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ECONOMICS OF SOME FEEDING PACKAGES APPLICATION UNDER MIXED PRODUCTION SYSTEM AT EL-BEHEIRA GOVERNORATE

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SUMMARY

Fifty farms under mixed farming system at El-Beheira Governorate were identified as farms who commonly used corn silage and/or urea treatment in animal feeding. A questionnaires format was designed to collect economical and technical data in dairy farms concerning animal feeding (corn silage and/or urea treatment) and milk revenue before and after the application of one of two feeding packages. The study was conducted from October 2005 to March 2006. The objective of this study was to evaluate the impact of two technical packages (corn silage and/or urea treatment) on dairy farm income under traditional dairy farming system in El-Beheira. Statistical descriptive and quantitative analyses were used in this study.

The extra total revenue due to feeding costs saving on ration containing whole corn silage and increase in milk production were L.E. 2.07, 4.15 and 2.81 per animal per day for local cows, Buffalo and cross cows respectively. Extra total revenue gained from animals fed ration containing rice straw with urea was L.E. 0.80, 1.40 and 1.38 per day per animal for local cows, Buffalo and cross cows, respectively. The 56% of surveyed farmers observed an increase in milk fat, while 42 % farmers found the same percentage of fat content and 2% farmers did not have any observation on milk fat. Milk price was higher in 44 % of studied farms and had the same price in 56% of farms.

Total areas cultivated with berseem in studied farms before the common use of corn silage making were 73.25 feddans but reduced to 49.17 feddans (33%) after corn silage making. The difference of 33% or 24.08 feddans of cultivated areas was converted to 21.33 (wheat), 1.5 (potatoes), 1 (pea) and 0.25 (bean). Thirteen farmers kept the same berseem areas as before using corn silage.

In conclusion, corn silage and/or urea treatment enhanced the profitability of dairy farms through feeding cost reduction and increased milk production. Berseem area was reduced by one third of the total winter green forage areas, where this reduction area can be used in cultivating other winter crops especially wheat or other important crops on national level.

Keywords: Mixed farming system, corn silage, urea treatment, berseem

INTRODUCTION

Most Egyptian farmers practice mixed farming system (crop/livestock). Animal feeding quality is the main constraint confronting farmers. Concentrate feeds have

no stable nutrient quality and available straw has low feeding value. The aim to increase livestock productivity and farm income has led to the introduction and adoption of new technologies. Whole maize silage and/or treated rice straw have been used to improve quality and availability of forages all year round. Animal nutrition research and extension require methods to assess the feasibility of technical innovations before their application under farm condition (Schiere and De Wit, 1995). The eventual success of the introduction of an innovation is determined by farmers' response, primarily based on the resources requirements, the impact on risk, and profitability. This response however is a long term process, especially when farmers are not in a position to judge the relevant issues in advance.

The development strategies in animal production usually emphasize on actions that support the development and implementation of innovation packages. The assessment of a new technology on farm is a phase in between the identification of problems and potentials and the dissemination of this technology within the context of farming systems research and development (Amir and Knipscheer, 1989).

The assessment of a new technology on farm level is important from farm point of view; the farmers often just partially adopt new and expectedly superior technologies developed on research stations, with results that the performance remains below original expectations. In crops production this phenomenon is referred to as the yield gap' (World Bank, 1982); in animal production ' performance gap' is more apparent. Investigation into this performance gap drew attention to a variety of differences between the conditions prevailing on research stations and those on the farms for which the technology was meant.

Different bio-physical, financial, economic, infrastructural and institutional conditions offer plausible explanations for, parts of this performance gap. Assessment of a new technology on farm must be seen as the phase in agricultural research in which researchers and farmers collaborate to confront a new technology with normal conditions of the farm households. In this phase the new technology can be adjusted according to the priorities, possibilities and constraints of the farm household, so that finally technologies can be disseminated which can be readily adopted by the farm household.

The objective of this study was to evaluate the impact of two technical packages (corn silage and/or urea treatment) on dairy farm income under traditional dairy farming system at El-Beheira Governorate.

MATERIALS AND METHODS

The study depended on the secondary and primary data which was collected through a questionnaire on the farms which are used to making corn silage and urea treated rice straw. The study was conducted from October 2005 to March 2006 on 50 dairy farms in two districts at El-Beheira Governorate which was selected because it has the highest number of female dairy animals, about 690,488 heads, (Ministry of Agriculture, Economic Affairs Sector, Annual Reports 2004) representing about 11.86% of total number of dairy animal in Egypt. The two districts were Delengat and Etai El-barood which were selected randomly, the farms were selected randomly as well from those which are using corn silage and /or urea treated straw in animal feeding. Questionnaires were pre-tested for clarity on limited numbers of farms who had good experience in using corn silage and/or treated rice straw with urea.

