative advantage. The high fish production rate and the improved feed conversion rate are main reasons beyond this phenomenon.

By applying sensitivity analysis the study found that under - the first scenario (increase energy costs) - the livestock and poultry products, except cattle meat and poultry meat from small scale production systems, enjoy comparative advantages. Under the second scenario (increase feed cost), the livestock and Poultry products except buffalo and native cattle meat production, enjoy comparative advantages. Finally under the third scenario (improve Productivity) the livestock and Poultry products, except buffalo meat production enjoy comparative advantages.

The study show that increases in costs due to the expected climate changes will decrease. The comparative advantages in different production systems by different ratios, from 2.5% (for fattened buffalo) and 33.7% (for broiler meat produced from small scale farms)

(ii). The livestock and poultry products, except the broiler meat in small scale production and cattle meat, achieve social profit. (iii) The livestock and poultry products, except cattle meat and poultry meat from small scale production systems, enjoy comparative advantages.

The changes in the DRC, private and social profits of livestock and poultry products under the first scenario are presented in (Table 10-Appendix). The results shown in the table show: (i) The DRC of bovine meat, broiler meat, egg and fish products have been decreased significantly. (ii) The DRC's of milk under the different animal types don't changes significantly. (iii) The private profits of beef meat, broiler meat, egg and fish products have been decreased significantly by different ratios (-52.97% for egg produced from large scale production systems and 156.22% for broiler meat produced from small scale production systems). (iv). The social profits of broiler meat, egg and fish products have been decreased significantly by different ratios (-7.81% for egg produced from large scale production systems and -103.88% for broiler meat produced from small scale production systems).

5.5.2 The second scenario: increase feed costs

In the second scenario the impacts of increase the feed costs at farm level by 20% on the comparative advantages and profitability of livestock products are going to be measured. Feed costs include concentrates and forage costs. The impacts of the feed costs increase on the private and social profitability and the DRC of livestock products are presented in (Table 11- Appendix). The results in the table can be summarized as follows: (i) The livestock and

poultry products, except the buffalo meat and broiler meat in small scale production, achieve private profit. (ii) The livestock and poultry products, except the buffalo and native cattle meat production, achieve social profit. (iii). The livestock and poultry products, except buffalo and native cattle meat production, enjoy comparative advantages .

The changes in the DRC, private and social profits of livestock and poultry products under the second scenario are presented in (Table 12-Appendix). The results shown in the table show: (i) The DRC of milk, broiler meat, egg and fish products have been decreased significantly (i.e., by 12.2% to 33.7%). (ii) The DRC's of bovine and buffalo meat decreased by 9.5% and 2.5%. (iii) The private profits of all livestock products have been decreased significantly by different ratios (from -24.03% for milk produced from exotic dairy and -138.97% for broiler meat produced from small scale production systems). (iv). The social profits of all livestock products (except exotic dairy) have been decreased significantly by different ratios (-13.65% for egg produced from large scale production systems and -77.97% for broiler meat in small scale production system). The social profit of milk produced from exotic dairy has been decreased by 2.29% only.

5.5.3 The third scenario: improve productivity

Improving the productivity of livestock products by different ways are the main objective of the third scenario. Improving the dairy production system through reducing the calving interval by one month, the meat fattening system by increasing the daily liveweight gain by 14% (from 1.38 kg/day to 1.58 kg/day), broiler production system through increasing the final liveweight of bird by 150 grams/bird, layer production system through

Table (8): Summary of Results of DRC

Livestock types	Domestic Resource Cost		
	DRC	Comparative Advantage	Ranking
Exotic dairy cow	0.25	Yes	2
Crossbred dairy cow	0.64	Yes	6
Buffalo dairy cow	0.70	Yes	7
Baladi dairy cow	0.71	Yes	8
Fattened head: native	1.04	No	10
Fattened head: buffalo	1.15	No	11
1000 Broiler: large scale	0.57	Yes	5
1000 Broiler: small scale	0.77	Yes	9
1000 layers: Large scale	0.23	Yes	1
1000 layers: small scale	0.29	Yes	3
10000 tilapia fingers	0.42	Yes	4

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

5.5. Sensitivity analysis

5.5.1 The first scenario: increase energy costs

A report about “The petrol consumption subsidy map in the world: where is Egypt lie?” issued by the Cabinet’s Information and Decision Support Centre (IDSC) present that the fuel subsidy is estimated at LE 60.3 billion representing 72% of the overall subsidies bill in 2007-08. The report noted that the octane gas and diesel were subsidised by 1.9 LE/litre and 3.22 LE/litre, respectively, in 2006. Subsidies represent the difference between the international price of energy and its local selling price.

The current prices of electricity and potages in livestock and poultry projects are about 0.24 LE/Kw and 4 LE/unit. Also, the current price of diesel is 1.1 LE/litre. If the current

prices of electricity, potages and diesel increases by 100% the energy costs will increase by 100% and the transportation costs will increase by 20%. The energy costs represent 20% of the transportation costs. In the first scenario the costs of electricity, potages and transportation in the livestock projects will increase from 0.24 LE/kw, 4 LE/unit and 50 LE/ton to 0.55 LE/kw (current price of commercial projects), 8 LE/unit and 60 LE/ton, respectively.

