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**MOROCCAN CEREAL MARKET REFORM PROJECT
MARA/DPAE**

**THE IMPACT OF CEREALS MARKET REFORM ON
THE FEED AND LIVESTOCK SECTORS**

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THE IMPACT OF CEREALS MARKET REFORM ON THE FEED AND LIVESTOCK SECTORS

INTRODUCTION

Terms of Reference

The objective of this report is to update the Cereals Market Reform Project's understanding of the livestock sector and its use of cereals and cereal forages, and to examine policy issues that derive from livestock use of cereals feeds. This objective comprises several specific tasks:

- identify trends in livestock feed use;
- assess current health of feed sector: its competitiveness, and reliance on international markets for primary feed inputs;
- evaluate the impact of cereals market policies on the feed industry and the livestock sector;
- identify areas for further applied research in the area.

This report is the product of a two and a half week mission between September 27 and October 14, 1992. It makes use of recent research and reports on the issues defined above, as well as a number of interviews conducted with actors in the poultry, feed, and cereal marketing sectors, and in the government.

Organization

The report provides first an overview of important trends in the livestock and feed sectors, with particular emphasis on cereal feed demand by the livestock sector. A second section reviews cereals marketing policy and market behavior for cereal products that are important to livestock. A third section examines the impact of these policies on the feed and poultry industries. A fourth section examines cereal use and the impact of cereal policies in ruminants livestock systems. Finally, conclusions and recommendations are made concerning cereals marketing policy and areas where further research or analysis seems warranted.

OVERVIEW OF LIVESTOCK AND FEED SECTOR RELATIONSHIPS AND TRENDS

The use of cereals by the livestock sector

Global estimates of the use of cereals in the livestock sector were made in 1985 as part of a national accounts exercise. The results of this exercise reported in Table 1 suggest that on average about 50% of maize consumption, 40% of barley consumption, 20% of sorghum

consumption, and almost 90% of oat consumption is used for animal feeds by the livestock sector. As a ratio of domestic production, these percentages are similar for barley, sorghum, and oats, because trade in these products is negligible. For maize, on the other hand, imports supply about a fifth of total demand, and the volume required for animal consumption alone is close to 90% of total production. Maize is also unique among the cereals in that the share of maize consumed by livestock has increased dramatically over the past decade, while for the other cereals the share consumed by animals has remained nearly constant.

Table 1
AVERAGE SHARE OF CEREALS USED FOR ANIMAL CONSUMPTION

	BARLEY		MAIZE		OATS		SORGHUM	
	% OF SUPPLY	% OF PROD'N						
1969-79	42%	43%	20%	23%	84%	84%	25%	25%
1980-85	40%	43%	48%	86%	87%	88%	22%	25%

Source: See Annex Table 1 for trend statistics from which these are derived.

An estimation of the allocation of feed cereals within the livestock sector is provided by Table 2. It illustrates the overwhelming use of maize in the poultry sector and, inversely, the overwhelming use of barley in ruminant systems and for traction animals. Though not illustrated in the table, oats are used in a similar manner to barley, whereas sorghum is primarily a substitute for maize in the poultry industry.