Information was obtained through personal interviews of 50 farms, divided into 30 farms using whole corn silage, and 20 farms using urea treated rice straw, the number of farms in each district was 25 farms. Collected data consisted of variable and fixed costs for corn silage and urea treatment, feed resources over the year, animal feeding systems and milk production before and after using corn silage and /or urea treated straw. Data also included return from milk production before and after using the two packages recorded for (local cows, buffalo and crossbred cows) in the observed farms.

Farmers' observation was recorded on whether rations consisted of corn silage or urea treatment and their effects on milk production and fat percent. Total green forage areas in the sample before and after using the two innovation packages were calculated. Average daily animal feeding per household, feed from crop residues, forage cultivation and purchased concentrate were also considered. The study depended on descriptive and quantitative statistical analysis which have been previously used in this study to calculate corn silage and treated rice straw annual revenue due to feeding costs saving and milk production per animal. Also, averages of technical and economic variables were calculated, as they were closely related to the subject of the study.

RESULTS AND DISCUSSION

Total cost per ton of whole corn silage and rice straw with urea treatment

Table 1 indicates that the total cost of one fedddan of corn was L.E.1979.50 including the price of corn production (L.E.1466) and silage processing cost (L.E.513.51). Total cost of one ton of corn silage (with estimated losses of 15% of total green corn) was calculated at around L.E.116.44. The price of corn production represents the main costs of 74.10% while the silage processing costs was 25.90% of one ton silage costs.

Table 1. Total cost of whole corn silage and treated rice straw with urea per ton and its percentage

Items of costs	Costs L.E./feddan corn	Costs L.E./ton Silage	% from total cost	% from cost of making silage
Labors	99.60	5.86	5.03	19.40
Plastic	103.32	6.08	5.22	20.12
Additives	103.00	6.06	5.20	20.06
Tractors	170.32	10.02	8.60	33.17
Choppers	37.27	2.19	1.88	7.25
Total cost of making whole corn silage	513.51	30.21	25.94	100
Feddan corn price	1466	86.23	74.06	
Total cost	**1979.51**	**116.44**	**100**	

The total costs of making whole corn silage comprised labors for corn cutting, transport to heap place and processing of silage, plastic, additives (ground corn, limestone, straws, molasses, urea, salt, and minerals).Cost of machinery (tractors and

choppers) was the highest among other cost i.e. 40.42%, while there was no much differences in other costs such as human labors, plastic and additives remained similar i.e. 19.40%, 20.12% and 20.10%, respectively.

Table 2. Costs of treated rice straw with urea

Items	Quantity	Price (L.E.)	Value (L.E.)	Cost/ton (L.E.)	% from the total cost
Plastic (m^2)	20.88	4.80	100.20	38.70	33.18
Labors (man/day)	2.59	18.24	47.24	18.24	15.65
Straw (ton)	2.59	48.50	125.62	48.50	41.58
Urea (kg)	38.13	0.76	28.98	11.19	9.59
Total cost				**116.63**	**100**

I - Effects of whole corn silage and urea treated straw on animal feeding values

Table (3) shows that the quantity of feed concentrate, green forage and wheat straw after using corn silage was reduced by 46, 42 and 45%; 29, 36 and 31% and 35, 20 and 28% for local cows, buffalo and crossbred cows respectively. Existing feeding values before using corn silage had more Dry Matter (DM) and Crude Protein (CP) than its requirement i.e. for DM: 5.93, 4.42 and 5.46 kg and for CP: 1.55, 0.11 and 0.32 % for local cow, buffalo and crossbred respectively. On the contrary, Total Digestible Nutrients (TDN) of the existing feeding values were less than their requirements, i.e. 5.21, 7.25 and 5.18% for local cow, buffalo and crossbred cow respectively. In addition, TDN slightly improved after using corn silage.

