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AN ECONOMIC STUDY OF THE MAIN FACTORS AFFECTING THE MILK PRODUCTION IN SHARKIA GOVERNORATE

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ABSTRACT

The main objectives of the study can be summarized as follows: (i) studying the production performance and economic efficiency for different types of dairy cows. (ii) studying the main dairy production problems or constraints affecting the milk productivity and total return per dairy head. The main results can be summarized as follows: (i) the total costs per kg of milk is estimated at 6.84 LE/kg for baladi cow, 4.77 LE/kg for crossbred cow and 5.35 LE/kg for buffalo cow. (ii) the net total costs per kg of milk (*i.e.,* total costs less non-milk return) is estimated at 2.74 LE/kg for baladi cow, 2.07 LE/kg for crossbred cow and 2.59 LE/kg for buffalo cow. (iii) the gross margins and the net profits per kg of milk for baladi cow, crossbred cow and buffalo cow are estimated at 1.44 LE/kg, 1.21 LE/kg; 2.02 LE/kg, 1.88 LE/kg and 3.04 LE/kg as well as 2.86 LE/kg, respectively. (iv) the farmer incentive per kg of milk is estimated at 31% for baladi cow, 48% for crossbred cow and 53% for buffalo cow. (v) the milk quantities produced from the studied cows increase when the problem degrees decrease. (ii) the total returns from milk per head increase when the problem degrees decrease.

Key words: Total costs, gross margin, farmer incentive, total returns, Sharkia Governorate.

INTRODUCTION

The milk production is considered as an important part of the animal production sector in Egypt. The value of milk production reached about 23.39 billion LE, which represents about 26.33% of the value of livestock production which is about 88.84 billion LE in 2012 (Egypt in Figures, 2014). 88% of buffaloes and cattle population are available in farms with less than 5 faddan and five heads (General Statistics Year Book, 2012). In these farms the local cattle and buffalo together are loaded on berseem area. Some of those farmers are particularly interested in dairy farming and the majority is contributing to the milk marketing. Women play a major role in the upbringing and care of animals especially milk processes and milk manufacturing (Ibrahim, 1996).

The local milk production reached about 5.85 million tons in 2012. The average milk and its products per capita consumption was about 70.80 kg in the same year (The Statistical Year Book, 2013). The small dairy farms represent the majority of animal population in Egypt. These farms characterized by inefficient technically and economically. This may be due to many problems such as lack of green fodders, high prices of livestock, dry fodders and veterinary drugs, shortage in concentrates and veterinary services, long distance between production sites and markets, and lack of finance.

The main objectives of the study can be summarized as follows: (i) studying the production performance and economic efficiency for different types of dairy cows. (ii) studying the main dairy production problems or constraints affecting the milk productivity and total return per dairy head.

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MATERIALS AND METHODS

Sharkia Governorate is very important region in agriculture sector especially in dairy animals. It is considered the second Governorate for dairy population in Egypt. The total numbers of buffaloes and local cattle are estimated at 329171 and 529635 heads which represent about 8.62%, and 11.20% of the total number of buffaloes and local cattle in Egypt, respectively.

The field primary published and unpublished data have been used to accomplish the previous objectives. A questionnaire sheet has been designed to collect and conduct a suitable primary field data. The questionnaire sheets have been applied in the targeted site, *i.e.,* sharkia Governorate during November and December 2014. The questionnaire sheet includes main three types of field primary data. These data are: (i) the inputs and outputs data of dairy production, (ii) socio-economic aspects data, (iii) the dairy production problems or constraints affecting the income from milk. The field data has been collected from one hundred and twenty dairy farms and conducted from three districts (*i.e.,* Deyerb-Negm, Minya-Qamh and Zagazig). Two villages have been selected from each district. twenty dairy farms were selected from each village. The dairy farms with 5 faddans and less as well as 5 dairy heads and less were targeted.

The dairy budget for dairy cow has been used to estimate the main economic efficient indicators (Maxwell, 1979 and Heady, 1968). These indicators are : (1) Feed and non-feed costs, (2) Total production costs per liter of milk, (3) Gross margin per liter of milk, (4) Profit per milking cow per year, (5) Profit per man/day, (6) Profit per liter of milk, (7) Profit per LE., and (8) The percentage of farmer incentive. In addition the descriptive statistical analysis has been applied and covariance analysis to achieve the objectives of the study (Huitema, 1980). The dummy variables model has been applied to measure the economic impacts of milk production problems on the milk yield and total return per milking head as follows:

$$Y_i = \mu + \sum \alpha_{ij} \quad (I)$$

$$TR_i = \mu + \sum \alpha_{ij} \quad (II)$$

Where:

Y_i = the estimated of milk yield for the i dairy cow and i = 1 (local cattle), 2 (crossbred) or 3 (buffalo).

TR_i = the estimated total return for the i dairy cow.

μ = the overall mean of milk yield or the total return per milk head.

α_{ij} = the impacts of the j problem on the milk yield or total return per the i dairy cow.

RESULTS AND DISCUSSION

The Dairy Farm Budget

The dairy farm budget for local cattle (baladi cows) is presented in Table 1. The data in the table indicate that: (i) the market and culling values of cow are estimated at 7581 and 6488 LE/head, respectively. (ii) the calving interval, milk per lactation period and milk per year are estimated at 370 days, 1262 kg of milk per lactation period and 1244 kg of milk per year, respectively. (iii) the milk farm gate price of local cattle is quite low (*i.e.,* 3.95 LE per kg). The total return, variable costs, total costs of cow are estimated at 10014.12, 8220.06 and 8509.81 LE/head, respectively. (iv) the total digested nutrient (TDN) of local cattle is estimated at 2904.33 kg. wherein 33.20% of the TDN comes from the concentrate, whereas 66.80% of the TDN comes from the fodders.

The dairy farm budget for crossbred cow is presented in Table 2. The data in the table indicate that: (i) the market and culling values of cow are estimated at 9008 and 7758 LE/head, respectively. (ii) the calving interval, milk per lactation period and milk per year are estimated at 362 days, 2255 kg of milk per lactation period and 2273.35 kg of milk per year, respectively. (iii) the milk farm gate price of crossbred is quite low (*i.e.,* 3.95 LE per liter). The total return, variable costs, total costs of cow are estimated at 15118.90, 10532.27 and 10834.24 LE/head, respectively. (iv) the total digested nutrient (TDN) of crossbred is estimated at 3645.23 kg. where in 32.20% of the TDN comes from the concentrate, whereas 67.80% of the TDN comes from the fodders.

Table 1. The dairy farm budget for local cattle (baladi cows), 2014

Name of farmer	**Average**		**No. Dairy cattle**		**1**	
Governorate	**Sharkia**		**Type of Strain**		**baladi**	
Date of data collect.	**11-12/2014**		**Herd Structure**			
Live weight	Kg	372	Animals born / birth		No.	1
Culling value	LE	6488	Calving interval		Day	370
Replacement	(%)	14	Calf weight		Kg	120
Market value	LE	7581	Milk yield / lactation		Liter	1262
Output			**Unit/Head**	**Total/Kg**	**LE/Unit**	**Total/LE**
Culling			0.14	53	17.5	928
Calf			1	118	27	3203
Milk	(per year)			1244	3.95	4916
Manure	m^3			30.00	32.25	968
Total return						**10014.12**
Variable input		**Total/Kg**	**TDN/g**	**Total/TDN**	**Price/Kg**	**Total/LE**
Concentrates		1251.59	680	851081	2.04	2553
Bran		192.66	590	113669	1.86	358
Berseem		10880	120	1305600	0.15	1632
green sorghum		1190	179	213010	0.19	223
Strew		979	430	420970	0.49	484
Feeding cost	Total TDN			**2904331**		**5250**
Replacement	14.00%					1084
Labour (man-day)						75
Labour wage						21
labour cost						1584
Veterinary service + medicine						118
All Service						88
Subtotal						**2970**
Total variable costs						**8220.06**
Total variable cost/liter of milk						**6.61**
Gross margin/dairy head						**1794.1**
Fixed input						
Buildings						8549
Equipment						1188
Subtotal						**9736**
Building depreciation				Production life: 50 years		171
Equipment depreciation				Depreciation rate: 10%		119
Total Fixed costs						**290**
Total costs/dairy head						**8509.81**
Profit/head						**1504.31**
			Total	**of conc.**	**(%)**	**of fodder**	**(%)**
Estimate of feed energy (proportions in TDN)			2904331	964751	33.2	1939580	66.8
Estimate of feed cost (proportions in LE)			5249.75	2911.59	55.5	2338.16	44.5

Source: calculated and compiled from the field sample survey which collected on Dec. and Nov. 2014.