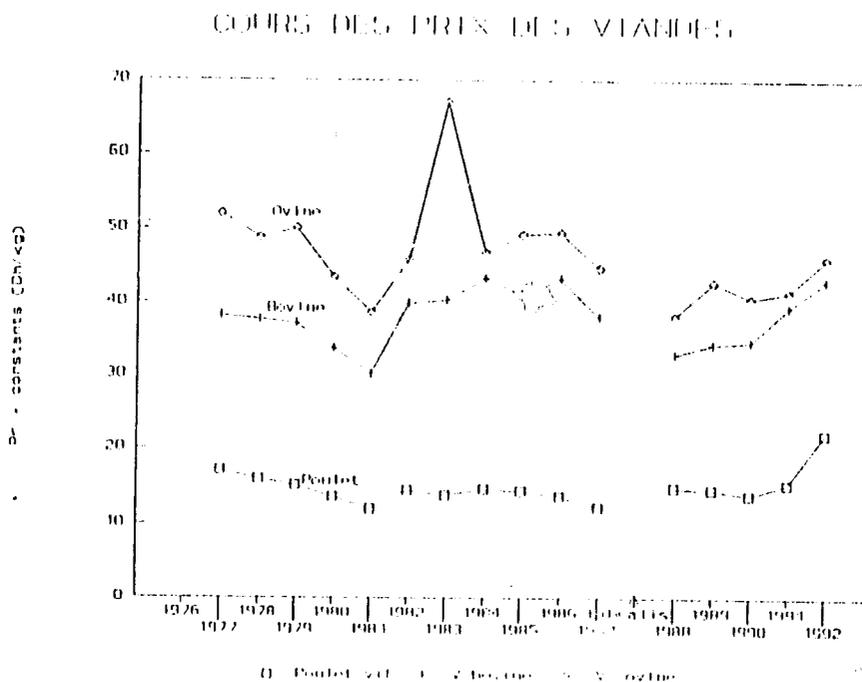
Table 2
DISAGGREGATION OF FEED USE BY LIVESTOCK SUBSECTORS, 1985
(% of Forage Units available)

	Forages	Hay	Barley	Dry be., Pulp	Bran	Maize	Fever beans	other concentrates
Cattle								
Pure & crossed	100.0	3.6	3.6	72.0	8.8			
Local		51.4	27.7	18.0	68.8	10.0	64.0	66.0
Total	100.0	55.0	31.3	90.0	77.6	10.0	64.0	66.0
Sheep	18.0	29.7	10.0	9.3		36.0		
Goats	2.0	9.0						
Traction animals		25.0	24.0		7.4			22.3
Poultry		6.0		5.7	90.0		11.7	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: DPAF, 1987

Trends in livestock production and prices

Trends in the ruminant livestock sector since the 1970s show that production of livestock products in Morocco continues to expand, but at a slower rate than demand projections, while poultry products have grown faster and have therefore increased their share of total livestock product consumption.¹



Graphique 1

Prices for livestock products have fluctuated widely but generally show a gradual increase. The exception is poultry products, whose prices fell dramatically in the early 1980s and then stabilized. These overarching trends have been overshadowed in recent years however by a sharp rise in red and white meat prices from relatively low prices which existed in 1987. As Graph 1 illustrates, poultry prices have risen most dramatically in the past year, to levels well above long run price levels. Several factors explain this rise. First, it will be argued that these increases reflect rising feed costs since the liberalization of the markets for many feed components in 1987. This explains the increase in the relative price of poultry compared to red

¹ See Nabil Khaldi, (1984) and the "Strategie Alimentaire" (1984) projections .

meat. Secondly, exceptional difficulties in the poultry sector, including disease and failures in the chick production industry, have further raised prices, albeit temporarily.

Red meat prices, have also risen, but from relatively low initial levels, such that current prices are not exceptionally high compared to long run trends. Last year's crop failures due to poor climatic conditions should have raised feed costs to all livestock, although the immediate effect on ruminant product prices is not evident, since red meat prices may drop initially if producers are required to destock under adverse conditions. If destocking of reproductive herds has occurred over this past year, red meat and milk prices should increase during the next few years, due to supply shortages until productive herds are reconstituted.

Feed resource trends

Feed resources have generally increased at rates commensurate with ruminant livestock product growth, as they are the principal constraint to livestock production increases. Table 3 traces the expansion of cereals and crop by-product feeds. The only feed products whose production has expanded dramatically have been oats and oilseed cake. Barley and molasses have also shown moderately strong growth. All other products have shown slow growth, with the exception of sorghum production, which has actually declined.