Table 3. Rations before/after use corn silage with feeding value and feed costs (L.E. head/day)

Items	Ration before use corn silage (kg)				Ration after use corn silage (kg)				
	Conc.	Berseem	Wheat Straw	Ration cost (L.E.)	Conc.	Berseem	Wheat Straw	Silage	Ration cost (L.E.)
Local cow	3.14	49.29	3.29	7.39	1.71	35.00	2.14	15.00	6.39
Buffalo	3.96	53.11	4.87	8.72	2.31	33.94	3.41	16.17	7.17
Cross cow	3.93	51.72	3.76	8.57	2.17	35.79	2.69	16.72	7.30
Existing feeding value	Feeding values before corn Silage				Feeding values after corn Silage				
	DM (kg)	CP %	TDN %		DM (kg)	CP %	TDN %		
Local cow	14.17	13.10	57.65		13.92	11.43	61.57		
Buffalo cow	16.98	13.58	56.92		15.77	11.00	60.62		
Cross cow	15.71	13.08	57.68		15.47	11.26	61.37		
Required feeding value	Feeding values before corn Silage				Feeding values after corn Silage				
	DM	CP	TDN		DM	CP	TDN		
Local cow	8.24	11.55	62.86		8.03	12.49	62.86		
Buffalo cow	12.56	13.47	64.17		13.03	13.76	64.66		
Cross cow	10.25	12.76	62.86		10.75	13.19	63.13		

The animal feeding requirements are calculated based on NRC 1989 requirements

An unbalanced ration was found after using corn silage. DM content was higher than its requirement i.e. .89, 2.74 and 4.72 kg for local cow buffalo and cross cow, respectively. However, CP and TDN were less than the requirement, i.e. for CP: were 1.06, 2.76 and 1.93 % and for TDN: 1.29, 4.09 and 1.76% for local cow buffalo and cross cow, respectively. The results revealed that some farmers used corn silage above recommended quantity; where they believed that the more they used corn silage the more milk they gained regardless the feeding cost. Therefore, DM content was more than required in the rations, having less CP but improved TDN after using corn silage.

Table 4 shows that the quantity of berseem after using treated straw reduced by 11.00, 6.15 and 8.89 kg/day /head for local cow, buffalo cow and crossbred cow, respectively. Feeding cost also reduced by L.E. 0.46, 0.68 and 0.85 /day/head, respectively. The feeding values in the existing situation had more Dry Matter (DM) but less Total Digestible Nutrients (TDN) than the requirements before and after using treated straw with urea while, CP remained the same. The results showed that the animals were given more urea treated straw and therefore the DM content in the ration was higher than the requirement. TDN improved a little after using treated rice straw but was still less than the requirements both before and after using urea treated straw. Similar situation was also shown for CP where it slightly improved after using urea treated straw.

Table 4. Rations before/after using treated straw with urea with feeding value and feed costs (L.E./ head/day)

Items	Ration before use urea treated straw (kg)				Ration after use urea treated straw (kg)			
	Conc	Berseem	W.S.*	Ration cost (L.E.)	Conc.	Berseem	T.R.S**	Ration cost L.E.
Local	2.00	51.00	4.50	6.38	2.37	40.00	5.50	5.92
Buffalo	2.63	60.00	5.00	7.75	2.55	53.85	6.50	7.07
Cross	2.94	60.56	5.00	8.15	2.90	51.67	6.00	7.30
Existing feeding value	**Feeding values before urea treated straw**				**Feeding values after urea treated straw**			
	DM (kg)	**CP %**	**TDN %**		**DM (kg)**	**CP %**	**TDN %**	
Local cow	14.52	12.18	56.16		13.88	13.45	57.20	
Buffalo cow	17.49	12.39	56.44		17.30	13.62	57.28	
Cross cow	17.82	12.47	56.57		16.79	13.78	57.56	
Required feeding value	**Feeding values before urea treated straw**				**Feeding values after urea treated straw**			
	DM (kg)	**CP %**	**TDN %**		**DM (kg)**	**CP %**	**TDN %**	
Local cow	8.24	11.55	62.86		8.03	12.49	62.86	
Buffalo cow	12.56	13.47	64.17		13.03	13.76	64.66	
Cross cow	10.25	12.76	62.86		10.75	13.19	63.13	

The animal feeding requirements are calculated based on NRC 1989 requirements
*WS: Wheat straw ** T.R.S :Treated Rice straw

This might be due to the improvement in treated straw digestibility which might result in increased milk production after using treated rice straw. This is in line with Mohamed (1988) who found that digestion coefficients of DM, OM, CP, CF and EE for ammoniated rice straw significantly ($P \leq 0.05$) increased as compared to the untreated. From the previous results it is concluded that milk production relatively

improved due to the use of corn silage treated rice straw. It also convinced dairy farmers to use rice straw instead of wheat straw as animals prefer to consume because it is less expensive.