Table 2. The dairy farm budget for dairy cattle crossbred, 2014

Name of farmer	**Average**		**No. Dairy cattle**		**1**	
Governorate	**Sharkia**		**Type of Strain**		**crossbred**	
Date of data collect.	**11-12/2014**		**Herd Structure**			
Live weight	Kg	437	Animals born / birth		No.	1
Culling value	LE	7758	Calving interval		Day	362
Replacement	(%)	20	Calf weight		Kg	120
Market value	LE	9008	Milk yield / lactation		Liter	2255
Output			**Unit/Head**	**Total/Kg**	**LE/Unit**	**Total/LE**
Culling			0.20	87	17.8	1552
Calf			1	121	30	3620
Milk	(per year)			2273.35	3.95	8980
Manure	m^3			30.00	32.25	968
Total return						**15118.90**
Variable input		**Total/Kg**	**TDN/g**	**Total/TDN**	**Price/Kg**	**Total/LE**
Concentrates		1563.56	680	1063221	2.04	3194
Bran		185.5	590	109445	1.86	345
Berseem		13920	120	1670400	0.15	2140
green sorghum		1627.5	179	291323	0.19	309
Strew		1188	430	510840	0.49	582
Feeding cost	Total TDN			**3645228**		**6571**
Replacement	20.00%					1802
Labour (man-day)						86
Labour wage						21
labour cost						1811
Veterinary service + medicine						118
All Service						97
Subtotal						**3961**
Total variable costs						**10532.27**
Total variable cost/liter of milk						**4.63**
Gross margin/dairy head						**4586.6**
Fixed input						
Buildings						8836
Equipment						1253
Subtotal						10089
Building depreciation			Production life 50 years			177
Equipment depreciation			Depreciation rate 10%			125
Total Fixed costs						**302**
Total costs/dairy head						**10834.24**
Profit/head						**4285**
		Total	**of conc.**	**(%)**	**of fodder**	**(%)**
Estimate of feed energy (proportions in TDN)		3645228	1172666	32.2	2472563	67.8
Estimate of feed cost (proportions in LE)		6570.93	3539.38	53.9	3031.55	46.1

Source: calculated and compiled from the field sample survey which collected on Dec. and Nov. 2014.

The dairy farm budget for buffalo cow is presented in Table 3. The data in the table indicate that: (i) the market and culling values of cow are estimated at 11933 and 8438 LE/head, respectively. (ii) the calving interval, milk per lactation period and milk per year are estimated at 396 days, 1970 kg of milk per lactation period and 1816 kg of milk per year, respectively. (iii) the milk farm gate price of buffalo is relatively low (*i.e.*, 5.45 LE per liter). The total return, variable costs, total costs of cow are estimated at 14905.52, 9382.64 and 9706.38 LE/head, respectively. (iv) the total digested nutrient (TDN) of cow is estimated at 3339.36 kg. where in 31.10% of the TDN comes from the concentrates, whereas 68.90% of the TDN comes from the fodders.

Economic Efficiency Measures

The production and economic efficiency measures for local cattle are presented in Table 4. The results show that: (i) the milk return represents 49% of the total return of dairy cow. (ii) the variable and feed costs represent 97% and 62% of the total costs of dairy cow, respectively. (iii) the total costs per kg of milk is estimated at 6.84 LE/kg whereas the net total costs per kg of milk (*i.e.*, total costs less non milk return) is estimated at 2.74 LE/kg. (iv) the gross margins and the net profits per kg of milk are estimated at 1.44 LE/kg and 1.21 LE/kg, respectively. (v) the farmer incentive per kg of milk (*i.e.*, profit/kg ÷ farm gate price/kg) is estimated at 31% only. (vi) the annual TDN required for maintenance and for milk production are estimated at 1017.67 kg/head and 374.58 kg, respectively. Consequently the total annual TDN required for dairy cow is estimated at 1392.25 kg/year (vii) Therefore the surplus of annual TDN per cow is estimated at 1512.08 kg/year (*i.e.*, 2904.33 kg of TDN/year – 1392.25 kg of TDN/year). This surplus of TDN is sufficient to produce 5023.54 kg of milk/year.

The production and economic efficiency measures for crossbred cow are presented in Table 4. The results show that: (i) the milk return represents 59% of the total return of dairy cow. (ii) the variable and feed costs represent 97% and 61% of the total costs of dairy cow, respectively. (iii) the total costs per kg of milk is estimated at 4.77 LE/kg whereas the net total costs per kg of milk is estimated at 2.07 LE/kg. (iv) the gross margins and the net profits per kg of milk are estimated at 2.02 LE/kg and 1.88 LE/kg, respectively. (v) the farmer incentive per kg of milk is estimated at 48% only. (vi) the annual TDN required for maintenance and for milk production are estimated at 1196 kg/head and 684 kg, respectively. Consequently the total annual TDN required for dairy cow is estimated at 1880.57 kg/year (vii) Therefore the surplus of annual TDN per cow is estimated at 1765 kg/year. This surplus of TDN is sufficient to produce 5863 kg of milk/year.

The production and economic efficiency measures for buffalo cow are presented in Table 4. The results show that: (i) the milk return represents 66% of the total return of dairy cow. (ii) the variable and feed costs represent 97% and 61% of the total costs of dairy cow, respectively. (iii) the total costs per kg of milk is estimated at 5.35 LE/kg whereas the net total costs per kg of milk is estimated at 2.59 LE/kg. (iv) the gross margins and the net profits per kg of milk are estimated at 3.04 LE/kg and 2.86 LE/kg, respectively. (v) the farmer incentive per kg of milk is estimated at 53%. (vi) the annual TDN required for maintenance and for milk production are estimated at 1360 kg/head and 547 kg/head, respectively. Consequently the total annual TDN required for dairy cow is estimated at 1906.54 kg/year (vii) Therefore the surplus of annual TDN per cow is estimated at 1433 kg/year. This surplus of TDN is sufficient to produce 4760 kg of milk/year.

Main Constraints Affecting on Farm Incomes from the Milk Production

In this part of the study, the impacts of main constraints affecting the quantities produced of milk and total return per dairy head have been measured for the studied cows. These problems are: (1) lack of green fodders, (2) high prices of livestock, (3) high prices of concentrates and dry fodders, (4) high prices of veterinary drugs, (5) unavailability of concentrates and dry fodders, (6) lack of veterinary services, (7) distance among the production and markets sites and (8) lack of finance.

Table 3. The dairy farm budget for dairy buffalo cow, 2014

Name of farmer		**Average**	**No. Dairy cattle**		**1**	
Governorate		**Sharkia**	**Type of strain**		**Buffalo**	
Date of data collect.		**11-12/2014**	**Herd structure**			
Live weight	Kg	497	Animals born / birth		No.	1
Culling value	LE	8438	Calving interval		Days	396
Replacement	(%)	10	Calf weight		Kg	120
Market value	LE	11933	Milk yield / lactation		Liter	1970
Output			**Unit/Head**	**Total/Kg**	**LE/Unit**	**Total/LE**
Culling			0.10	50	17.0	844
Calf			1	111	26	2876
Milk	(per year)			1816	5.45	9896
Manure	m^3			40.00	32.25	1290
Total return						**14905.52**
Variable input		**Total/Kg**	**TDN/g**	**Total/TDN**	**Price/Kg**	**Total/LE**
Concentrates		1393.419	680	947525	2.04	2843
Bran		154	590	90860	1.86	286
Berseem		12660	120	1519200	0.15	1899
green sorghum		1540	179	275660	0.19	293
Strew		1177	430	506110	0.49	577
Feeding cost	Total TDN			**3339355**		**5897**
Replacement	20.00%					1193
Labour (man-day)						92
Labour wage						21
labour cost						1929
Veterinary service + medicine						137
All Service						114
Subtotal						**3485**
Total variable costs						**9382.64**
Total variable cost/liter of milk						**5.17**
Gross margin/dairy head						**5522.9**
Fixed input						
Buildings						9152
Equipment						1407
Subtotal						**10559**
Building depreciation			Production life 50			183
Equipment depreciation			Depreciation rate 10%			141
Total Fixed costs						**324**
Total costs/dairy head						**9706.38**
Profit/head						**5199.15**
		Total	**of conc.**	**(%)**	**of fodder**	**(%)**
Estimate of feed energy (proportions in TDN)		3339355	1038385	31.1	2300970	68.9
Estimate of feed cost (proportions in LE)		5897.34	3129.01	53.1	2768.33	46.9

Source: calculated and compiled from the field sample survey which collected on Dec. and Nov. 2014.