The impacts of the previous increases on the private and social profitability and the DRC of livestock products are presented in (Table 9 - Appendix). The results in the table can be summarized as follows: (i) The livestock and poultry products, except the broiler meat in small scale production, achieve private profit.

Table (7): Summary of Results of Protection

Livestock types	Protection on Output			Protection on Tradable Inputs			Effective Protection		
	NPC	RNP	Incentives	NPI	RNPI	Incentives	EPC	REP	Incentives
Exotic dairy cow	0.79	-21%		0.90	-10%		0.77	-23%	
Crossbred dairy cow	0.85	-15%		0.80	-23%		0.86	-13%	
Buffalo dairy cow	0.93	-7%		0.72	-28%		0.95	-5%	
native dairy cow	0.86	-14%		0.85	-15%		0.87	-13%	
Fattened head: native	1.05	5%		0.91	-9%		1.10	10%	
Fattened head: buffalo	1.05	5%		0.91	-9%		1.10	10%	
1000 Broiler: large scale	0.93	-7%		0.88	-12%		0.99	-1%	
1000 Broiler: small scale	0.93	-7%		0.88	-12%		1.02	2%	
1000 layers: Large scale	0.64	-36%		0.98	-2%		0.49	-51%	
1000 layers: small scale	0.64	-36%		0.98	-2%		0.45	-55%	
10000 tilapia fingers	0.77	-23%		1.22	22%		0.47	-53%	

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

5.4. Measure of Comparative Advantages of livestock products

The Domestic Resource Cost (DRC) analyses shown in table (8) summarize the following points:

- (i). The Egyptian livestock sector enjoys comparative advantages in producing broiler meat, egg, fish and milk production.
- (ii). In the case of fattened calves, the native cattle and buffalo production systems do not enjoy comparative advantages (i.e., 1.04 and 1.15, respectively) in producing red meat. This is because of high input cost in terms of purchased young animals and imported feed ingredients.
- (iii). In the case of dairy cows, exotic cow enjoys the highest comparative advantage (i.e., 0.25) in producing milk among the dairy cows. This is because of the high yield of milk per cow (i.e., 11783 kg/lactation period). The

baladi dairy cow in traditional system has comparative advantage (0.71) because the non-milk returns represents 45% of the total returns and the cheap forages are the main source of the nutrition.

- (iv). For layer and broiler, large scale production systems have more comparative advantages than the small ones.

(v). The most competitive systems is the large scale production system of layer and exotic dairy cow which yield DRC equals to 0.23 and 0.25, respectively. This is due mainly to fact that the average world price of imported egg and milk is almost double the local one.

- (vi). The fish production in ponds enjoys quite high comparative advantage (i.e., 0.42). The high fish production rate (40 kg/cubic meter of water) and the improved feed conversion rate are (i.e., 1.6 kg of feed/kg of fish) the main reasons beyond this phenomenon.

5.2.5 Fish Production

The economic efficiency measures of fish production in aquaculture have been calculated according the main key production, technical and economic parameters.

The private and social total production costs, net production costs, margins (or farmer income), net profits per 10000 fish fingers or ton of fish are presented in table (6). The results

in the table summarize that: (i) The changes among the private and social total production costs per 10000 fish fingers or per ton of fish are trifle (0.5%). and (ii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers per 10000 fish fingers or per ton of fish are very large (i.e., 50.9% and 78.5% respectively).

Table (6): Economic Efficiency Measures for 10000 fingers of tilapia, 2010/2011

Indicators	Unit	Private	Social	Change
Total production costs per ton of fish	LE/ton	7236	7275	0.5%
Gross margin per ton of fish	LE/ton	2723	4109	50.9%
Net profit per ton of fish	LE/ton	1764	3150	78.5%

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

5.3. Measures of Protection Coefficients

5.3.1 Nominal Protection Coefficient (NPC)

The results shown in table (7) present the following points: (i) The Egyptian livestock producers of egg, fish and milk production face implicit taxes because the private prices of their products is less than the border prices and (ii) In the case of fattened calves, the native cattle and buffalo producers enjoy implicit subsidies where their private prices are higher than the border prices.

5.3.2 Nominal Protection Coefficient on Tradable Inputs (NPI)

The results shown in table (7) present that the Egyptian livestock producers of broiler, egg, meat and milk production are subsidized when they buy tradable inputs but the fish producers don't.

5.3.3 Effective Protection Coefficient (EPC)

The data shown in table (7) present that the overall impacts of the existing policies results in a net negative incentive in producing milk, egg and fish. In contrary, overall impacts of the existing policies results in a net positive incentive in producing meat and broiler.