The total cultivated areas with berssem before corn silage making in the studied farms were 73.25 feddan, while after corn silage making it reduced to 49.17 feddan. This resulted in the increase of other crops of 24.08 feddan which were distributed into 21.33 feddan wheat, 1.5 feddan potatoes, 1.00 feddan pea, 0.25 feddan bean while 13 farmers did not show any changes in their berseem area. The results also showed that after using corn silage in their animal feeding, 67% farmers reduced their berseem areas while 33% did not show any changes. The total reduction of berseem area was 32.88%. Khalil *et al*. (2005) found that using millet silage or corn silage in Ismaila reduced cultivated green forage area in winter by 25 and 21 % compared with traditional ration without any feeding package.

Previous results have shown that applications of some technical packages by farmers have different impact compared to those implemented in experimental stations. Mutsaers *et al*. (1986) made a distinction between researchers managed-researcher executed research, and farmer managed-farmer executed research, as the two extremes of farmer involvement. The first extreme resembled to a large extent on-station conditions, leaving a narrow range of specific farm conditions to be studied. The other extreme resulted in a full exposure of the new technology to normal farm conditions, and thereby offers scope for a much broader assessment.

II- Effect of using whole corn silage and urea treated straw on feed cost reduction

Table 5 shows that the total ration costs for dairy animals before using corn silage were L.E. 7.39, 8.72 and 8.57/day/animal for local cows, buffalo and crossbred cows respectively. While using corn silage reduced the daily feeding cost by L.E. 1.00, 1.55 and 1.27 for the same animals.

Table 5. Average daily feed cost for rations with corn silage or urea-treated rice straw (L.E./head/day)

	Ration costs before /after corn silage use			Ration costs before /after use urea treated rice straw		
	Before (L.E.)	After (L.E.)	Feeding cost saving* (L.E.)	Before (L.E.)	After (L.E.)	Feeding cost saving* (L.E.)
Local cow	7.39	6.39	1.00	6.38	5.92	0.46
Buffalo	8.72	7.17	1.55	7.75	7.07	0.68
Crossbred cow	8.57	7.30	1.27	8.15	7.30	0.85

*Average price of feed stuffs/ kg : Conc. : L.E. 1.2, Berseem L.E. 0.06, wheat straw L.E. 0.20, Treated rice straw L.E. 0.12 and Corn Silage L.E. 0.12

The animal feeding cost savings were 13.53, 17.78 and 14.82% from total feeding costs before using silage for local cow, buffalo and cross cow, respectively. Feeding costs for dairy animals before using urea treated rice straw were L.E. 6.38, 7.75 and 8.15 for local, buffalo and crossbred cows, respectively. While urea treated rice straw in the rations reduced daily feeding cost by L.E. 0.46, 0.68 and 0.85/day/animal for previous animals. The reduction in feeding costs for animals fed with urea treated

straw was 7.21, 8.80 and 10.43% of total feeding costs before using treated straw for local buffalo and cross cow. Bendary and Younis (1997) found that replacing the rice straw with maize stalk silage for dairy cows saved a considerable amount of expensive concentrate and reduced the cost of feeding by 29%. The data obtained from small dairy farm in Ismaila governorate indicated that conservation of green forage in winter and other green agriculture by-products as a cheap source of animal feeding reduced feed cost during summer. Shalaby et.al. (2005). Using berseem silage in dairy animal feeding reduced the feed cost by L.E. 0.64 /head/day Sammour (2002).

El-Wardani *et al*. (2005) found that animals fed at mixed farm system (crop/livestock) with enriched and conserved crop residues as silage and treated the low quality roughage by urea/ammonia resulted in saving around 42% of dairy feed cost.

III- Effect of using whole corn silage and urea treated straw on milk production and total revenue

Table 6 shows that the average milk production of dairy animals before feeding the rations with silage was 5.20, 7.32, 8.87 kg/day for local cows, buffalo and crossbred cows, respectively. It increased to 5.78, 8.23, 9.65 kg/day, respectively after given the silage in the rations. It clearly shows that silage in the rations improved milk production by 0.58, 0.91, 0.78kg for local cows, buffalos, and cross cows respectively.