Table 4. The production and economic efficiency measures for local cattle (baladi cows), crossbred cow and buffalo cow, 2014

Indicators	Unit	Baladi	Crossbred	buffalo
Calving interval	Day	370	362	396
Milk yield per dairy head per year	Kg/head/year	1244	2273	1816
Milk price per liter	LE/liter	3.95	3.95	5.45
TDN from conc./total TDN	(%)	33	32	31
TDN cost from conc./total TDN cost	(%)	55	54	53
Total revenue per dairy head per year	LE/head/year	10014.12	15118.90	14905.52
Milk revenue	(%)	49	59	66
Non-milk revenue	(%)	51	41	34
Feed costs	(%)	62	61	61
Variable costs	(%)	97	97	97
Fixed costs	(%)	3	3	3
Total production costs per dairy head per year	LE/head/year	8509.81	10834.24	9706.38
Total production costs per dairy head per day	LE/head/day	23.31	29.68	26.59
Total production costs per liter of milk	LE/liter	6.84	4.77	5.35
Net total production costs per liter of milk	LE/liter	2.74	2.07	2.59
Gross margin per dairy head per year	LE/head/year	1794.05	4586.63	5522.88
Gross margin per liter of milk	LE/liter	1.44	2.02	3.04
Gross margin per labour	LE/man day	23.79	53.19	60.13
Profit per dairy head per year	LE/head/year	1504.31	4284.65	5199.15
Profit per man day	LE/man day	19.95	49.69	56.61
Profit per liter of milk	LE/liter	1.21	1.88	2.86
Profit per LE	LE/LE	0.18	0.40	0.54
Farmer incentive	(%)	31	48	53
Farmer margin per liter of milk	LE/liter	-2.89	-0.82	0.10
Annual TDN requirement for maintenance	Kg/head	1017.67	1196	1360
Annual TDN requirement for milk production	Kg	374.58	684	547
Surplus or shortage in annual TDN requirement	Kg	1512.08	1765	1433
annual loss in terms of milk (liters)	Liter/year	5023.54	5863	4760
Daily annual loss in terms of milk (liters)	Liter/day	13.8	16.1	13.0

Source: calculated and compiled from the field sample survey which collected on Dec. and Nov. 2014.
1- Net total production costs = total production costs – return from (culling, calf and manure).
2- Gross margin = total revenue - variable production costs.
3- Profit = total revenue - total production costs.
4- Farmer incentive = profit per liter of milk/milk price per liter.
5- Farmer margin per liter of milk = milk price per liter - total production costs per liter of milk

The impacts of the dangerous degree of the eight previous production problems (*i.e.,* no problem, weak or severe) on the quantities produced of milk and total returns per dairy head of local cattle, crossbred and buffalo have been identified, compared and discussed in Table 5. The data shown in the table indicate that (i) the milk quantities produced from local cattle, crossbred and buffalo increase when the problem degrees decrease. (ii) the total returns from milk per head of local cattle, crossbred and buffalo increase when the problem degrees decrease.

Estimation of the Impacts of Main Constraints Affecting the Milk Production

Local Dairy cattle

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of green fodders lack on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (1). The results indicate that: (i) the milk production is estimated at 0.992 ton/lactation period when the problem impact of green fodders lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.429 and 0.595 ton/lactation period when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of green fodders lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.,* F-Ratio = 10.92). (v) the variations in problem degrees of green fodders lack explain 56% of the variations of the milk quantities produced.

$$Y_i = 0.992 + 0.429\,Weak_1 + 0.595\,No\ problem_1 \quad (1)$$

$$(12.41)^{**} \quad (3.55)^{*} \quad (4.13)^{**}$$

$$F\text{-Ratio} = (10.92)^{**} \qquad R'^2 = 0.56$$

Where:

Y_i = the estimated quantity of milk produced from local cattle (ton/lactation).

Constant = the impact of green fodders lack on the milk quantities produced is severe.

$Weak_1$ = the net impact of green fodders lack on the milk quantities produced is weak.

$No\ problem_1$ = the net impact of green fodders lack on the milk quantities produced is no problem.

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of livestock high prices on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (2). The results indicate that: (i) the milk production is estimated at 1.043 ton/lactation period when the problem impact of livestock high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.436 and 0.440 ton/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of livestock high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 6.34). (v) the variations in problem degrees of livestock high prices explain 43% of the variations of the milk quantities produced.

$$Y_i = 1.043 + 0.436\,Weak_2 + 0.440\,No\ problem \quad (2)$$

$$(12.02)^{**} \quad (3.22)^{**} \quad (2.44)^{*}$$

$$F\text{-Ratio} = (6.34)^{**} \qquad R'^2 = 0.43$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of concentrates and dry fodders high prices on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (3). The results indicate that: (i) the milk production is estimated at 1.050 ton/lactation period when the problem impact of concentrates and dry fodder high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.371 and 0.407 ton/lactation period when the net problem impacts of concentrates and dry fodders high prices are weak or no, respectively.

Table 5. The relationship among milk production problems, the milk quantities produced in lactation period and the total milk returns per head of the local cattle, crossbred cattle and buffalo, 2014

the main dairy production problems		Milk yield / lactation period (ton)			Total milk return / head (LE)		
		baladi	Crossbred	Buffaloes	baladi	crossbred	Buffaloes
1- Lack of green fodders							
No problem	(%)	20	30	20	20	30	20
	Mean	1.59	2.56	2.33	11240	16577	19198
Weak	(%)	35	35	35	35	35	35
	Mean	1.42	2.32	2.06	10755	15827	16755
Severe	(%)	45	35	45	45	35	45
	Mean	0.99	1.93	1.74	9202	13893	14265
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
2- High prices of live animal							
No problem	(%)	15	30	15	15	30	15
	Mean	1.48	2.59	2.33	11312	17133	19170
Weak	(%)	35	35	35	35	35	35
	Mean	1.48	2.27	2.10	10751	15261	17240
Severe	(%)	50	35	50	50	35	50
	Mean	1.04	1.95	1.77	9387	13983	14424
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
3- High prices of concentrates and dry fodder							
No problem	(%)	15	10	35	15	10	35
	Mean	1.62	2.81	2.19	11550	2.81	17803
Weak	(%)	30	30	30	30	30	30
	Mean	1.46	2.47	2.10	10680	16406	16766
Severe	(%)	55	60	35	55	60	35
	Mean	1.06	2.05	1.64	9484	14469	13888
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
4- High prices of veterinary drugs							
No problem	(%)	25	20	20	25	20	20
	Mean	1.50	2.68	2.33	11293	17125	18794
Weak	(%)	50	55	45	50	55	45
	Mean	1.30	2.28	2.07	10192	15478	16671
Severe	(%)	25	25	35	25	25	35
	Mean	0.96	1.86	1.64	8936	13750	13888
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
5- Unavailability of concentrates and dry fodders							
No problem	(%)	20	25	30	20	25	30
	Mean	1.56	2.68	2.22	11380	16946	17980
Weak	(%)	25	20	25	25	20	25
	Mean	1.53	2.39	2.08	11036	16692	16897
Severe	(%)	55	55	45	55	55	45
	Mean	1.03	2.01	1.74	9305	14183	14451
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
6- Lack of veterinary services							
No problem	(%)	10	15	10	10	15	10
	Mean	1.63	2.65	2.40	11740	17443	19490
Weak	(%)	40	35	50	40	35	50
	Mean	1.40	2.46	2.06	10754	16222	16709
Severe	(%)	50	50	40	50	50	40
	Mean	1.08	1.99	1.75	9355	14162	14545
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
7- distance length among the production and markets sites							
No problem	(%)	30	40	20	30	40	20
	Mean	1.52	2.46	2.20	11268	16632	17595
Weak	(%)	25	25	40	25	25	40
	Mean	1.40	2.37	2.09	10732	15451	17082
Severe	(%)	45	35	40	45	35	40
	Mean	1.02	1.93	1.74	9089	13885	14424
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121
8- Lack of finance							
No problem	(%)	15	15	45	15	15	45
	Mean	1.65	2.67	2.11	11846	17471	17123
Weak	(%)	20	25	25	20	25	25
	Mean	1.43	2.50	2.08	11105	16613	16749
Severe	(%)	65	60	30	65	60	30
	Mean	1.12	2.05	1.67	9469	14335	14095
Total	(%)	100	100	100	100	100	100
	Mean	1.26	2.25	1.97	10153	15375	16121

Source: calculated and compiled from the field sample survey which collected on Dec. and Nov. 2014.