Table (4): Economic Efficiency Measures for exotic, buffalo, cross-bred and native cattle, 2010/2011

Indicators	Unit	Private	Social	Change
<u>Exotic:</u>				
Total production costs per ton of milk	LE/ton	1705	1685	-1.1%
Net production costs per ton of milk	LE/ton	1307	1287	-1.5%
Gross margin per ton of milk	LE/ton	2297	2682	16.8%
Net profit per ton of milk	LE/ton	2193	2578	17.5%
<u>Cross bred:</u>				
Total production costs per ton of milk	LE/ton	4606	4355	-5.4%
Net production costs per ton of milk	LE/ton	1762	1510	-14.3%
Gross margin per ton of milk	LE/ton	1918	2436	27.0%
Net profit per ton of milk	LE/ton	1838	2355	28.2%
<u>Buffalo:</u>				
Total production costs per ton of milk	LE/ton	4491	4290	-4.5%
Net production costs per ton of milk	LE/ton	2301	2099	-8.8%
Gross margin per ton of milk	LE/ton	1788	1856	3.8%
Net profit per ton of milk	LE/ton	1699	1767	4.0%
<u>Native cattle:</u>				
Total production costs per ton of milk	LE/ton	5301	5649	6.6%
Net production costs per ton of milk	LE/ton	2280	2627	15.2%
Gross margin per ton of milk	LE/ton	1233	1251	1.5%
Net profit per ton of milk	LE/ton	1220	1238	1.5%

Source: Compiled and computed from field visit tours using the participatory rapid appraisal, 2010-2011

Table (5): Economic Efficiency Measures for fattened buffalo and native cattle head, 2010/2011

Indicators	Unit	Private	Social	Change
<u>Buffalo:</u>				
Total production costs per ton of meat	LE/ton	53307	58010	8.8%
Net production costs per ton of meat	LE/ton	42449	50143	18.1%
Gross margin per ton of meat	LE/ton	8806	-15511	-276.1%
Net profit per ton of meat	LE/ton	7551	-16765	-322.0%
<u>Native cattle:</u>				
Total production costs per ton of meat	LE/ton	51064	53688	5.1%
Net production costs per ton of meat	LE/ton	40203	45820	14.0%
Gross margin per ton of meat	LE/ton	11053	-11186	-201.2%
Net profit per ton of meat	LE/ton	9797	-12441	-227.0%

Source: Compiled and computed from field visit tours using the policy analysis matrix, 2010-2011

The private and social total production costs, net production costs, margins (or farmer income), net profits per crossbred cow or ton of milk are presented in table (4). The results in the table summarize that: (i) The changes among the private and social total production costs per crossbred cow or per ton of milk are relatively notable (-5.4%). (ii) The changes between the private and social net production costs per ton of milk is quite significant (-14.3%) and (iii). The changes among the private and social gross margins (farmer incomes) or net profits of farmers per crossbred cow or per ton of milk are quite large (i.e., 27.0% and 28.2% respectively).

3. Milk Production: buffalo production system

The private and social total production costs, net production costs, margins (or farmer income), net profits per buffalo cow or ton of milk are presented in table (4). The results in the table summarize that: (i) The changes among the private and social total production costs per crossbred cow or per ton of milk are relatively small (-4.5%). (ii) The changes between the private and social net production costs per ton of milk is relatively remarkable (-8.8%) and (iii). The changes among the private and social gross margins (farmer incomes) or net profits of farmers per buffalo cow or per ton of milk are relatively small (i.e., 3.8% and 4.0% respectively).

4. Milk Production: native cattle production system

The private and social total production costs, net production costs, margins (or farmer income), net profits per native cow or ton of milk are presented in table (4). The results in the table summarize that: (i) The changes among the private and social total production costs per native cow or per ton of milk are large (6.6%). (ii) the changes between the private and social net production costs per ton of milk is quite significant (15.2%) and (iii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers per

native cow or per ton of milk are very small for both of them (1.5%).

5.2.4. Fattening Production

Two fattening production systems can be distinguished in Egypt where their production and technical parameters are relatively different. The two production systems are buffalo and native cattle. The economic efficiency measures of beef production have been calculated according the main key production, technical and economic parameters.

1. Fattening Production: buffalo production system

The private and social total production costs, net production costs, margins (or farmer income), net profits per fattened head or ton of beef meat are presented in table (5). The results in the table summarize that: (i) the changes among the private and social total production costs per fattened head or per ton of meat are significant (8.8%). (ii) The changes between the private and social net production costs per ton of meat is relatively large (18.1. %) and (iii). The changes among the private and social gross margins (farmer incomes) or net profits of farmers per fattened head or per ton of meat are negative and very large (i.e., -267.6% and -426.2% respectively).

2. Fattening Production: native cattle production system

The private and social total production costs, net production costs, margins (or farmer income), net profits per fattened head or ton of beef meat are presented in table (5). The results in the table summarize that: (i) The changes among the private and social total production costs per fattened head or per ton of meat are significant (5.1%). (ii) The changes between the private and social net production costs per ton of meat is relatively large (14%) and (iii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers per fattened head or per ton of meat are negative and very large (i.e., -201.2% and -227.0% respectively).