Table 6. Average daily milk production and revenue before and after use corn silage and urea treated straw. (L.E./head/day)

Items	Before using silage		After using silage		Before using T. Straw		After using T. straw	
	Milk* Prod. (kg)	Milk. Revenue (L.E.)	Milk Prod. (kg)	Milk.** revenue (L.E.)	Milk Prod. (kg)	Milk.* revenue (L.E.)	Milk Prod. (kg)	Milk.* revenue (L.E.)
Local cow	5.20	7.02	5.78	8.09	4.00	5.40	4.25	5.74
Buffalo	7.32	14.27	8.23	16.87	7.44	14.51	7.81	15.23
Cross cow	8.87	11.97	9.65	13.51	8.06	10.88	8.45	11.41

*Milk price were L.E. 1.35 for local and cross cows and 1.95 for Buffalo before using corn silage.
**Milk price were L.E. 1.40 for local and cross cows and 2.05 for Buffalo after using corn silage.

Table 6 shows that the milk revenue was also improved. Milk revenue before feeding rations with silage was L.E. 7.02, 14.27 and 11.97 per head. It increased to L.E. 8.09, 16.87, 13.51 per head or increased by L.E. 1.07, 2.6, 1.54/head/day for local cows, buffalo and crossbred cows, respectively, after given the silage in rations.

Similar situation also happened in rations with urea-treated rice straw. Milk production increased to about 0.25, 0.37, 0.39 kg/day or around 6.25%, 5.00%, 5.00% /head/day for local cows, buffaloes and cross cows, respectively.

In line with the milk production, milk revenue was also improved using the urea-treated rice straw. Milk revenue increased by L.E. 0.34, 0.72, 0.53 / head / day or around 6.30%, 5.00%, 5.00% for the three type of animals, respectively. It is

remarkable to notice an improvement of animal feeding leading to the increase in animal production and farm profitability. Shalaby *et al*. (2005) found that the net revenue per kg milk in dairy small farm in Ismalia was L.E. 1.12, 0.98 and 0.11 for crossbred, buffalo and Local cows respectively.

Corn silage making and urea treatment were considered in the study based on the Egyptian national campaign to efficiently use the farm by-products and green forage. The role of extension workers on the adoption of corn silage in animal feeding was positive. But more efforts are needed to promote animal feeding technical packages. In Kenya, organized extension had little influence on smallholder dairy development whereby technologies such as forage cultivated and conservation evolved without support of the extension systems (Jahnke, 1982). However, it should be borne in mind that extension is an institutional element critical to technological progress through flow of information on relevant inputs and farming practices. It also helps to create conducive environment to change by making farmers more responsive to ideas of superior technologies (Sarkar, 1995).

IV - Some of economic measures that reflect the economics of using silage and urea treated straw

Economics of using silage and urea treated straw can be recognized in ration of dairy animals by using measures of economic efficiency "which means the optimal usage of resources that achieve the maximum production and maximize the farm profits".

Measures of economic efficiency that were used in the study are as follows:

1- Extra total revenues

It is clear from the data in Table 7 that the extra total revenues "extra total benefits" gained from the usage of corn silage mixed in the ration of dairy animals were L.E. 2.07, 4.15, 2.81/head/day for local cows, buffaloes and cross cows, respectively. These extra revenues resulted from two factors which are, the increase of the revenue due to the increase of average milk production, and the saving of feed costs per animal as explained before. Fifty six percent of the sample farmers who used silage, indicated that silage in the ration increased fat percentage in milk which in turn, increased the price of milk by L.E. 0.05, 0.10 per kilogram for cow and buffalo milk, respectively. Number of farmers who gained an increase in milk prices after using silage was about 44% of total sample farmers.

Table 7. Increase in daily return from extra milk production and feed cost saving (L.E./head/day)

	Extra total revenue after using corn silage			Extra total revenue after using treated rice straw		
	Milk Prod. (L.E.)	Feed saving (L.E.)	Extra total revenue (L.E.)	Milk Pro. (L.E.)	Feed saving (L.E.)	Extra total revenue (L.E.)
Local cow	1.07	1.00	2.07	0.34	0.46	0.80
Buffalo	2.60	1.55	4.15	0.72	0.68	1.40
Crossbred cow	1.54	1.27	2.81	0.53	0.85	1.38

Table 7 also shows that the extra total revenues resulted from usage of urea treated rice straw in the ration of dairy animals reached about 0.80, 1.40, 1.38 LE /head/day for local cows, buffaloes and crossbred cows, respectively.

In general, extra total revenues gained from using silage in the ration of dairy animals have increased around 2.59, 2.96, 2.04 times more than using ration treated straw for local cows, buffaloes and cross cows respectively. El-Ashmawy (2003) found that winter or summer rations containing corn silage or corn stalk silage were economically efficient compared with control ration.