That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders high prices is also statistically significant at 5% level (*i.e.,* F-Ratio = 4.17). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 33% of the variations of the milk quantities produced.

$$Y_i=1.050+0.371Weak_3+0.407No\ problem_3 \quad (3)$$

$$(10.61)^{**} \quad (2.48)^{**} \quad (2.28)^{*}$$

$$F\text{-}Ratio = (4.17)^{*} \qquad R^{\prime 2} = 0.33$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary drugs high prices on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (4). The results indicate that: (i) the milk production is estimated at 0.960 ton/lactation period when the problem impact of veterinary drugs high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.335 and 0.536 ton/lactation period when the net problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary drugs high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary drugs high prices is also statistically significant at 5% level (*i.e.,* F-Ratio = 4.21). (v) the variations in problem degrees of veterinary drugs high prices explain 33% of the variations of the milk quantities produced.

$$Y_i=0.960+0.335Weak_4+0.536No\ problem_4 \quad (4)$$

$$(7.24)^{**} \quad (2.06)^{*} \quad (2.86)^{**}$$

$$F\text{-}Ratio = (4.21)^{*} \qquad R^{\prime 2} = 0.33$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of concentrates and dry fodders unavailability on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (5). The results indicate that: (i) the milk production is estimated at 1.030 ton/lactation period when the problem impact of concentrates and dry fodders unavailability on the milk quantities produced is severe. (ii) the milk production will increase by 0.500 and 0.532 ton/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders unavailability are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.,* F-Ratio = 12.09). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 59% of the variations of the milk quantities produced.

$$Y_i=1.030+0.500Weak_5+0.532No\ problem_5 \quad (5)$$

$$(14.66)^{**} \quad (3.98)^{**} \quad (3.91)^{**}$$

$$F\text{-}Ratio = (12.09)^{**} \qquad R^{\prime 2} = 0.59$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary services lack on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (6). The results indicate that: (i) the milk production is estimated at 1.080 ton/lactation period when the problem impact of veterinary services lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.318 and 0.545 ton/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary services lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on

the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary services lack is also statistically significant at 5% level (*i.e.*, F-Ratio = 4.22). (v) the variations in problem degrees of veterinary services lack explain 33% of the variations of the milk quantities produced.

$$Y_i=1.080+0.318Weak_6+0.545No\ problem_6 \quad (6)$$

$$(11.52)^{**} \quad (2.26)^{*} \quad (2.37)^{*}$$

$$F\text{-}Ratio = (4.22)^{*} \quad R'^2 = 0.33$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of distance among the production and markets sites on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (7). The results indicate that: (i) the milk production is estimated at 1.017 ton/lactation period when the problem impact of distance among the production and markets sites on the milk quantities produced is severe. (ii) the milk production will increase by 0.379 and 0.500 ton/lactation period when the net problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of distance among the production and markets sites are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of distance among the production and markets sites is also statistically significant at 1% level (*i.e.*, F-Ratio = 7.14). (v) the variations in problem degrees of distance among the production and markets sites explain 46% of the variations of the milk quantities produced.

$$Y_i=1.017+0.379Weak_7+0.500No\ problem_7 \quad (7)$$

$$(11.41)^{**} \quad (2.54)^{*} \quad (3.55)^{**}$$

$$F\text{-}Ratio = (7.14)^{**} \quad R'^2 = 0.46$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of finance lack on the milk quantities produced in lactation period per head of the local cattle are estimated in equation (8). The results indicate that: (i) the milk production is estimated at 1.098 ton/lactation period when the problem impact of finance lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.322 and 0.522 ton/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of finance lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of finance lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 5.71). (v) the variations in problem degrees of finance lack explain 40% of the variations of the milk quantities produced.

$$Y_i=1.098+0.322Weak_8+0.522No\ problem_8 \quad (8)$$

$$(13.57)^{**} \quad (2.16)^{*} \quad (3.05)^{**}$$

$$F\text{-}Ratio = (5.71)^{**} \quad R'^2 = 0.40$$

Dairy crossbred cattle

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of green fodders lack on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (9). The results indicate that: (i) the milk production is estimated at 1.929 ton/ lactation period when the problem impact of green fodders lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.391 and 0.631 ton/lactation period when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of green fodders lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 8.43). (v) the variations in problem degrees of green fodders lack explain 50% of the variations of the milk quantities produced.

$$Y_i=1.929+0.391Weak_1+0.631No\ problem_1 \quad (9)$$
$$(18.15)^{**} \quad (2.60)^{**} \quad (4.04)^{**}$$
$$F\text{-}Ratio = (8.43)^{**} \quad R'^2 = 0.50$$

Where:

Y_i = the estimated quantity of milk produced from crossbred cattle (ton/lactation).

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of livestock high prices on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (10). The results indicate that: (i) the milk production is estimated at 1.954 ton/lactation period when the problem impact of livestock high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.313 and 0.638 ton/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of livestock high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 8.23). (v) the variations in problem degrees of livestock high prices explain 49% of the variations of the milk quantities produced.

$$Y_i=1.954+0.313Weak_2+0.638Noproblem_2 \quad (10)$$
$$(18.28)^{**} \quad (2.07)^{*} \quad (4.05)^{**}$$
$$F\text{-}Ratio = (8.23)^{**} \quad R'^2 = 0.49$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of concentrates and dry fodders high prices on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (11). The results indicate that: (i) the milk production is estimated at 2.052 ton/lactation period when the problem impact of concentrates and dry fodders high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.421 and 0.760 ton/lactation period when the net problem impacts of concentrates and dry fodders high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 9.35). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 52% of the variations of the milk quantities produced.

$$Y_i=2.052+0.421Weak_3+0.760No\ problem_3 \quad (11)$$
$$(25.97)^{**} \quad (3.08)^{**} \quad (3.64)^{**}$$
$$F\text{-}Ratio = (9.35)^{**} \quad R'^2 = 0.52$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary drugs high prices on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (12). The results indicate that: (i) the milk production is estimated at 1.855 ton/lactation period when the problem impact of veterinary drugs high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.426 and 0.826 ton/lactation period when the net problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary drugs high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary drugs high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 11.43). (v) the variations in problem degrees of veterinary drugs high prices explain 57% of the variations of the milk quantities produced.

$$Y_i=1.855+0.426Weak_4+0.826\ No\ problem_4 \quad (12)$$
$$(16.01)^{**} \quad (3.05)^{**} \quad (4.75)^{**}$$
$$F\text{-}Ratio = (11.43)^{**} \quad R'^2 = 0.57$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders unavailability on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (13). The results indicate that: (i) the milk production is estimated at 2.012 ton/lactation period when the problem impact of concentrates and dry fodders unavailability on the milk quantities produced is severe. (ii) the milk production is estimated will increase by 0.382 and 0.667 ton/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders unavailability are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.*, F-Ratio = 13.15). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 61% of the variations of the milk quantities produced.