Table (3): Economic Efficiency Measures for broiler and egg- table production 2010/2011

Indicators	Unit	Private	Social	Change
<i>Broiler production; large scale:</i>				
Total production costs per ton of broiler meat	LE/ton	14778	14828	0.3%
Net production costs per ton of broiler meat	LE/ton	14045	14095	0.4%
Gross margin per ton of broiler meat	LE/ton	5063	4260	-15.9%
Net profit per ton of broiler meat	LE/ton	3955	3152	-20.3%
<i>Broiler production; small scale:</i>				
Total production costs per ton of broiler meat	LE/ton	16598	16654	0.3%
Net production costs per ton of broiler meat	LE/ton	15775	15831	0.4%
Gross margin per ton of broiler meat	LE/ton	3470	2661	-23.3%
Net profit per ton of broiler meat	LE/ton	2225	1416	-36.4%
<i>Table-egg production; Large scale:</i>				
Total production costs	LE/ton	9395	9452	0.6%
Net production costs	LE/ton	7921	9237	16.6%
Gross margin	LE/ton	6615	11557	74.7%
Net profit	LE/ton	6079	11021	81.3%
<i>Table-egg production; Small scale:</i>				
Total production costs	LE/ton	11059	11126	0.6%
Net production costs	LE/ton	9459	10874	15.0%
Gross margin	LE/ton	5172	10130	95.8%
Net profit	LE/ton	4541	9498	109.2%

Source: Compiled and computed from field visit tours using the participatory rapid appraisal, 2010-2011

5.2.3. Milk Production

Four milk production systems can be distinguish in Egypt where their production and technical parameters are quite different. The milk productivity of baladi, crossbred, buffalo and exotic cow are mainly different. **The economic efficiency measures of milk production of exotic cow have been calculated according the main key production, technical and economic parameters.**

1. Milk Production: exotic production system

The private and social total production costs, net production costs, margins (or farmer income), net profits per exotic cow or ton of

milk are presented in table (4). The results in the table summarize that: (i) The changes among the private and social total production costs per crossbred cow or per ton of milk are relatively small (-1.1%). (ii) The changes between the private and social net production costs per ton of milk is relatively small (-1.5%) and (iii). The changes among the private and social gross margins (farmer incomes) or net profits of farmers per exotic cow or per ton of milk are quite remarkable (i.e., 18.6% and 17.5% respectively).

2. Milk Production: Cross bred production system

1. Large scale farms

The private and social total production costs of broiler meat, private and social net production costs of broiler meat, private and social gross margins (or farmer income) of broiler meat and private and social net profits of broiler meat are presented in table (3). The results in the table show that: (i) The changes among the private and social net or total production costs of broiler meat are very small (0.4%) and (ii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers are quite small (i.e., - 15.9% and -20.3%, respectively).

2. Small scale farms

The private and social total production costs of broiler meat, private and social net production costs of broiler meat, private and social gross margins (or farmer income) of broiler meat and private and social net profits of broiler meat are presented in table (3). The results in the table show that: (i) The changes among the private and social net or total production costs of broiler meat are very small (0.4%) and (ii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers are quite small (i.e., - 23.3% and -36.4%, respectively).

5.2.2. Table-egg Production

The economic and production efficiency of layer farms differs relatively between the large and small farms. Therefore, the economic efficiency measures of layer production farms have been calculated according the farm production scale; small scale farms (i.e., less than 20 thousand birds/batch) and large scale farms (i.e., more than 20 thousand bird/batch). The economic efficiency measures of Egg production farms have been calculated according the main key production, technical and economic parameters.

1. Table-egg Production: large scale farms

The private and social total production costs of egg, private and social net production costs of egg, private and social gross margins (or farmer income) of egg and private and social net profits of egg are presented in table (3). The results in the table summarize that: (i) The changes among the private and social total production costs per 1000 layers or per ton of egg are very small (0.6%) and (ii) The changes between the private and social net production costs per ton of egg is quite significant (16.6%) and (iii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers per 1000 layers or per ton of egg are very large (i.e., 74.7% and 81.3%, respectively).

2. Table-egg Production: small scale farms

The private and social total production costs of egg, private and social net production costs of egg, private and social gross margins (or farmer income) of egg and private and social net profits of egg are presented in table (3). The results in the table summarize that: (i) The changes among the private and social total production costs per 1000 layers or per ton of egg are very small (0.6%) and (ii) The changes between the private and social net production costs per ton of egg is significant (15.0%) and (iii) The changes among the private and social gross margins (farmer incomes) or net profits of farmers per 1000 layers or per ton of egg are very large (i.e., 95.8% and 109.2%, respectively).