2- Ratio of total revenue/ total feeding costs

Table 8 clearly shows that the ratio of total return to total feed cost after using silage in the ration was L.E 0.32, 0.71 and 0.45/head/day for local cow, buffalo and crossbred cow, respectively. On the other hand, the ratio of total return to feed cost after using urea was less compared to silage, i.e. 0.12, 0.28 and 0.23 for the same animals, respectively.

Table 8. Ratio of total return to total feeding cost (head/day)

	Before use silage	After use silage	Return/cost for silage (L.E)	Before use urea	After use urea	Return/ cost for urea (L.E.)
Local cow	0.95	1.27	0.32	0.85	0.97	0.12
Buffalo	1.64	2.35	0.71	1.87	2.15	0.28
Cross cow	1.40	1.85	0.45	1.33	1.56	0.23

3- Feeding costs ratio/ quantity of produced milk

Table 9 showed that the average feeding cost before using silage was LE. 1.42, 1.19 and 0.97/kg milk for local cow, buffalo and crossbred cow, respectively. It reduced to L.E. 1.11, 0.87 and 0.76/kg milk for the respective animals after using silage. It indicates that using silage in the ration will reduce the feed cost around L.E 0.31, 0.32 and 0.21/kg milk for the respective animals.

Table 9. Average feeding cost for one kg milk

	Before use silage (L.E.)	After use silage (L.E.)	Fees cost saving (L.E.)	Before use urea (L.E.)	After use urea (L.E.)	Feed cost saving (L.E.)
Local cow	1.42	1.11	0.31	1.60	1.39	0.21
Buffalo	1.19	0.87	0.32	1.04	0.91	0.13
Cross cow	0.97	0.76	0.21	1.01	0.86	0.15

The same table also indicates similar result with using the average feeding costs for each kilogram of produced milk reduced around 0.21, 0.13, 0.15 for the three mentioned types of animals, respectively.

The average feed cost for local cow in particular showed that the cost of using urea treated straw was higher than using silage. It might due to the reduction of average daily milk production before and after using urea treated straw.

For buffaloes and crossbred cows, the value of this measure indicated that the reduction of average milk cost production before and after using treated straw may be due to the increase of average head's productivity of milk for these animals.

Economic effects of using silage and treated straw in the ration of dairy animals at small farms and national level

The results of questionnaire and available data at the national level were used to estimate the economic effects of using these two packages at small farms and national level.

1- Extra total revenues at small farms level

Smallholder dairy farms (5 heads or less) are the majority in this country, representing over 90% of the total number of dairy farms. Thus, this study aimed in this part, at estimating the extra total revenues in these farms, assuming that the average number of dairy cattle is 5 heads per farm. The survey, clearly showed that using corn silage in the ration of dairy animals can achieve extra revenues of about 10.35, 20.75, 14.05 LE per farm per day for local cows, buffaloes and crossbred cows respectively. In addition, the extra total revenue of the farm for the total period of feeding animals on silage (i.e. three months) was L.E. 931.5, 1867.5 and 1264.5 for the mentioned farms respectively. As a result, the majority of smallholder dairy farms can raise their farm income level as much as the economic savings provided that they were convinced by this technical package and applied silage in the ration.

The smallholder dairy farms can also achieve economic savings as well, if urea treated rice straw were used in the ration. The extra revenue was estimated about L.E. 4, 7, and 6.9 per day for local cows, buffaloes and crossbred cows, respectively. In addition, extra revenues of the farm for the total period of feeding dairy animals on urea treated straw are about L.E. 360, 630, and 621for the mentioned farms. So, milk producers can raise their farm income level as well, if they applied this nutritional package into the regimen of their dairy animals.

2- Estimation of economic revenues and benefits at the national level

The survey, previous studies and the indicated data at national level can be used to estimate the expected increase in dairy production and economic benefits at the national level (refer to table 10, Annex table 1)

For what is related to estimating the expected economic revenues and benefits, assuming generalization of using whole corn silage among the ration of dairy animals, data in table 10 indicated that the total expected increase in cow and buffalo milk production at the level of the republic is about 202.756 thousand tons (within a period of 120 days, and it was calculated, depending on that whole corn production at the level of the republic and which is specified for livestock, is sufficient for dairy and other animals through this period) and it covers about 15.85% of total imported milk and also reflects the gap in milk production in Egypt (the gap was around 1279 thousand tons for the period of 2001-2003 and the total increase of the dairy value reached about 351.11 million pounds, representing about 6.92 % of net income from

the dairy sector at the level of the republic, and which is about 5077 million pounds for 2004).