$$Y_i=2.012+0.382Weak_5+0.667No\ problem_5 \quad (13)$$
$$(26.84)^{**} \quad (2.63)^{**} \quad (4.97)^{**}$$
$$F\text{-}Ratio = (13.15)^{**} \quad R'^2 = 0.61$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary services lack on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (14). The results indicate that: (i) the milk production is estimated at 1.989 ton/lactation period when the problem impact of veterinary services lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.474 and 0.664 ton/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary services lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary services lack is also statistically significant at 5% level (*i.e.*, F-Ratio = 10.61). (v) the variations in problem degrees of veterinary services lack explain 56% of the variations of the milk quantities produced.

$$Y_i=1.989+0.474Weak_6+0.664No\ problem_6 \quad (14)$$
$$(23.77)^{**} \quad (3.64)^{**} \quad (3.81)^{**}$$
$$F\text{-}Ratio = (10.61)^{*} \quad R'^2 = 0.56$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of distance among the production and markets sites on the milk quantities produced in lactation period per head of the crossbred cattle are estimated in equation (15). The results indicate that: (i) the milk production is estimated at 1.932 ton/lactation period when the problem impact of distance among the production and markets sites on the milk quantities produced is severe. (ii) the milk production will increase by 0.442 and 0.530 ton/lactation period when the net problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of distance among the production and markets sites are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of distance among the production and markets sites is also statistically significant at 1% level (*i.e.*, F-Ratio = 6.35). (v) the variations in problem degrees of distance among the production and markets sites explain 43% of the variations of the milk quantities produced.

$$Y_i=1.932+0.442Weak_7+0.530No\ prolem_7 \quad (15)$$
$$(17.03)^{**} \quad (2.51)^{*} \quad (3.42)^{**}$$
$$F\text{-}Ratio = (6.35)^{**} \quad R'^2 = 0.43$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of finance lack on the milk quantities produced in lactation period per

head of the crossbred cattle are estimated in equation (16). The results indicate that: (i) the milk production is estimated at 2.049 ton/lactation period when the problem impact of finance lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.451 and 0.617 ton/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of finance lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of finance lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 8.22). (v) the variations in problem degrees of finance lack explain 49% of the variations of the milk quantities produced.

$$Y_i=2.049+0.451Weak_8+0.617No\ problem_8 \quad (16)$$

$$(25.10)^{**} \quad (2.99)^{*} \quad (3.38)^{**}$$

$$F\text{-Ratio} = (8.22)^{**} \quad R'^2 = 0.49$$

Dairy buffalo

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of green fodders lack on the milk quantities produced in lactation period per head of buffalo are estimated in equation (17). The results indicate that: (i) the milk production is estimated at 1.744 ton/lactation period when the problem impact of green fodders lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.313 and 0.581 ton/lactation period when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of green fodders lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 6.41). (v) the variations in problem degrees of green fodders lack explain 43% of the variations of the milk quantities produced.

$$Y_i=1.744+0.313Weak_1+0.581No\ problem_1 \quad (17)$$

$$(18.59)^{**} \quad (2.20)^{*} \quad (3.43)^{**}$$

$$F\text{-Ratio} = (6.41)^{**} \quad R'^2 = 0.43$$

Where:

Y_i = the estimated quantity of milk produced from buffaloes (ton/lactation).

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of livestock high prices on the milk quantities produced in lactation period per head of buffalo are estimated in equation (18). The results indicate that: (i) the milk production is estimated at 1.770 ton/lactation period when the problem impact of livestock high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.330 and 0.563 ton/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of livestock high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 5.37). (v) the variations in problem degrees of livestock high prices explain 39% of the variations of the milk quantities produced.

$$Y_i=1.770+0.330Weak_2+0.563No\ problem_2 \quad (18)$$

$$(19.18)^{**} \quad (2.30)^{*} \quad (2.93)^{**}$$

$$F\text{-Ratio} = (5.37)^{**} \quad R'^2 = 0.39$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders high prices on the milk quantities produced in lactation period per head of buffalo are estimated in equation (19). The results indicate that: (i) the milk production is estimated at 1.643 ton/lactation period when the problem impact of concentrates and dry fodders high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.457 and 0.543 ton/lactation period when the net problem impacts of concentrates and dry fodders

high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 8.43). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 50% of the variations of the milk quantities produced.

$$Y_i=1.643+0.457Weak_3+0.543No\ problem_3 \qquad (19)$$
$$(16.46)^{**} \quad (3.11)^{**} \quad (3.85)^{**}$$
$$F\text{-Ratio} = (8.43)^{**} \qquad R'^2 = 0.50$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary drugs high prices on the milk quantities produced in lactation period per head of buffalo are estimated in equation (20). The results indicate that: (i) the milk production is estimated at 1.643 ton/lactation period when the problem impact of veterinary drugs high prices on the milk quantities produced is severe. (ii) the milk production will increase by 0.424 and 0.682 ton/lactation period when the net problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary drugs high prices are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary drugs high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 11.09). (v) the variations in problem degrees of veterinary drugs high prices explain 57% of the variations of the milk quantities produced.

$$Y_i=1.643+0.424Weak_4+0.682No\ problem_4 \qquad (20)$$
$$(17.71)^{**} \quad (3.43)^{**} \quad (4.43)^{**}$$
$$F\text{-Ratio} = (11.09)^{**} \qquad R'^2 = 0.57$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders unavailability on the milk quantities produced in lactation period per head of buffalo are estimated in equation (21). The results indicate that: (i) the milk production is estimated at 1.744 ton/lactation period when the problem impact of concentrates and dry fodders unavailability on the milk quantities produced is severe. (ii) the milk production will increase by 0.336 and 0.472 ton/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of concentrates and dry fodders unavailability are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.*, F-Ratio = 5.08). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 37% of the variations of the milk quantities produced.

$$Y_i=1.744+0.336Weak_5+0.472\ No\ problem_5 \qquad (21)$$
$$(17.75)^{**} \quad (2.04)^{*} \quad (3.04)^{**}$$
$$F\text{-Ratio} = (5.08)^{**} \qquad R'^2 = 0.37$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary services lack on the milk quantities produced in lactation period per head of buffalo are estimated in equation (22). The results indicate that: (i) the milk production is estimated at 1.750 ton/lactation period when the problem impact of veterinary services lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.310 and 0.650 ton/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of veterinary services lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on

the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of veterinary services lack is also statistically significant at 5% level (*i.e.,* F-Ratio = 4.67). (v) the variations in problem degrees of veterinary services lack explain 36% of the variations of the milk quantities produced.

$$Y_i=1.750+0.310Weak_6+0.650No\ problem_6 \quad (22)$$

$$(16.53)^{**} \quad (2.18)^{*} \quad (2.75)^{**}$$

$$F\text{-Ratio} = (4.67)^{*} \quad R'^2 = 0.36$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of distance among the production and markets sites on the milk quantities produced in lactation period per head of buffalo are estimated in equation (23). The results indicate that: (i) the milk production is estimated at 1.738 ton/lactation period when the problem impact of distance among the production and markets sites on the milk quantities produced is severe. (ii) the milk production will increase by 0.350 and 0.462 ton/lactation period when the net problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of distance among the production and markets sites are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of distance among the production and markets sites is also statistically significant at 5% level (*i.e.,* F-Ratio = 3.99). (v) the variations in problem degrees of distance among the production and markets sites explain 32% of the variations of the milk quantities produced.

$$Y_i=1.738+0.350Weak_7+0.462No\ problem_7 \quad (23)$$

$$(15.98)^{**} \quad (2.28)^{*} \quad (2.46)^{**}$$

$$F\text{-Ratio} = (3.99)^{*} \quad R'^2 = 0.32$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of finance lack on the milk quantities produced in lactation period per head of buffalo are estimated in equation (24). The results indicate that: (i) the milk production is estimated at 1.667 ton/lactation period when the problem impact of finance lack on the milk quantities produced is severe. (ii) the milk production will increase by 0.413 and 0.444 ton/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the milk quantities produced and degree of finance lack are negative. The milk quantities produced increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the milk quantities produced are statistically significant. (iv) the mathematical relationship between the milk quantities produced and problem degrees of finance lack is also statistically significant at 5% level (*i.e.,* F-Ratio = 4.29). (v) the variations in problem degrees of finance lack explain 34% of the variations of the milk quantities produced.

$$Y_i=1.667+0.413Weak_8+0.444No\ problem_8 \quad (24)$$

$$(13.43)^{**} \quad (2.25)^{*} \quad (2.78)^{**}$$

$$F\text{-Ratio} = (4.29)^{*} \quad R'^2 = 0.34$$

Estimation of the Impacts of Main Constraints Affecting Total Return from the Milk Production

Local Dairy cattle

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of green fodders lack on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (25). The results indicate that: (i) the total returns of milk production is estimated at 9202.163 LE/lactation period when the problem impact of green fodders lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1552.582 and 2037.470 LE/lactation period when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of green fodders lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the total returns from milk production are statistically significant. (iv) the mathematical

relationship between the total returns from milk production and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.,* F-Ratio = 6.46). (v) the variations in problem degrees of green fodders lack explain 43% of the variations of the total returns from milk production.

