COMPOUND FEED INDUSTRY IN EGYPT AND NEAR EAST

by

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Human resources in Arab Nations of the Near East

The total population of the Arab Nations in 1980 was 162 million. The working population reached 43 million with more or less similar distribution intensities in the different zones. Twenty-four million are engaged in agriculture (56% of the working population).

Agricultural production as a percentage of GNP varies greatly among Arab countries but averages 20%, the highest being for Somalia (60%) the lowest for Saudi Arabia (1%) and Libya (2%).

The total exports of the Arab Nations in 1980 were 157 billion US$, 93% of which were mainly by Arab Nation exporters of oil.

The agricultural exports were only 3 billion dollars worth representing 2% of total exports. Egypt, Morocco and Sudan exported at 56% of the rate of the total exports.

Animal production - relative importance

As in most developing countries the Arab countries have a large number of animal units with low productivity. The total number of cattle in the Arab Nations was estimated at 677 million units in 1980, with 65% situated in the middle zone (Egypt, Somalia and Sudan - see Table 1).

Animal feed industry

In 1980 there were 500 feedmills in the Arab Nations with only 15% of these in the Middle Zone, 44% in the East Zone, 33% in the West Zone and 8% in the Arab Peninsula.

These mills produced 7 million tons per year although they have the capacity for producing about 15 million tons.

The nutrient requirements

For estimating the requirements of animals in the Arab world it was assumed that 40% of the herd are mature animals, 40% at 1-3 years of age and 20% are calves. Accordingly, animal units were calculated in Table 4.

The requirements were calculated assuming an animal unit is equivalent to a milking cow weighing 300 kg and giving 1 000 kg of milk with 5% fat. Thus according to Morrison (1957) this animal unit requires 1.1 - 1.2 tons TDN and 100 kg digestible protein. The total requirements for the total animal units were estimated at 81.3 million tons TDN.

The poultry industry has developed considerably in almost all of the Arab world. In 1980 the total number of broilers were 754 million, laying hens, 55 million and parent stock 10 million. The different zones seem to have similar numbers.

Animal feeds

Forages and by-products availability was estimated to be 166 million tons dry matter in 1980.

Poultry requirements

Poultry requirements were estimated at: 3.5 kg compound feed for broilers during the period of fattening, 55 kg compound feed/year for laying hens, 75 kg compound feed/year for mothers. Therefore, the total requirements of poultry in the Arab Nations was estimated to be 6.4 million tons of compound feed, 47% for laying hens, 41% for broilers and 12% for mothers.

Animal feed resources in the Arab Nations

The total agricultural area in the Arab world is 50.6 million hectares representing 3.67% of the total area. The land is mostly dependent on rain and only a small area is dependent on irrigation.

Sugarcane and beet molasses are produced in the Arab World but are not fully utilized. It has a relatively high TDN value.

Poultry feed balance

Comparing the feed requirements for poultry production and the produced and imported feed annually, a deficit of 2.9 million tons of grains, 0.65 million tons of compound feeds and surplus of 72 thousand tons of oil meals were reported for 1980 for Arab Nations. A total deficit of 2.62 million tons of TDN were estimated for the year 1980.

Ruminant feed balance

A deficit of 8.9 million tons TDN was estimated for ruminants in the Arab Nations. The Middle Zone had a surplus of 4.8 million tons of concentrate feeds (Table 7). A total deficit of TDN for ruminants and poultry was estimated at 12 million tons.

Industrial requirements for animal and poultry feeds

It was estimated that poultry feed requirements were 6.0 million tons per annum. However, if the present capacity of the feedmills were to be realized, there will be no deficit.

On the other hand, the total requirements of all animals are 86.1 million tons of TDN; 4.8 million tons TDN are the total requirements for poultry. Only 4.0 million tons of concentrate feeds are available locally and 3.4 million tons are imported which leaves 2.6 million tons TDN for ruminants (3.7 million tons of concentrate feeds). Only 2.6 million tons are being manufactured thus leaving 1.0 million tons.

If all present mills were to work to full capacity they could produce 6.5 million tons compound feeds with a surplus of 2 million tons.

Three alternative systems of feeding were suggested for general milking cows and buffaloes and for ruminant feeding in general whereby compound manufactured feeds could be used at 10%, 15% or 20% of the total requirements.

The future plans for developing the compound feed industry in the Arab Nations were suggested by a consultancy group for the Arab Organization for Industrial Development, AOID, Baghdad (1983) based on three dimensions:

a) Increasing concentrate feed milling capacity in the Arab world to meet animal requirements;

b) Efficient utilization of by-products from the agroindustry;

c) Establishing a National Technical Training Centre

To increase the concentrate feed capacity based on the first alternative (10% concentrate feeding), 7.4 million tons should be manufactured, or 12.5 million tons for the second alternative (15% concentrate feeding) or 17.7 million tons for the third alternative (20% concentrate feeding). This should require 51 mills, 86 mills or 120 mills in addition to the present zones. 70% of this milling capacity should be in the middle zone, 14% in the West zone, 9% in the East zone and 7% in the Arab Peninsula.