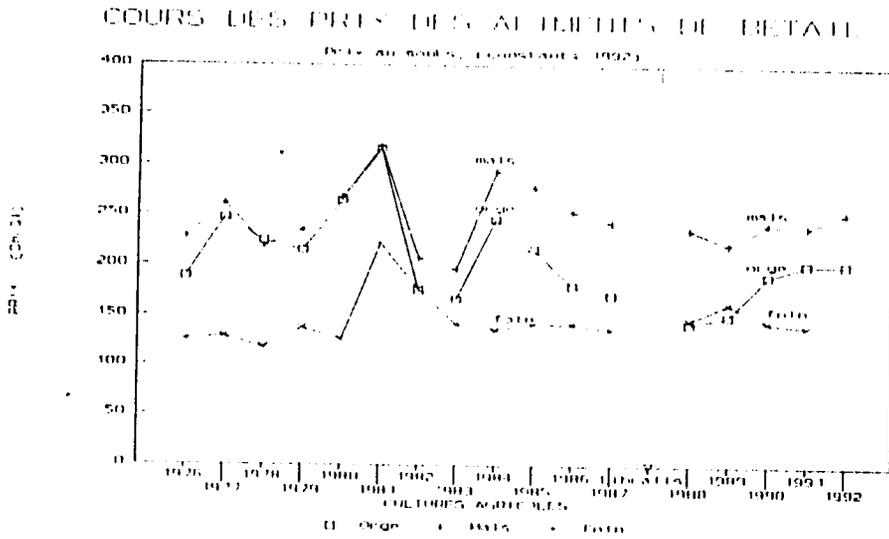
Table 3
PRODUCTION GROWTH OF PRINCIPAL FEED COMPONENTS IN MOROCCO
(thousand metric tons)

	Barley	Maize	Oats	Sorghum	Dry beet pulp	Cereal bran	Dry citrus pulp	Molasses	Fish meal	Oil seed cake
1975	1506	352	27	71	100	933	5	106	21	6
1976	2717	468	34	18	73	784	7	128	28	20
1977	1278	175	7	4	75	1124	9	79	20	40
1978	2210	371	11	34	112	654	4	130	28	22
1979	1792	296	6	22	122	1036	7	118	24	31
1980	2099	316	31	22	114	920	9	129	30	28
1981	987	85	36	11	95	969	9	146	30	17
1982	2217	235	71	27	108	697	8	105	24	38
1983	1166	245	42	23	130	795	15	170	25	32
1984	1334	251	42	23	126	766	8	152	35	46
1985	2414	305	33	20	118	812	15	127	25	42
1986	3563	307	77	0	140	811	19	177	45	65
1987	1543	240	33	14	136	1900	5	176	27	59
1988	3454	358	56	14	167	1198		216	37	60
1989	2999	403	58	14	159	1138		185	35	64
1990	2138	436	47	16	166			179	30	64
1991	3253	335								
GROWTH RATE:	5.0%	1.4%	9.7%	-3.0%	4.4%	2.2%	5.8%	4.4%	2.8%	10.9%
Std. Error	.018	.020	.034	.032	.007	.015	.031	.009	.010	.021

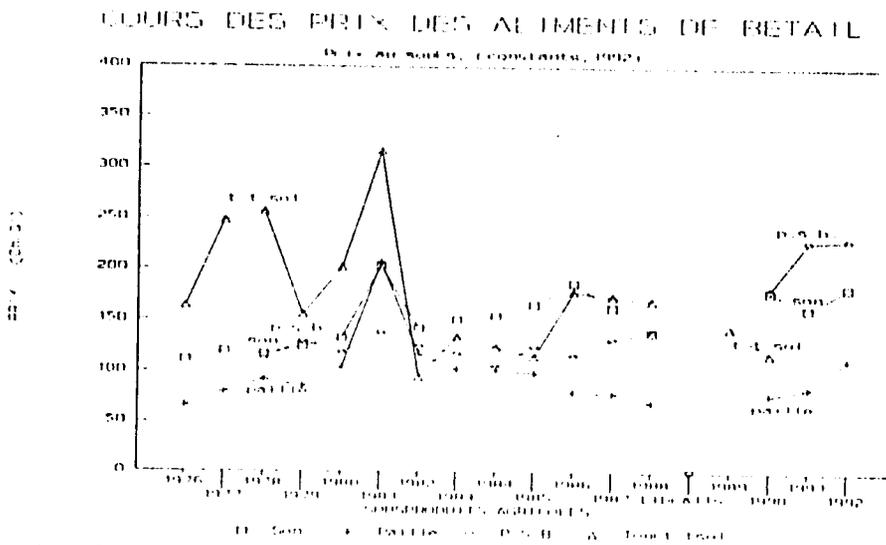
Source: Service d'Alimentation, Direction de l'Elevage.