TR_i=9202.163+1552.582$Weak_1$+2037.47No $problem_1$ (25)

(25.30)** (2.82)** (3.11)**

F-Ratio = (6.46)** R^{-2} = 0.43

Where:

TR_i = the estimated total returns from milk per head of local cattle (LE/lactation).

Constant = the impact of green fodders lack on the total returns from milk is severe.

$Weak_1$ = the impact of green fodders lack on the total returns from milk is weak.

No $problem_1$ = the impact of green fodders lack on the total returns from milk is no problem.

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of livestock high prices on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (26). The results indicate that: (i) the total returns of milk production is estimated at 9260.815 LE/lactation period when the problem impact of livestock high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1670.148 and 2051.288 LE/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of livestock high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 7.11). (v) the variations in problem degrees of live animal high prices explain 46% of the variations of the total returns from milk production.

TR_i=9260.815+1670.148$Weak_3$+2051.29No $problem_3$ (26)

(27.41)** (3.17)** (2.92)**

F-Ratio = (7.11)** R^{-2} = 0.46

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of concentrates and dry fodders high prices on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (27). The results indicate that: (i) the total returns of milk production is estimated at 9307.176 LE/lactation period when the problem impact of concentrates and dry fodders high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1293.334 and 1966.088 LE/lactation period when the net problem impacts of concentrates and dry fodders high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders high prices is also statistically significant at 5% level (*i.e.,* F-Ratio = 4.80). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 36% of the variations of the total returns from milk production.

TR_i=9307.176+1293.334$Weak_3$+1966.09No $problem_3$ (27)

(24.12)** (2.22)* (2.83)**

F-Ratio = (4.80)* R^{-2} = 0.36

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary drugs high prices on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (28). The results indicate that: (i) the total returns of milk production is estimated at 8935.595 LE/lactation period when the problem impact of veterinary drugs high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1256.339 and 2357.183 LE/lactation period when the net

problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary drugs high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary drugs high prices is also statistically significant at 1% level (*i.e.,* F-Ratio = 5.45). (v) the variations in problem degrees of veterinary drugs high prices explain 39% of the variations of the total returns from milk production.

$$TR_i=8935.595+1256.339Weak_4+2357.18No\ problem_4 \quad (28)$$

$$(17.68)^{**} \quad (2.03)^{*} \quad (3.30)^{**}$$

$$\text{F-Ratio} = (5.45)^{**} \qquad R'^2 = 0.39$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of concentrates and dry fodders unavailability on the total returns from milk production in lactation period per head of the local are estimated in equation (29). The results indicate that: (i) the total returns of milk production is estimated at 9305.449 LE/lactation period when the problem impact of concentrates and dry fodders unavailability on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1730.543 and 2074.878 LE/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders unavailability are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.,* F-Ratio = 8.51). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 50% of the variations of the total returns from milk production.

$$TR_i=9305.449+1730.543Weak_5+2074.88No\ problem_5 \quad (29)$$

$$(30.15)^{**} \quad (3.13)^{**} \quad (3.47)^{**}$$

$$\text{F-Ratio} = (8.51)^{**} \qquad R'^2 = 0.50$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary services lack on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (30). The results indicate that: (i) the total returns of milk production is estimated at 9355.030 LE/lactation period when the problem impact of veterinary services lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1398.938 and 2384.554 LE/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary services lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary services lack is also statistically significant at 1% level (*i.e.,* F-Ratio = 5.69). (v) the variations in problem degrees of veterinary services lack explain 40% of the variations of the total returns from milk production.

$$TR_i=9355.030+1398.938Weak_6+2384.55No\ problem_6 \quad (30)$$

$$(26.40)^{**} \quad (2.63)^{**} \quad (2.75)^{**}$$

$$\text{F-Ratio} = (5.69)^{**} \qquad R'^2 = 0.40$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of distance among the production and markets sites on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (31). The results indicate that: (i) the total returns of milk production is estimated at 9088.459 LE/lactation period when the problem impact of distance among the production and markets sites on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1643.351 and 2179.213 LE/lactation period when the net

problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of distance among the production and markets sites are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of distance among the production and markets sites is also statistically significant at 1% level (*i.e.*, F-Ratio = 10.07). (v) the variations in problem degrees of distance among the production and markets sites length explain 54% of the variations of the total returns from milk production.

$$TR_i=9088.459+1643.351Weak_7+2179.21No\ problem_7 \quad (31)$$

$$(27.84)^{**} \qquad (3.01)^{**} \qquad (4.22)^{**}$$

$$F\text{-Ratio} = (10.07)^{**} \qquad R'^2 = 0.54$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of finance lack on the total returns from milk production in lactation period per head of the local cattle are estimated in equation (32). The results indicate that: (i) the total returns of milk production is estimated at 9414.370 LE/lactation period when the problem impact of finance lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1495.551 and 2432.019 LE/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of finance lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of finance lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 8.69). (v) the variations in problem degrees of finance lack explain 51% of the variations of the total returns from milk production.

$$TR_i=9414.370+1495.551Weak_8+2432.02No\ problem_8 \quad (32)$$

$$(32.03)^{**} \qquad (2.76)^{**} \qquad (3.70)^{**}$$

$$F\text{-Ratio} = (8.69)^{**} \qquad R'^2 = 0.51$$

Dairy crossbred cattle

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of green fodders lack on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (33). The results indicate that: (i) the total returns of milk production is estimated at 13893.393 LE/ lactation period when the problem impact of green fodders lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1933.554 and 2683.552 LE/lactation period when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of green fodders lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 7.90). (v) the variations in problem degrees of green fodders lack explain 48% of the variations of the total returns from milk production.

$$TR_i=13893.393+1933.55Weak_1+2683.55No\ problem_1 \quad (33)$$

$$(28.95)^{**} \qquad (2.85)^{**} \qquad (3.80)^{**}$$

$$F\text{-Ratio} = (7.90)^{**} \qquad R'^2 = 0.48$$

Where:

TR_i = the estimated total returns from milk per head of crossbred cattle (LE/lactation).

. The impacts of problem degrees (*i.e.*, severe, weak and no problem) of livestock high prices on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (34). The results indicate that: (i) the total returns of milk production is estimated at 13982.781 LE/lactation period when the problem impact of livestock high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1278.112

and 3150.275 LE/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of livestock high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 13.25). (v) the variations in problem degrees of livestock high prices explain 61% of the variations of the total returns from milk production.

$$TR_i=13982.781+1278.11Weak_2+3150.28No\ problem_2 \quad (34)$$
$$(33.56)^{**} \quad (2.17)^{*} \quad (5.14)^{**}$$
$$\text{F-Ratio} = (13.25)^{**} \quad R'^2 = 0.61$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders high prices on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (35). The results indicate that: (i) the total returns of milk production is estimated at 14468.810 LE/lactation period when the problem impact of concentrates and dry fodders high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1937.579 and 3251.190 LE/lactation period when the net problem impacts of concentrates and dry fodders high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 9.03). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 52% of the variations of the total returns from milk production.