Near East animal industry development up to the year 2 000

The population of the Near East (including Pakistan, Afghanistan, Iran and Cyprus) was 224.45 million. The estimated consumption of red meat, white meat, eggs and milk (fish not included) was 3.02, 0.978, 0.802 and 16.7 million tons per year. They provide 17.3 g protein/person/day. (FAO 1982, Production Year Book gives a value of 16.2 g protein/day/person.)

In the year 2 000 the population should reach about 370 million.

To receive the same level of animal protein (16.2 - 17.3), they will be expected to consume about 5, 1.6, 1.3 and 2 million tons of red meat, white meat, eggs and milk respectively.

However, one could visualize an animal protein consumption rate of 24 g/day/person which is still below the recommended minimum animal protein requirements of 29 g/day/person. If we calculate the animal products required at that level (24 g/day/person), keeping the same distribution rates of the different sources we reach the values of 7, 2.3, 2.0 and 40 million tons of red met, white meat, eggs and milk.

Assuming the following mode of production per unit: 160 kg red meat/head; 1.5 kg white meat/broiler; 200 eggs/laying hen; 3 000 kg milk/milking cow or buffalo.

By the year 2 000, the animal population of the Near East should follow the following pattern: 46 million animals for meat production; 1 596 million broilers for white meat production; 197 million laying hens; 14 million lactating cows (or buffaloes); 7 million followers.

Requirements expressed in TDN and in Feeds (concentrates and roughages) are given in Table 7. It could be calculated that the total requirements for the producing animals by the year 2 000 should amount to 10 million tons of TDN or to 156 million tons of concentrate compound feed with an average TDN value of 65%. The requirements for roughages were estimated at 97 million tons of TDN or 165 million tons of dried roughages assuming an average TDN value of 55%.

Assuming an average production of 6 tons of TDN per acre, it could be calculated that 16 million acres forage land should be made available in the Near East.

It will be noticed that the ratio of roughage to concentrate is about 50:50. However, it is possible to visualize other possible systems with more roughage consumption than compound feeds a system closer to 65:35 as exists in the USA.

However, the compound feed industry would require 1 444 mills by the year 2 000. Each mill will produce 30 tons/hr or 108 000 tons in 300 days by working two shifts a day.

It is recommended:

1. The Governments of the Near East should develop better cooperation and integration among themselves. Regions which have possibilities of producing more concentrate feeds such as Sudan, Somalia, Egypt, Iraq, Pakistan, Iran, should aim at increasing the number of feedmills. Other nations of the region could contribute to establishing such an industry in these countries, which could cover the requirements of the whole region and may be allowed for export to other regions.

2. It is suggested that the newly established mills should have three lines of operations:

   (a) Grinding, mixing and pelleting
   (b) Treatment of poor quality roughages to improve their nutritive value
   (c) Extraction of leaf proteins from forages and water weeds such as water hyacinth

   The reason for such a complex operation is obvious. There are certain shortages of grains due to low productivity in the area. Therefore, use must be made of by-products from the agro-industry which may require some physical, chemical or microbiological treatment to raise its nutritive value. Such methods have been developed and could be exploited on the farm or industrially where accumulation of by-products are available. Improvements of up to 30% of the nutritive value have been reported.

   Naturally, certain supplements need to be included, e.g. minerals, urea, proteins, vitamins, ionophores, which would give a nutritionally balanced final product.

   There are two important reasons for having a line for extraction of leaf proteins:

   (a) Some of the forage proteins are soluble and easily degradable in the rumen. They are lost to the nitrogen economy of the ruminant animal

(b) They could be readily extracted and represent a good protein supplement to poultry, pig and calf rations. They have a high biological value almost comparable to that of soybean. Experiments at Alexandria University using berseem leaves or water hyacinth leaves showed that they could replace 50% of the fish meal protein in the ration without affecting the nutritive value. They were also successfully utilized in starter meals for early weaned buffalo and cow calves.

3. Programmes for improving forage production by examining the total digestible nutrients per acre as criterion for their improvement should be undertaken. Newly reclaimed land areas should be cropped with forages.

4. Improvements of the genetical constitution of the animals is an important factor for the development of the animal and feed industry. Thus the efficiency of feed utilization could be improved.