Graphs 2 and 3 plot average market prices for important commercial feeds since 1976 in constant prices (1991). They suggest that most feed prices have risen only slightly since the late 1970s. The dramatic disruption of the feed market caused by the drought conditions in the early 1980s is evident, although prices dropped back to earlier levels in the mid 1980s. Since the liberalization of the internal markets for these products in 1987, however, most prices appear to have risen, despite relatively good harvests in 1989 through 1991.

On the other hand, price increases for ruminant feeds in 1992 are expected, because of the poor growing conditions in the 1991/92 season. This appears to have been the case for most products, but not for barley, for which prices have remained at last year's levels. Several explanations for this have been offered. Most notably, the state has increased availability of barley throughout the country by allowing more than 300,000 tons of imports since January 1991 for the *Programme de Sauvegarde du Cheptel*. Moreover, on-farm storage of barley is thought to have increased to a great extent. This is attributed to three phenomena. First, last year's harvest was a record high, resulting in large quantities of barley on the market. Second, and consequently, farmers were wary of the previous year when barley prices rose dramatically, and



Graphique 2



Graphique 3

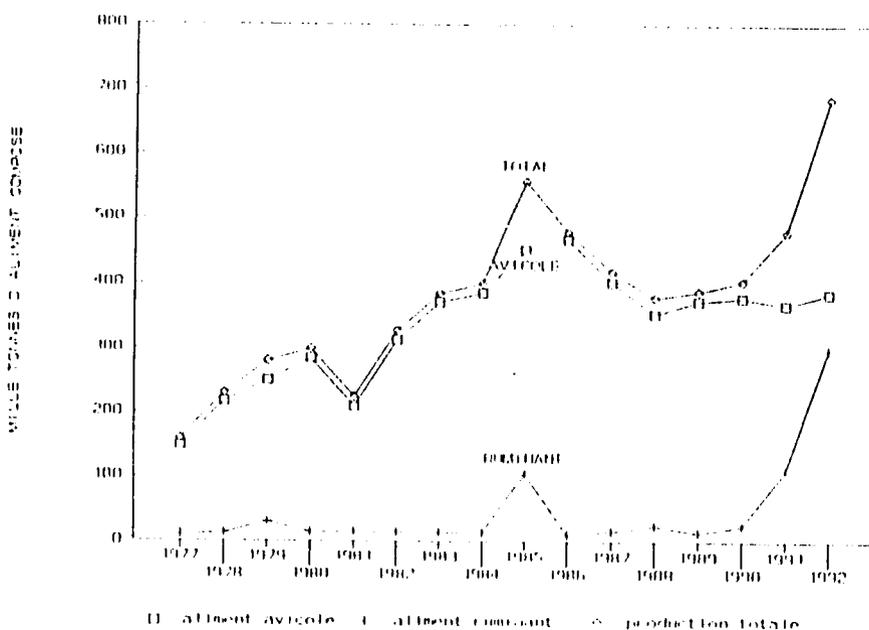
therefore they held onto their barley rather than sell immediately. Lastly, since the liberalization of the barley market, the SCAM/CMA have withdrawn from the commercialization

of barley, including the storage function that they once filled. In response to this withdrawal, farmers are thought to have increased their on-farm stocks commensurately.