$$TR_i=14468.810+1937.58Weak_3+3251.19No\ problem_3 \quad (35)$$
$$(40.82)^{**} \quad (3.16)^{**} \quad (3.47)^{**}$$
$$\text{F-Ratio} = (9.03)^{**} \quad R'^2 = 0.52$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary drugs high prices on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (36). The results indicate that: (i) the total returns of milk production is estimated at 13750.000 LE/lactation period when the problem impact of veterinary drugs high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1727.792 and 3374.583 LE/lactation period when the net problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary drugs high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary drugs high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 11.43). (v) the variations in problem degrees of veterinary drugs high prices explain 48% of the variations of the total returns from milk production.

$$TR_i=13750.000+1727.79Weak_4+3374.58No\ problem_4 \quad (36)$$
$$(24.26)^{**} \quad (2.53)^{*} \quad (3.97)^{**}$$
$$\text{F-Ratio} = (11.43)^{**} \quad R'^2 = 0.48$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders unavailability on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (37). The results indicate that: (i) the total returns of milk production is estimated at 14182.641 LE/lactation period when the problem impact of concentrates and dry fodders unavailability on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2509.234 and

2762.859 LE/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders unavailability are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.,* F-Ratio = 16.52). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 65% of the variations of the total returns from milk production.

$$TR_i=14182.641+2509.23Weak_5+2762.86No\ problem_5 \quad (37)$$
$$(45.77)^{**} \qquad (4.18)^{**} \qquad (4.98)^{**}$$
$$F\text{-Ratio} = (16.52)^{**} \qquad R'^2 = 0.65$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of veterinary services lack on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (38). The results indicate that: (i) the total returns of milk production is estimated at 14161.833 LE/lactation period when the problem impact of veterinary services lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2060.531 and 3281.222 LE/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary services lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary services lack is also statistically significant at 5% level (*i.e.,* F-Ratio = 16.65). (v) the variations in problem degrees of veterinary services lack explain 62% of the variations of the total returns from milk production.

$$TR_i=14161.833+2060.53Weak_6+3281.22No\ problem_6 \quad (38)$$
$$(40.99)^{**} \qquad (3.83)^{**} \qquad (4.56)^{**}$$
$$F\text{-Ratio} = (16.65)^{*} \qquad R'^2 = 0.62$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of distance among the production and markets sites on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (39). The results indicate that: (i) the total returns of milk production is estimated at 13885.357 LE/lactation period when the problem impact of distance among the production and markets sites on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 1565.286 and 2746.310 LE/lactation period when the net problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of distance among the production and markets sites are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites length on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of distance among the production and markets sites is also statistically significant at 1% level (*i.e.,* F-Ratio = 9.71). (v) the variations in problem degrees of distance among the production and markets sites explain 53% of the variations of the total returns from milk production.

$$TR_i=13885.357+1565.29Weak_7+2746.31No\ problem_7 \quad (39)$$
$$(30.50)^{**} \qquad (2.22)^{*} \qquad (4.41)^{**}$$
$$F\text{-Ratio} = (9.71)^{**} \qquad R'^2 = 0.53$$

The impacts of problem degrees (*i.e.,* severe, weak and no problem) of finance lack on the total returns from milk production in lactation period per head of the crossbred cattle are estimated in equation (40). The results indicate that: (i) the total returns of milk production is

estimated at 14335.476 LE/lactation period when the problem impact of finance lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2277.524 and 3135.635 LE/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of finance lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of finance lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 15.08). (v) the variations in problem degrees of finance lack explain 64% of the variations of the total returns from milk production.

$$TR_i = 14335.476 + 2277.52 Weak_8 + 3135.64 No\ problem_8 \quad (40)$$
$$(46.91)^{**} \qquad (4.04)^{**} \qquad (4.59)^{**}$$
$$F\text{-Ratio} = (15.08)^{**} \qquad R'^2 = 0.64$$

Dairy buffalo

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of green fodders lack on the total returns from milk production in lactation period per head of buffalo are estimated in equation (41). The results indicate that: (i) the total returns of milk production is estimated at 14264.907 LE/lactation period when the problem impact of green fodders lack on the total returns from milk production is Severe. (ii) the total returns from milk production will increase by 2490.511 and 4923.843 LE/lactation period. when the net problem impacts of green fodders lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of green fodders lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of green fodders lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of green fodders lack is also statistically significant at 1% level (*i.e.*, F-Ratio = 22.47). (v) the variations in problem degrees of green fodders lack explain 73% of the variations of the total returns from milk production.

$$TR_i = 14264.907 + 2490.51 Weak_1 + 4923.84 No\ problem_1 \quad (41)$$
$$(33.93)^{**} \qquad (3.92)^{**} \qquad (6.50)^{**}$$
$$F\text{-Ratio} = (22.47)^{**} \qquad R'^2 = 0.73$$

Where:

TR_i = the estimated total returns from milk per head of buffaloes (LE/lactation).

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of livestock high prices on the total returns from milk production in lactation period per head of buffalo are estimated in equation (42). The results indicate that: (i) the total returns of milk production is estimated at 14423.871 LE/lactation period when the problem impact of livestock high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2815.977 and 4745.944 LE/lactation period when the net problem impacts of livestock high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of livestock high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of livestock high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of livestock high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 16.83). (v) the variations in problem degrees of livestock high prices explain 66% of the variations of the total returns from milk production.

$$TR_i = 14423.871 + 2815.98 Weak_2 + 4745.94 No\ problem_2 \quad (42)$$
$$(32.71)^{**} \qquad (4.10)^{**} \qquad (5.17)^{**}$$
$$F\text{-Ratio} = (16.83)^{**} \qquad R'^2 = 0.66$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders high prices on the total returns from milk production in lactation period per head of buffalo are estimated in equation (43). The results indicate that: (i) the total returns of milk production is estimated at 13887.955 LE/

lactation period when the problem impact of concentrates and dry fodders high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2877.643 and 3914.592 LE/lactation period when the net problem impacts of concentrates and dry fodders high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 11.77). (v) the variations in problem degrees of concentrates and dry fodders high prices explain 58% of the variations of the total returns from milk production.

$$TR_i = 13887.955 + 2877.64 Weak_3 + 3914.59 No\ problem_3 \quad (43)$$
$$(23.57)^{**} \qquad (3.32)^{**} \qquad (4.70)^{**}$$
$$\text{F-Ratio} = (11.77)^{**} \qquad R'^2 = 0.58$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary drugs high prices on the total returns from milk production in lactation period per head of buffalo are estimated in equation (44). The results indicate that: (i) the total returns of milk production is estimated at 13887.955 LE/ lactation period when the problem impact of veterinary drugs high prices on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2782.567 and 4906.225 LE/lactation period when the net problem impacts of veterinary drugs high prices are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary drugs high prices are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary drugs high prices on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary drugs high prices is also statistically significant at 1% level (*i.e.*, F-Ratio = 11.09). (v) the variations in problem degrees of veterinary drugs high prices explain 67% of the variations of the total returns from milk production.

$$TR_i = 13887.955 + 2782.57 Weak_4 + 4906.23 No\ problem_4 \quad (44)$$
$$(26.66)^{**} \qquad (4.01)^{**} \qquad (5.68)^{**}$$
$$\text{F-Ratio} = (11.09)^{**} \qquad R'^2 = 0.67$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of concentrates and dry fodders unavailability on the total returns from milk production in lactation period per head of buffalo are estimated in equation (45). The results indicate that: (i) the total returns of milk production is estimated at 14451.383 LE/l actation period when the problem impact of concentrates and dry fodders unavailability on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2445.203 and 3528.903 LE/lactation period when the net problem impacts of concentrates and dry fodders unavailability are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of concentrates and dry fodders unavailability are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of concentrates and dry fodders unavailability on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of concentrates and dry fodders unavailability is also statistically significant at 1% level (*i.e.*, F-Ratio = 16.52). (v) the variations in problem degrees of concentrates and dry fodders unavailability explain 65% of the variations of the total returns from milk production.

$$TR_i = 14451.383 + 2445.20 Weak_5 + 3528.91 No\ problem_5 \quad (45)$$
$$(25.36)^{**} \qquad (2.57)^{*} \qquad (3.92)^{**}$$
$$\text{F-Ratio} = (8.36)^{**} \qquad R'^2 = 0.50$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of veterinary services lack on the total returns from milk production in lactation period per head of buffalo are estimated in equation (46). The results indicate that: (i) the total returns of milk production is estimated at 14544.700 LE/lactation period when the problem impact of veterinary services

lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2164.305 and 4945.022 LE/lactation period when the net problem impacts of veterinary services lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of veterinary services lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of veterinary services lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of veterinary services lack is also statistically significant at 5% level (*i.e.*, F-Ratio = 7.46). (v) the variations in problem degrees of veterinary services lack explain 47% of the variations of the total returns from milk production.