Table (2) : Value of the various components of animal production in Egypt in value terms,

Year	Cattle meat		Milk		Poultry		Table eggs		Bee honey		Wool, hair and camel hair		Manure		Total animal production	
	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%	Value (million LE)	%
1995/1996	6 426	45.6	3 426	24.3	2 346	16.6	707	5	75	0.5	77	0.5	1 045	7.4	14 102	100
1996/1997	7 463	48	3 553	22.8	2 551	16.4	705	4.5	83	0.5	77	0.5	1 124	7.2	15 556	100
1997/1998	8 038	45.1	4 685	26.3	2 757	15.5	868	4.9	84	0.5	86	0.5	1 297	7.3	17 815	100
1998/1999	8 086	42.8	5 052	26.8	2 912	15.4	879	4.7	80	0.4	95	0.5	1 767	9.4	18 871	100
1999/2000	8 494	41.1	5 383	26	3 315	16	959	4.6	87	0.4	97	0.5	2 348	11.4	20 683	100
2000/2001	8 936	40.4	6 065	27.4	3 477	15.7	1 028	4.6	90	0.4	107	0.5	2 423	11	22 126	100
2001/2002	9 061	37.7	6 385	26.6	4 458	18.6	1 347	5.6	97	0.4	114	0.5	2 541	10.6	24 003	100
2002/2003	11 407	38.6	7 035	23.8	6 266	21.2	1 923	6.5	99	0.3	125	0.4	2 701	9.1	29 556	100
2003/2004	12 500	36.1	9 500	27.5	6 400	18.5	2 100	6.1	100	0.3	132	0.4	3 868	11.2	34 600	100
2004/2005	18800	39.8	12600	26.7	7 700	16.4	2 000	4.3	116	0.3	137	0.3	5800	12.3	47200	100
2005/2006	20 100	40.5	13 400	27	7 700	14.5	2 800	5.6	118	0.2	139	0.3	5 900	11.9	49 700	100
2006/2007	21 500	39	15 700	28	8 400	15	3 100	6	120	0.2	158	0.3	5 900	11	55 300	100
2007/2008	24 200	37.2	17 800	27.4	10 400	15.9	4 400	6.8	119	0.2	164	0.3	6 300	12.2	65 100	100
2008/2009	27 800	40.3	18 700	27	11 100	16.1	3 900	5.7	132	0.2	185	0.3	7 200	10.4	69 100	100
2009/2010	31 500	40.7	20 000	25.8	13 100	16.9	4 800	6.3	129	0.17	184	0.24	7 700	6.9	77 400	100
Average	18800	41	12600	26	6880	17	824	5	102	33%	125	0	5800	10	47200	100

Source : Compiled and computed from the data available at the Ministry of Agriculture and Land Reclamation, Economic Affairs Department, Livestock, poultry and fisheries statistics bulletin, different years.

Table (1). The averages values of cattle meat, milk products, poultry, table eggs are estimated at 18.8, 12.6, 6.8 and 0.8 billion LE, respectively, representing 41%, 26%, 17% and 5% of the total animal production during the period (1995/1996 – 2009/2010), Table (2).

Table (1) : The value of animal production relative to that of other agricultural activities, 1996- 2010

Year	Crop production		Livestock production		Fish production		Total agricultural production	
	Value	%	Value	%	Value	%	Value	%
	(million LE)		(million LE)		(million LE)		(million LE)	
1995/1996	33 750	67.5	14 102	28.2	2 133	4.3	49 985	100
1996/1997	38 046	67.7	15 556	27.7	2 564	4.6	56 166	100
1997/1998	40 312	65.8	17 815	29.1	3 144	5.1	61 271	100
1998/1999	40 786	64.1	18 871	29.7	3 983	6.3	63 640	100
1999/2000	43 997	63.9	20 683	30	4 207	6.1	68 887	100
2000/2001	43 852	61.2	22 126	30.9	5 686	7.9	71 664	100
2001/2002	44 744	59.9	24 003	32.1	5 993	8	74 740	100
2002/2003	48 516	57.6	29 556	35.1	6 188	7.3	84 260	100
2003/2004	55 500	57.3	34 600	35.7	6 700	6.9	96 800	100
2004/2005	71900	56.6	39 300	35.2	7 400	6.6	111 800	100
2005/2006	78400	57.1	47200	37.2	7800	6.2	127000	100
2006/2007	89800	58	55300	35	10800	7	156000	100
2007/2008	109800	59.1	65100	35.1	10800	5.8	186000	100
2008/2009	108600	57.4	69100	36.5	11700	6.1	189400	100
2009/2010	117500	56.1	77400	37	14500	6.9	209300	100
average	96000	57	62820	36	11120	6	173540	100

Source: Compiled and computed from the data available at the Ministry of Agriculture and Land Reclamation, Economic Affairs Department, Livestock, poultry and fisheries statistics bulletin, different years.

on producers. In other words, those involved in the commodity system are earning less than they would if the commodity was freely traded. If $NPC = 1$, it indicates the absence of any intervention on the output market or the existing system of intervention produces both negative and positive impacts that result in a neutral impact on product prices.

NPI is defined as the ratio of the cost of tradable inputs measured at domestic market price to its border parity price. Thus, NPI is a measure of the transfer of resources between producers and the rest of the economy as a result of taxes, subsidies and exchange rate manipulation. In other words, the objective of calculating NPI is to measure the actual divergences or distortions between domestic prices and international or border prices of tradable inputs. If NPI is greater than 1, it indicates that producers are taxed. In other words, those involved in the commodity system are paying for tradable inputs more than they would if these inputs are freely traded. If NPI is less than 1, this means that producers are subsidized when they buy tradable inputs. In other words, those involved in the commodity system are paying for tradable inputs less than they would if these inputs are freely traded. If $NPI = 1$, it means no government intervention or the existing system of intervention produces both negative and positive impacts that cancel each other.