Growth of the feed milling industry

The feed milling industry is made up of about two dozen firms with capacities greater than 5000 tons per year and has a total capacity of about 1.1 million tons, of which about 80% is held by eight firms. (See Annex Table 2). Graph 4 below shows the evolution of production in the industry since 1976. It illustrates that rapid growth has occurred primarily in conjunction with the growth of the poultry industry, and yet since 1990, ruminant feeds have rapidly become an important share of its product. These two product trends are examine separately below.

TENDANCES DE PRODUCTION DE LA PROVENDE

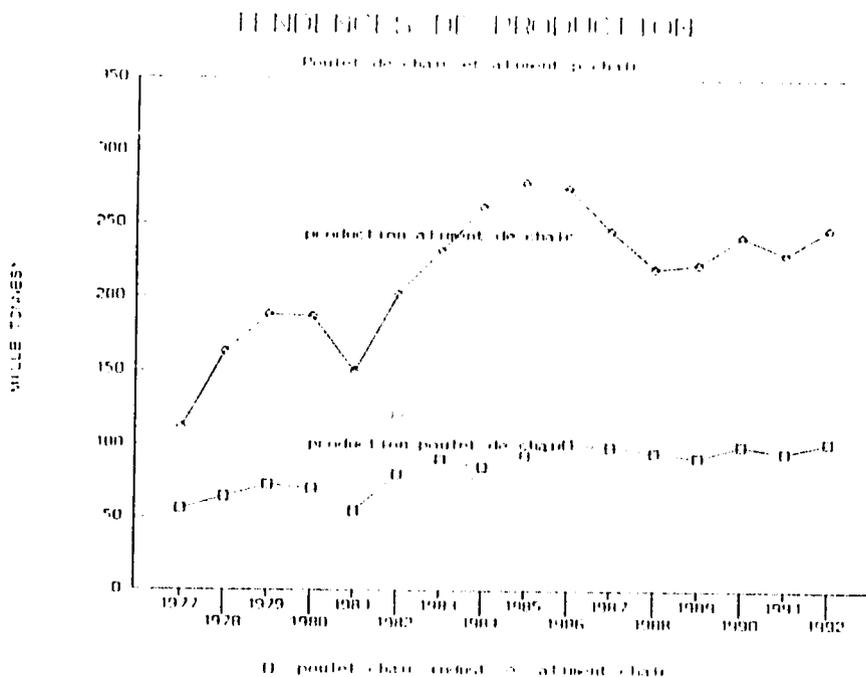


Graphique 4

Poultry feeds

Since the early 1970's poultry meat production has grown at 6% while egg production has grown at about 4%. This growth has been spurred both by population and income growth,

and as the introduction of modern poultry production has lowered unit costs and stimulated demand for white meat and eggs as a replacement for red meat. Since 1987, however, the



Graphique 5

poultry sector has contracted, with chick production falling from 73 million in 1986 to 65 million in 1990. Over the same period, poultry meat production fell from 88,000 tons to 78,000 tons. In 1991, an outbreak of Gumboro disease killed about 40% of flocks attacked, and the largest chick producing farm went out of business, resulting in a shortage of day-old chicks. This further reduced flock numbers under production in early 1992 and has caused a shortage of poultry meat that has further raised poultry prices.

As graph 5 illustrates, these trends in poultry production have translated directly into production trends for feed milling sector. Poultry feed production expanded rapidly from the mid 1970s through 1986, but since then fell by about 20% and has remained there.

According to the Direction de l'Elevage (Department of Livestock, or DE), the general decline in poultry production since 1986 is due to a drop in demand, caused by a rise in poultry prices from 7 Dh/kg to 10 Dh/kg liveweight. The poultry price rise is, in turn, a result of rising feed prices, which rose by 30% over the period. The industry attributes the brunt of these

increases to price increases for maize and cereal bran, which resulted from policies to protect maize and to liberalize the bran market.² These policies will be examined in the next sections.