$$TR_i = 14544.700 + 2164.31 Weak_6 + 4945.02 No\ problem_6 \quad (46)$$
$$(23.42)^{**} \qquad (2.60)^{**} \qquad (3.56)^{**}$$
$$\text{F-Ratio} = (7.46)^{*} \qquad R'^2 = 0.47$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of distance among the production and markets sites on the total returns from milk production in lactation period per head of buffalo are estimated in equation (47). The results indicate that: (i) the total returns of milk production is estimated at 14424.132 LE/lactation period when the problem impact of distance among the production and markets sites on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2657.484 and 3171.146 LE/lactation period when the net problem impacts of distance among the production and markets sites are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of distance among the production and markets sites are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of distance among the production and markets sites on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of distance among the production and markets sites is also statistically significant at 1% level (*i.e.*, F-Ratio = 5.60). (v) the variations in problem degrees of distance among the production and markets sites explain 40% of the variations of the total returns from milk production.

$$TR_i = 14424.132 + 2657.48 Weak_8 + 3171.15 No\ problem_7 \quad (47)$$
$$(21.83)^{**} \qquad (2.77)^{**} \qquad (2.84)^{**}$$
$$\text{F-Ratio} = (5.60)^{**} \qquad R'^2 = 0.40$$

The impacts of problem degrees (*i.e.*, severe, weak and no problem) of finance lack on the total returns from milk production in lactation period per head of buffalo are estimated in equation (48). The results indicate that: (i) the total returns of milk production is estimated at 14095.206 LE/lactation period when the problem impact of finance lack on the total returns from milk production is severe. (ii) the total returns from milk production will increase by 2653.693 and 3028.279 LE/lactation period when the net problem impacts of finance lack are weak or no, respectively. That means, the relationship among the total returns from milk production and degree of finance lack are negative. The total returns from milk production increase when the problem degrees decrease. (iii) the previous net impacts of problem degree of finance lack on the total returns from milk production are statistically significant. (iv) the mathematical relationship between the total returns from milk production and problem degrees of finance lack is also statistically significant at 5% level (*i.e.*, F-Ratio = 4.82). (v) the variations in problem degrees of finance lack explain 36% of the variations of the total returns from milk production.

$$TR_i = 14095.206 + 2653.69 Weak_8 + 3028.28 No\ problem_8 \quad (48)$$
$$(17.95)^{**} \qquad (2.28)^{*} \qquad (2.99)^{**}$$
$$\text{F-Ratio} = (4.82)^{*} \qquad R'^2 = 0.36$$

Recommendations

Providing the green fodder for the dairy heads will increase the milk yield for the dairy cow from 0.99 ton/lactation period to 1.59 ton/ lactation period (*i.e.*, 61%) for baladi cow, from 1.93 ton/lactation period to 2.56 ton/lactation period (*i.e.*, 33%) for crossbred cow and from 1.74 ton/lactation period to 2.33 ton/lactation period (*i.e.*, 34%) for buffalo cow.

Providing the concentrates and dry fodders for the dairy heads will increase the milk yield for the dairy cow from 1.03 ton/lactation period

to 1.56 ton/lactation period (*i.e.,* 51%) for baladi cow, from 2.01 ton/lactation period to 2.68 ton/lactation period (*i.e.,* 33%) for crossbred cow and from 1.74 ton/lactation period to 2.22 ton/lactation period (*i.e.,* 28%) for buffalo cow.

Providing the veterinary services for the dairy heads will increase the milk yield for the dairy cow from 1.08 ton/lactation period to 1.63 ton/lactation period (*i.e.,* 51%) for baladi cow, from 1.99 ton/lactation period to 2.65 ton/lactation period (*i.e.,* 33%) for crossbred cow and from 1.75 ton/lactation period to 2.40 ton/lactation period (*i.e.,* 37%) for buffalo cow.

Providing the finance for the dairy heads will increase the milk yield for the dairy cow from 1.12 ton/lactation period to 1.65 ton/lactation period (*i.e.,* 47%) for baladi cow, from 2.05 ton/lactation period to 2.67 ton/lactation period (*i.e.,* 30%) for crossbred cow and from 1.67 ton/lactation period to 2.11 ton/lactation period (*i.e.,* 26%) for buffalo cow.

Providing the green fodder for the dairy heads will increase the total return from milk cow from 9202 LE/head to 11239 LE/head (*i.e.,* 22%) for baladi cow, from 13893 LE/head to 16576 LE/head (*i.e.,* 19%) for crossbred cow and from 14264 LE/head to 19188 LE/head (*i.e.,* 35%) for buffalo cow.

Providing the concentrates and dry fodders for the dairy heads will increase the total return from milk cow from 9305 LE/head to 11380 LE/head (*i.e.,* 22%) for baladi cow, from 14183 LE/head to 16946 LE/head (*i.e.,* 19%) for crossbred cow and from 14451 LE/head to 17980 LE/head (*i.e.,* 24%) for buffalo cow.

Providing the veterinary services for the dairy heads will increase the total return from milk cow from 9355 LE/head to 11740 LE/head (*i.e.,* 25%) for baladi cow, from 14162 LE/head to 17443 LE/head (*i.e.,* 23%) for crossbred cow and from 14545 LE/head to 19490 LE/head (*i.e.,* 34%) for buffalo cow.

Providing the finance for the dairy heads will increase the total return from milk cow from 9469 LE/head to 11846 LE/head (*i.e.,* 25%) for baladi cow, from 14335 LE/head to 17471 LE/ head (*i.e.,* 22%) for cross bred cow and from 14095 LE/head to 17123 LE/head (*i.e.,* 21%) for buffalo cow.

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دراسة اقتصادية لأهم العوامل المؤثرة على إنتاج الألبان في محافظة الشرقية

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تهدف الدراسة إلى دراسة الكفاءة الإنتاجية والاقتصادية لإنتاج الألبان من الأبقار البلدية والخليطة والجاموس، ودراسة أهم مشاكل أو محددات إنتاج الألبان وتأثيرها على إنتاجية اللبن والعائد الإجمالي من الرأس الحلابة، ويمكن حصر أهم نتائج الدراسة في الأتي: (أ) التكاليف الكلية لكل كيلو جرام من اللبن تقدر بنحو ٦,٨٤ جنيه، ٤,٧٧ جنيه، ٥,٣٥ جنيه للأبقار البلدية والخليطة والجاموس على الترتيب. (ب) صافي التكاليف الكلية لكل كيلو جرام من اللبن تقدر بنحو ٢,٧٤ جنيه، ٢,٠٧، ٢,٥٩ جنيه للأبقار البلدية والخليطة والجاموس على الترتيب، (ت) يقدر الهامش الكلي وصافي الربح لكل كيلو جرام من لبن الأبقار البلدية نحو ١,٤٤ جنيه، ١,٢١ جنيه على الترتيب، ويقدر الهامش الكلي وصافي الربح لكل كيلو جرام من لبن الأبقار الخليطة نحو ٢,٠٢ جنيه، ١,٨٨ جنيه على الترتيب، في حين يقدر الهامش الكلي وصافي الربح لكل كيلو جرام من لبن الجاموس ٣,٠٤ جنيه، ٢,٨٦ جنيه على الترتيب، (ث) يقدر حافز المزارع لكل كيلو جرام من اللبن نحو ٣١٪، ٤٨٪، ٥٣٪ للأبقار البلدية والخليطة والجاموس على الترتيب، (ج) تزداد كل من الكميات المنتجة من اللبن والعائد الكلي من اللبن للأبقار البلدية والخليطة والجاموس بإنخفاض درجة حدة المشكلات الإنتاجية والاقتصادية موضوع الدراسة،

الكلمات الاسترشادية: التكاليف الكلية، الهامش الكلي، حافز المزارع، الإيرادات الكلية، محافظة الشرقية.

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