NPC and NPI consider the distortion of government policy in the product (output) and tradable input markets respectively in isolation. It is conceptually easy to find a case where output prices are higher than world prices, but where the disincentives in the input market are so large that net incentives are negative. The EPC is a natural extension of the nominal protection concept that it measures the combined effects of policies (intervention) on tradable output as well as the tradable input markets. EPC is defined as the ratio of value added measured at prices to the value added

measured at social prices. If EPC is greater than 1, it implies that the overall impact of the existing policy results in a net positive incentive (subsidy) to produce the commodity. If EPC is less than 1, it implies that the overall impact of the existing policy results in a net negative incentive (disincentive or tax) to produce the commodity. If $EPC = 1$, it implies either no intervention or the net impact of various policy measures imposed on both tradable input and output markets just result in a neutral effect on value added [Isabelle Tsakok; 1990 :55-96, 266-277] .

5- Results and Discussion

5.1 The Relative importance of the livestock sector

The averages values of livestock and fish production are estimated at 62.8 and 11.1 billion LE, respectively, representing 36% and 6% of the average of total agricultural production during the period (1995/1996 – 2009/2010), Table (1). The averages values of cattle meat, milk products, poultry, table eggs are estimated at 18.8, 12.6, 6.8 and 0.8 billion LE, respectively, representing 41%, 26%, 17% and 5% of the total animal production during the period (1995/1996 – 2009/2010), Table (2).

5.2. Private and Social Values of Economic Efficiency Measures

5.2.1. Broiler Production

The economic and production efficiency of broiler farms differs relatively between the large and small farms. Therefore, the economic efficiency measures of broiler production farms have been calculated according the farm production scale; small scale farms (i.e., less than 20 thousand birds/batch) and large scale farms (i.e., more than 20 thousand bird/batch). The economic efficiency measures of broiler production farms have been calculated according the main key production, technical and economic parameters.

4- Database and methodology

Three methodologies will adopt and use to gather the primary basic data needed for accomplishing the objectives; (i) The Participatory Rapid Appraisal (PRA), (ii) field study tours and (iii) focus group meeting or discussions with the targeted groups.

The field data about the commercial and conventional livestock farm have been conducted using questionnaire sheet to provide: (i) The technical or production data such as calving interval, lactation period, weaning period, milking cow culling rate, mortality rate, production period, egg yield, feed conversion rate, number of lot per year and final liveweight. (ii) Prices and quantities of inputs and outputs data such as milk, calf, culling, manure, egg production, layers and broiler sold, fish produced, different feed parts, youngstock, baby chicks, veterinary services and medicine, fish fingers replacement, transportation, labour, water and energy. (iii) Farm assets including dairy houses, equipments and transportation means. (iv). Credit, interest rate and insurance.

The Domestic Resource Cost (DRC) is a social cost-benefit ratio, which helps determine the efficiency of domestic production relative to international market. In other words it is a measure of economic efficiency or comparative advantage in international terms. It indicates whether there are social costs or benefits in producing the commodity rather than importing it. On the other hand, the DRC is the ratio of domestic factor cost required to produce a certain output valued at social prices to the value added created by the same resources measured at social prices. Thus, the domestic factor cost is the opportunity cost of the domestic resources involved in the production of the product, while the benefit is the value-added generated by the resources measured at social prices.

If DRC is less than 1, it means that the domestic factor cost is less than the social benefit generated by the domestic resources. In

this case, the country enjoys a comparative advantage in producing the commodity, as the costs associated with importing the commodity are greater than the costs of it. It is socially desirable to expand the production producing it domestically. If DRC is greater than 1, it means that the opportunity cost of the domestic factors involved in the production of the commodity is greater than the social value of the value-added generated by those factors. In this case the country is not competitive internationally in the production of this commodity. In other words, the country doesn't enjoy a comparative advantage in producing the commodity and the country would be better off by shifting resources away from the concerned commodity to other commodities. In case of an export commodity, economic efficiency can be improved by reallocating resources to other more profitable commodity (ies). If $DRC = 1$, it implies a break-even situation in which it is just worthwhile to produce the commodity. It also implies that the allocation of productive resources has reached an optimal point in the sense that, further reallocation of domestic resources would decrease the country's welfare [Tsakok; 1990; 117-130].