Table 10. Estimation of expected economic revenues and benefits for using treated rice straw and whole corn silage in ration of dairy animals at the level of the republic (quantities in thousands of tons, value in millions of pounds)

Types of economic and technical variables	Urea treated rice straw			Whole corn silage		
	Local and cross cows	Buffaloes	Total	Local and cross cows	buffaloes	Total
Increase of milk production	38.64	48.41	87.05	83.70	119.06	202.76
Value of increase of milk production	52.16	96.82	148.98	112.99	238.12	351.11
Gap in production (imports)*	-	-	1279	-	-	1279
% of increase of milk production from imports	3.02	3.78	6.80	6.54	9.31	15.85
Net income from dairy sector**	-	-	5077	-	-	50.77
% of value of increase of milk production from net income	1.03	1.91	2.94	2.23	4.69	6.92
Extra total revenues	129.94	183.17	313.11	279.10	542.97	822.08
% of extra revenues from net income from dairy sector	2.56	3.61	6.17	5.50	10.69	16.19
Gap of wheat production (imports*)	-	-	4229	-	-	4229
Expected increase of wheat production***	-	-	-	-	-	1056
% of wheat imports	Proposal 1	-	5.15	-	-	9.71
	Proposal 2					24.98

(*) average of years 2001, 2002, 2003, (**) data of year 2004, (***) it was calculated according to replacing 20% of barseem area for the average period from 2002 – 2004 which is about 391 thousand feddan per year, by an area of wheat.

Source: 1- calculated from data of survey sample

2- Ministry of Agriculture and land reclamation, Economic Affairs Sector, Reports of livestock, Food security, diverse editions.

The estimations also indicated that extra total revenues, produced by the increase in dairy production and reduction of feeding costs for the dairy animal, reached about 822.076 million pounds, equivalent to 16.19% of net income from dairy sector at the level of the republic. This study made two proposals to see the effect of generalization of this technical packages on reducing the gap in wheat production or reducing its imports. The first proposal focused on estimating barseem amounts that can be saved, at the level of the republic, based on saving of barseem amounts given to dairy animals due to the usage of silage in the ration, and which was previously indicated through the results of the survey sample. Considering the number of dairy

animals at the level of the republic and the feeding period (around 4 months), it became clear that the amount of barseem that can be saved at the level of the republic is about 4.414 million tons, produced from a cultivated area of around 147.144 thousand feddan. Replacing this available area, by cultivating it with wheat made the total production of wheat reached about 410.53 thousand tons, which covers about 9.71% of the wheat gap, or 4229 thousand tons (average for the period of 2001-2003)

The second proposal was made based on the result of 67% of sample farmers who indicated that they reduced the cultivated areas for barseem by 33% and replaced it with wheat and other crops (mainly wheat crop). The study assumed that the barseem areas were possible to be replaced by wheat, estimated around 391 thousand feddan or 20% of the present barseem area, with more conservation and caution (average barseem areas for the period of 2002-2004 reached around 1,956 thousand feddans). Wheat production can reach around 1,053 thousand tons or 25% of the total wheat gap.

The total expected extra revenues in cow and buffalo milk production gained from the usage of urea or ammonia treated rice straw in the dairy ration at the republic's level as indicated in the previous table reached around 87.05 thousand tons or 6.8% of total dairy imports. In addition, the value of increase of milk production reached about 3% of the net income from the dairy sector. The total expected economic revenues and benefits reached about 313.11 million pounds, representing about 6.17% of the net income from dairy sector.

The first proposal is likely to be applicable to see the effect of generalization of the feeding package on reducing the gap in wheat production. It is shown that using this technology can save an area of barseem of about 78.016 thousand feddans, and produced about 217.66 thousand tons of wheat covering about 5.15% of the total wheat gap.

It could be concluded from the previous presentation that generalization of using these two technical packages in the ration of dairy animals, to a considerable extent, can reduce milk import, which in turn, reduce some of the burden on the payment balance and the Egyptian trade balance. In addition, it may lead to increasing the income in the field of dairy sector in particular and the annual agricultural income in general.

CONCLUSION

Feeding management systems is expected to provide the right nutrients with appropriate quantities at the right time to feed the dairy cattle. In addition, improving farm income is also determined by high performance of the animals given the low cost rations with considerable amount of concentrate. Utilization of green forage and processing the agricultural by-products with urea or ammonia treatment for preservation purposes particularly for highly perishable feed materials will improve the feeding value as well as reduce environmental pollution.