5. Integration of animal production with crop production to recycle all wastes and by-products.

Table 1: The number of farm animals in the Arab Nations in 1980 (x 1 000 units)

	West Z.		East Z.		Mid Z.		Arab Pen.		Ar. N.	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cattle	5 490	21	2 586	10	16 964	65	1 106	4	26 146	39
Buffalo	-	-	194	10	1 768	90	-	-	1 962	3
Sheep	8 500	43	3 729	19	6 157	31	1 359	7	19 745	29
Goats	2 460	25	745	8	4 986	51	1 558	16	9 749	14
Camels	1 363	13.4	36	0.4	8 311	82	424	4.2	10 134	15
Total	17 813	26	7 290	11	38 186	56	4 447	7	67 736	100

1 cow = 0.7 unit, 1 Buffalo = 0.8 unit , Camel = 1 unit, Sheep = 0.2 unit, Goat = 0.166 Unit

Table 2: Agricultural and animal production imports to the Arab Nations in 1980

(million US$)

	Agric imports	Animal prod. imports	Anim. prod % of agri. imp.
Jordan	476	109	23
Emirates	53	174	-
Bahrain	178	56	31
Tunis	532	85	16
Algeria	1 756	285	16
Saudi Arabia	3 588	915	26
Sudan	180	10	0.6
Syria	263	117	45
Somalia	113	7	6
Iraq	1 515	262	2
Katar	170	193	-
Kuwait	886	249	28
Oman	83	54	65
Lebanon	596	187	31
Libya	965	427	44
Egypt	1 868	294	15.7
Morocco	932	74	8
Mauritania	70	10	14
Yemen, P. Dem. Rep.	107	10	9
Yemen, Arab Rep.	187	99	53
Total	14 518	3 608	25

Table 3: Roughage feeds in the Arab World 1980 (x 1 000 tons DM)

	West	%	East	%	Middle	%	Penin.	%	Total	%
Grazing area	15 945	12	4 144	3	103 547	78	8 923	7	132 559	80
Green forages	2 212	16	3 948	29	7 251	52	449	3	13 860	8
Straw & stover	4 776	29	4 581	28	4 966	31	1 874	12	16 197	10
By-products of vegetab. & fruits	1 474	41	1 792	50	180	5	127	4	3 573	2
Sugar industry by-products	102	20	67	13	336	67	-	-	505	-
Total	24 509	15	14 532	9	116 280	69	11 373	7	166 694	100

Table 4: Animal concentrate feeds in the Arab Nations in 1980 (x 1 000 tons)

	West	%	East	%	Middle	%	Pen.	%	Whole	%
Grains	99	8	666	52	436	35	62	5	1 263	21
Oil meals	112	7	183	11	1 347	80	36	2	1 678	29
Brans	593	30	576	30	683	35	98	5	1 950	33
Molasses	156	26	14	2	428	72	-	-	598	10
Dates	-	-	-	-	-	-	84	100	84	1
Concent. mix. for poultry	175	93	-	-	-	-	14	7	189	3
Concent. mix. for rumin.	128	83	-	-	-	-	27	17	155	3
	1 263	21	1 439	25	2 894	49	321	5	5 917	100

Table 5: Imported concentrate feeds to the Arab Nations in 1980. (x 1 000 tons)

	West	%	East	%	Middle	%	Pen.	%	Whole	%
Grains	1 464	45	1 237	38	206	6	358	11	3 265	68
Oil meals	280	44	162	25	143	22	55	9	640	14
Brans	57	14	-	-	30	7	330	79	417	9
Concent. mix for poult.	100	48	30	14	-	-	78	38	208	4
Concent. mix for rumin.	166	68	-	-	-	-	79	32	245	5
Total	2 067	43	1 429	30	379	8	900	19	4 775	100

Table 6: Poultry compound feed requirements in the Arab Nations (1979-1981)

	East	Pen.	Mid.	West	Whole
Broilers (x 1000)	167 255	80 814	222 343	283 352	753 764
Broiler feeds (x 1 000 tons)	585	283	778	992	2 638
Layers (x 1 000)	17 218	7 572	15 624	14 870	55 284
Layer feeds (1 000 tons)	947	416	859	818	3 040
Mothers (x 1 000)	2 445	300	2 344	5 024	10 113
Mother feeds (1 000 tons)	180	22	172	369	743
Total feeds	1 712	721	1 809	2 179	6 421

Table 7: Ruminant feed balance in the Arab Nations (1980) x 1 000 tons TDN

	East	Pen.	Mid.	West	Whole
Animal units	7 290	4 447	38 186	17 813	67 736
TDN Requir.	8 748	5 336	45 823	21 376	81 283
TDN Available					
Roughages	6 773	4 704	47 843	10 482	69 802
Concentr.	385	140	1 338	820	2 583
Total	7 158	4 844	49 181	11 203	72 385
Balance TDN	- 1 590	- 492	+ 3 358	-10 147	- 8 898
Compd. Feed 70/TDN	- 2 471	- 703	+ 4 797	-14 534	-112 711