NPC is defined as the ratio of domestic market price to the border parity price of a commodity. Thus, NPC is a measure of the transfer of resources between producers and the rest of the economy as a result of taxes, subsidies and exchange rate manipulation. In other words, the objective of calculating NPC is to measure the actual divergences or distortions between domestic prices and international or border prices of output. If NPC greater than 1, this means that the private price of the output is higher than the border price and implies an implicit subsidy to producers. In other words, those involved in the commodity system are earning more than they would if the commodity was freely traded. If NPC less than 1, this means that the private price of the output is less than the border price and implies an implicit tax

for agriculture in various CEECs. The study identifies that in general CEEC crop production is more internationally competitive than livestock farming. During the mid- 1990s, wheat production in Bulgaria, the Czech Republic, Hungary, Romania and Slovakia was internationally competitive. In contrast, during the same period, milk production was not internationally competitive. However, there is also a considerable degree of variation from country to country; very little of Slovenia's agricultural production is internationally competitive. In the livestock sector the greatest problems lie where large herds have been broken up resulting in fragmented production. This has particularly affected beef and milk production. Considering variations in DRCs by farm type, larger private farms in Hungary and Czech Republic are more internationally competitive than smaller private farms in crop production. If CEEC producers faced average EU prices for their traded inputs and output, most could be price competitive; however, the conclusions should be treated with caution due to sensitivity of DRC ratios to changes in international prices and the choice of the shadow prices for non-tradable inputs.

(Gonzales, Kasryno, Perez and Rosegrant; 1993) measured comparative advantage in the production of food crops in the Philippines by comparing the border price by the social or economic opportunity costs of producing, processing, transporting, handling and marketing an incremental unit of the food commodity. If the opportunity costs are less the border price, then that country has a comparative advantage in the producing that commodity. They use three indicators of comparative advantage: net social worth, the DRC ratio and the resource – cost ratio.

(Warr; 1994) noted that the decision to complete in the production and trade of export goods is guided by two parameters: comparative advantage, which is measured in shadow prices, and competitiveness, or comparative advantage,

which is measured in market prices. Comparative advantage indicates whether it is economically advantageous for a country to expand production and trade of a specific commodity.

3- The objective of the study

The Egyptian feed industry depends mainly on imported feed ingredients such as yellow corn, soybean, fish, meat and bone meals. In the Egyptian livestock sector, the feed costs represent the dominant items in the production cost structure of livestock products. Therefore the increases in the world prices of feed ingredients because of the climate and environment changes have great impacts on the comparative advantages of livestock products such as meat, milk, broiler, fish and egg. The comparative advantages of livestock products have been measured by estimating the Domestic Resource Cost (DRC) approach. In addition, the protection coefficient of livestock products and inputs such as Nominal Protection Coefficient (NPC), Nominal Protection Coefficient on Tradable Inputs (NPI) and Effective Protection Coefficient (EPC) have been calculated and discussed. Eleven livestock production models have been analyzed to examine their comparative advantages; four dairy (baladi, buffalo, crossbred and exotic), two broiler (small and large scale), two egg (small and large scale), two meat (Baladi cattle and buffalo) and fish.

Measuring and discussing the comparative advantages of the eleven livestock models are the main purpose of the study. In addition, the impact assessment of world price changes in feed ingredients because of the climate changes on the comparative advantages of the livestock products is purposed. Consequently, the DRC, NPC, NPI and EPC indicators under different levels of world prices of the main feed ingredients have been investigated by performing the sensitivity analysis.

Competitiveness and comparative advantage would be the same in a world of perfect competition in which there are homogeneous products, perfect information and an absence of market failure. In fact, however, the two indicators typically diverge because of distortions in input and product marketing systems, often associated with direct and indirect government intervention. It is important to calculate both measures and to identify the reasons for divergences.

Divergences arise from distortions in :

- Market prices of inputs, due to events in the economic environment and trade regimes;
- Prices of factors used in production;
- Prices of factors used in marketing activities that influence marketing margins;
- Interest rates; and the exchange rate.

In cases where comparative advantage and competitiveness diverge may represent opportunities for policy dialog. Revealing these distortions and their sources can. Open up possibilities to improve both measures (ADB 1993a).

Han (1991) expressed the view that international competitiveness depends heavily on the stability of the macroeconomic environment. Macroeconomic tools such as exchange rates and interest rates are important factors determining the price aspects of international competitiveness. Like, price stability and equilibrium exchange rates are generally regarded as essential macroeconomic conditions for steadily high international competitiveness. Other macroeconomic factors such as fiscal policy, political stability and industrial relations also impact the competitiveness of an industry in the international market. The government is primarily responsible for ensuring favourable macroeconomic conditions. On the other hand, the more direct factors affecting international competitiveness are microeconomic one set of such factors obviously affect the cost of production but other marketing and

management factors can also be important, Influencing things such as the quality of products. These factors are determined at the level of the firm and its plants where the actual strategic and tactical management decisions are made and production processes take place.

Comparative advantage and competitiveness reveal the relative efficiency of an activity in saving foreign exchange through import substitution or earning it through exports. Maximum efficiency in balancing the foreign exchange budget means doing so at least cost in the social value of resources used. So, if one activity costs less in domestic resources to save or earn a unit of foreign exchange at the margin than other, the former is advantageous in relation to the second one. Accordingly, activities can be ranked at the margin according to their competitiveness or comparative advantage. So, an activity with a greater comparative advantage means reducing the balancing the foreign exchange budget (Warr 1992; ADB 1993a).