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Annex: Table 1. Some economic and technical variables related to economics of using silage and treated straw at the national level

Statement	unit	Area and total production and number of variables
Total Area of summer and Nily rice year 2004	Thousand feddan	1537
Total rice straw production 2004	Million ton	3.458
Total corn area 2004	Thousand feddan	2033
Total estimated production of whole corn crop 2004	Million tons	34.561
Corn production that can be made into silage depending on 33% of crop weight specified to livestock 2004	Million tons	11.405
Average area of permanent barseem 2002-2004	Thousand feddan	1956
20% of barseem area that can be replaced by wheat crop (from average of the period)	Thousand feddan	391
Wheat crop production from the replaced area	Thousand tons	1056
Wheat production gap (total imports) for average of period 2001-2003	Thousand tons	4229
Gap of milk production from 2001- 2003	Thousand tons	1279
Number of dairy animals in 2004:		
Local cows above 2 years	Thousand heads	986
Cross cows above 2 years	Thousand heads	573
Buffaloes above 2 years	Thousand heads	1619

Source: calculated from Ministry of Agriculture, Economic Affairs Sector, Annual Reports about livestock and field crops, food security projects, diverse editions.

إقتصاديات بعض الحزم الغذائية تحت النظام المختلط لمزارع الألبان بمحافظة البحيرة

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تم إختيار ٥٠ مزرعة من مزارع الألبان التي تستخدم سيلاج الذرة والقش المعامل باليوريا في تغذية الحيوان. كما تم تصميم استمارة استبيان تضمنت بيانات اقتصادية و فنية متعلقة بتكاليف عمل سيلاج الذرة ومعاملة القش باليوريا عوائد اللبن قبل وبعد استخدام تلك الحزم الغذائية. الدراسة قد تمت فى الفترة ما بين أكتوبر ٢٠٠٥ و مارس ٢٠٠٦ وكان الهدف منها هو تقيم مردود هذه الحزم الفنية (سيلاج الذرة – القش المعامل باليوريا) عند التغذية عليها على العوائد المز رعية للنظام التقليدي المختلط السائد فى مصر.

و قد أستخدم التحليل الوصفي والكمي في هذه الدراسة وقد أوضحت نتائج التحليل ما يلي :

أن اجمالي العوائد الإضافية لإستخدام سيلاج الذرة بالكيزان في عليقة حيوانات اللبن و التي تعزى للزيادة في انتاج اللبن و الوفر في تكاليف التغذية قد بلغت ٢.٠٧، ٤.١٥، ٢.٨١ جنية /رأس/يوم للأبقار البلدي والجاموس والأبقار الخليط على التوالي. بينما كانت هذه الزيادة من استخدام القش المعامل باليوريا ٠.٨٠ ، ١.٤٠، ١.٣٨ جنية/رأس/يوم لنفس الحيوانات سالفة الذكر على التوالي.

نسبة المزارعين الذين لاحظوا زيادة في نسبة الدهن باللبن كانت ٥٦% بينما ٤٢% منهم لم يلاحظوا أي زيادة في الدهن، أما بالنسبة لسعر بيع اللبن فإن ٤٤% من مزارعي العينة أوضحوا أن هناك زيادة في سعره بينما أشار نحو ٥٦% منهم بأنه لا يوجد أي تغير في السعر.

مساحة البرسيم قبل أستخدم سيلاج الذرة فى تغذية الحيوان كانت بعينة الدراسة ٧٣.٢٥ فدان لكل المزارعين وبعد أستخدم السيلاج وجد أن مساحة البرسيم قد أنخفضت بمقدار ٢٤.٠٨ فدان فأصبحت المساحة المزروعة بالبرسيم نحو ٤٩.١٧ فدان و قد زرعت المساحة المتوفرة من البرسيم بمحاصيل شتوية أخرى مثّل القمح منها أكبر مساحة حيث بلغت نحو ٢١.٣٣ فدان، و قد بلغ اجمالي الانخفاض في مساحة البرسيم نحو ٣٢.٨٨ % من اجمالي المساحة المزروعة بالبرسيم قبل استخدام السيلاج.

من هذا يمكن أن نستخلص أن أستخدم سيلاج الذرة والقش المعامل باليوريا يمكن أن تحسن من دخل مزارع أنتاج الألبان من خلال خفض تكاليف التغذية مع رفع نسبة الدهن باللبن أيضا خفض مساحة البرسيم الى ثلثى المساحة وهذا يمكن أن يزيد مساحات المحاصيل الأخرى خاصة القمح.