Ruminant mixed feed

As Graph 4 shows, prior to 1990, the relative share of ruminant feeds in the feed industry was rarely more than 10%. In 1992, however, it is expected to rise to more than 40% of total industry production. This is primarily due to the incidence of the *Programme de Sauvegarde du Cheptel*, which in 1992 has increased ruminant feed use dramatically, in an effort to mitigate the effects of the failed 1991/92 crop season.

The *Programme de Sauvegarde du Cheptel* is an ongoing effort that before 1988 consisted primarily of the distribution of dry beet pulp, barley, and cereal bran to provide feed to drought-stricken areas of the country at subsidized rates. Since 1990, however, the state has begun to distribute mixed feeds. This new orientation has several objectives, including support for the feed milling industry, promotion of balanced feeds, and introduction of new feed components. To date, approximately 456,000 tons have been distributed (1990, 26,000 tons; 1991, 110,000 tons; 1992, 320,000 tons). These feeds have been provided at a 50% subsidy, which has been supported by the import levy collections on all cereals and taxes on bran and dry beet pulp sales at the mills. Because the program is unable to satisfy demand at these subsidized prices, it has to be rationed. At the national level, DE and the Ministry of the Interior allocate to the provincial level on the basis of herd numbers, average volume of milk production, and an assessment of the impact of climate in each province. Provincial committees make allocations to the communes, whose committees then allocate to individuals.

Obviously, the dramatic rise in ruminant livestock demand for mixed feeds can not be expected to persist since the *Programme de Sauvegarde* will be reduced as drought effects subside. However, other conditions have changed that may make ruminant feed a more permanent component of the feed milling industry. Prior to 1988, ruminant feeds were generally an unattractive proposition, because the primary components of the feed, (dry beet pulp, cereal bran, and molasses), were subsidized to livestock producers, encouraging them to use these products directly, rather than in mixed feeds. However, the liberalization of prices in 1987 created the opportunity for the feed industry to sell ruminant feeds competitively. According to the feed industry, demand for mixed ruminant feed did not increase immediately because producers were suspicious of these products and unaware of their value. Now, however, with the major subsidy and promotional effort of the *Programme de Sauvegarde*, the industry hopes that producers have understood their value and will continue to use them.

² Jerrari Chaouki, Secteur Agricole: Situation actuelle et perspectives d'avenir, Direction de l'Élevage, présenté au 4ème journées avicoles de ANPA, juin 1992.

Cereal use by the feed milling industry

As Table 4 shows, maize, barley and cereals bran are important inputs to the feed industry. Maize is the principal component of poultry feed, accounting for more than half of poultry feed composition. Barley, the second important cereal in the feed mixing industry generally comprised less than 10% of poultry feeds.

Table 4
PRIMARY FEEDS USED BY THE FEED MIXING INDUSTRY

	Maize	Barley	Bran	Oilseed cake	Fish meal
1986	264	25	33	60	37
1987	246	19	27	59	36
1988	235	30	22	36	30
1989	141	39	15	39	30
AVERAGE	221	28	24	49	33
Percent *	62.3%	7.9%	6.8%	13.8%	9.3%

Note: * This represents a percentage of the feeds presented here. However, other feeds comprise about 10% of the industry's total primary feed use.

Source: Direction de l'Élevage, 1992.

Recently, however, the barley component in poultry feed increased (as suggested by the 1989 data presented above), due to the effort of the DE to encourage greater substitution of barley for maize in poultry feeds. Research and trials sponsored by the DE have suggested that it can be incorporated up to 57% of feed composition for egg production without negative effects on performance compared to traditional feed mixes.³ Similar results have been found for broiler production. Feed millers and poultry producers claim that, in practice, maximum incorporation rates are lower, but concede that rates could go much higher than current rates of less than 10%. They suggest, however, that relative prices are currently the principal constraint to raising the proportion of barley in poultry feeds. They maintain that the barley price must fall below three-fourths the price of maize (140 Dh/188 Dh) to make it attractive.