The two main methods are to measure the comparative advantage and competitiveness of producing and exporting commodities: The benefit-cost ratio (BCR) and domestic resource cost (DRC) ratio. These approaches have the same foundation but differ in their capacity to interpret the results. One approach is to report measures of comparative advantage and competitiveness in a summary table and compare their decision outcome for each (product) and rankings among products. An alternative approach is to include DRC ratios only, and report where any of the other measures diverge from them in respect of the rankings among the activities. (Masters and Winter – Nelson; 1995 : 243 – 244).

Matthew & Sophia (2001), survey, The price competitiveness of agricultural production in central and East European countries (CEECs). It draws together empirical work conducted by the authors and other studies that have estimated domestic resource cost (DRC) ratios

I- Introduction

The Egyptian livestock sector is consists mainly of six production sub-sectors; dairy, fattening, broiler, layers, fish and feed. In 2011, the total numbers of cattle is estimated at 8.76 million heads; buffalo (45.5%), cows (54.5%). The commercial broiler and egg-table industries produce about 479.8 million live birds and 14.84 billion eggs. The factories of animal foddering produce about 1013.8 thousand ton poultry and ruminant feed. The domestic output of fish is 1362/(1000) M.T [MALR,.EAS; Statistics of Livestock, Poultry and fish,2011].

Five models were analyzed to examine livestock comparative advantages. Following are the one-year livestock models and their main and secondary outputs: (i) One milking cow producing milk and three month calf as main outputs and manure and culled animals as secondary outputs, (ii) One fattened head producing red meat as main output and manure as secondary outputs, (iii) 1000 broiler producing broiler meat as main output and treated residuals and manure as secondary outputs, (iv) 1000 layers producing eggs as main output and spent-layer meat and manure as secondary outputs and (v) 10000 Tilapia fingers producing fish as main output. Four dairy production system models and two fattening system models have been analyzed to calculate their comparative advantages. For dairy the models are: baladi, buffalo, crossbred and exotic milking cows. For fattening the systems are: native and buffalo cow. In addition, small and large production system models for broiler and layer have been analyzed to calculate their comparative advantages.

2-Article review:

Protor (1990) used the doctrine of comparative costs to explain comparative advantage and competitiveness. Theoretically, he noted that it depends on three factors : a highly competitive macroeconomic environment; innovative capacity to develop and adopt technology to

reduce production costs, and diversify and differentiate products; and competitive marketing .

Warr (1994) disagreed with this explanation and argued that the two concepts are not the same, and any attempt to portray them as being the same, or at least similar, is misleading. Competitiveness is determined by the commercial performance of individual firms whereas comparative advantage is about efficient allocation of resources at the national level, especially among the sectors of the economy producing traded goods and services. The first is about firms, the second is about countries. The concept of comparative advantage is most relevant for nations that are currently producers of primary products and standardized manufactured goods, while the concept of competitiveness has most to offer individual firms that produce differentiated products (goods and services) sold in specific market segments.

Competitiveness indicates which firms within or across countries could better compete in international markets under certain assumptions about existing marketing systems and government interventions.

Warr (1994) noted that the decision to compete in the production and trade of export goods is generally guided by two parameters; comparative advantage, which is measured in shadow prices, and competitiveness, or competitive advantage, which is measured in market prices. Comparative advantage indicates whether it is economically advantageous for a country to expand production and trade of a specific commodity. It is a concept that applies to inter-and intra – industry comparisons within a country in the traded goods sector, but is inappropriate for inter-country comparisons. Competitiveness indicates whether a firm or set of firms could successfully compete in the trade of the commodity in the international markets given existing policies and economic structure.

Climate changes and Comparative Advantage of Livestock Sector in Egypt

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ABSTRACT: The Egyptian livestock sector enjoys comparative advantages in producing broiler meat, egg, fish and milk production. But, in the case of Fattened calves, the native cattle and buffalo production systems do not enjoy comparative advantages. In producing red meat .This is because of high input cost in terms of purchased young stock (cattle) and imported feed ingredients. In the case of dairy cows, exotic cow enjoys the highest comparative advantage in producing milk among the dairy cows, because of the high yield of milk per cow. The native dairy cow in traditional system has comparative advantage because the non – milk returns represents 45 % of the total returns and the cheap forages are the main source of the nutrition. For layer and broiler, large scale production systems have more comparative advantages than the small ones. The most competitive systems is the large scale production system of layer and exotic dairy cow which yield DRC equals to 0.23 and 0.25, respectively. This is due mainly to fact that the average border price of egg and milk is almost double the local one .The fish production in Ponds enjoys quite high comparative advantage .The high fish production rate and the improved feed conversion rate are main reasons beyond this phenomenon.

By applying sensitivity analysis the study found - *under the first scenario* (increase energy costs) - the livestock and poultry products, except cattle meat and poultry meat from small scale production systems, enjoy comparative advantages. *Under the second scenario* (increase feed cost), the livestock and Poultry products, except buffalo and native cattle meat production, enjoy comparative advantages. Finally *under the third scenario* (improve Productivity) the livestock and Poultry products, except beef production from fattened head (native and buffalo) enjoy comparative advantages..