Clearly, barley use in the feed mixing industry has risen since 1989 because of increasing production of ruminant feeds, for which barley is an important component, reflecting the impact of the *Programme de Sauvegarde* and the concerted effort by the DE to promote mixed feeds for ruminants.

A third cereal product of importance to the feed industry is cereal bran. As Table 4 above illustrates, it comprises about 7% of the important ingredients in mixed feeds. As a

³ Benabdeljelil, K., *Valorisation de l'orge dans l'alimentation de la poule: effets sur les performances de ponte et la qualité de l'oeuf*, 4eme journées avicoles de l'ANPA, 18-20 juin, 1992.

byproduct of cereal milling, bran is now sold by the flour mills at market prices. These prices have risen substantially since liberalization due to the elimination of the administered price at which it had been sold by the mills. This price, which was established in order to calculate the net subsidy required by the mills for producing flour, was itself generally below the private market value of bran. The increase in prices which occurred when this system was terminated is said to have reduced demand by the feed mixing industry, resulting in a substitution of barley for bran. Nonetheless, in this last year there were imports of bran for the *Programme de Sauvegarde de Cheptel*.

CEREALS MARKETING POLICY AND CONDUCT

Public policies governing feed cereals

Maize policy

Imports of maize are currently subject to a variable levy (*prélèvement variable*) that is applied to all imports based on an internal reference price. The current reference price for maize is 188 Dh/ql, based on average maize prices in the wholesale market in Casablanca in 1989.⁴ The previous reference price, which had pertained in 1989, was only slightly less (185 DH/ql). The variable levy is calculated as the difference between the reference price and the cost of importing (inclusive of cost and freight, the import margin, and expenses of the importer) and several ad-valorem taxes. These include the customs duties (*droits de douane*) of 2.5%, which since May 1992 have been reintroduced for all cereals, and the fiscal import levy, or PFI (*prélèvement fiscal à l'importation*), of 12.5%. It is also inclusive of the financial charges for the value-added tax, which are fixed at 4.04 DH/ql (see below) but do not include the value-added tax itself.⁵

The value-added tax (TVA) of 19% is applied to the import price (cost and freight) plus the PFI and the importers margin, but not the variable levy. In principal, intermediate consumers can deduct the cost of the TVA on their inputs from the TVA charged on their product, thus making the net tax base the "added value" of their activity.

Other minor taxes exist, including a flat tax, the *taxe de commercialisation* of .45 Dh/ql for maize and barley to support ONICL costs, and a negligible *taxe végétale* to cover phytosanitary inspections.

⁴ This price was fixed by a Decision of MARA on 1 February 1990.

⁵ The "Décision" fixing this series of calculations is number 006873/ONICL dated 22 May 1989.

Barley policy

Barley is only an occasional import to Morocco, because in normal crop years Moroccan production meets consumption requirements. Barley importers pay the same import taxes (droits de douane = 2.5%, PFI = 12.5%) and marketing tax (.45 Dh/ql) as maize.⁶ A value-added tax of 19% was also applied to barley imported for animal feed (but not barley for human consumption) until May of 1992, when the value-added tax was suspended indefinitely.

In principal, barley imports are subject to a fixed levy (*prélèvement fixe*) which is set for 1992 at 50 Dh/ql. Import taxes (but not the TVA) are subtracted from the 50 DH/ql, so that it incorporates these taxes. In addition, losses due to an exchange rate increase of more than 5% from the reference rate of 8.5 Dh/\$ may be deducted from the fixed levy. This mechanism removes the risk of foreign exchange rate fluctuations from the importer's risks.

This year, in order to meet the barley requirements for the unusual growth of the *Programme de Sauvegarde*, the state has had to adjust barley marketing policy. The livestock department announced a request for barley for the mixed feed which was to be purchased by the *Programme* at a fixed price of 160 Dh/ql delivered to the feed mills, or 150 Dh/ql without delivery charges included. No barley importers were able to deliver at this price, however, because world prices plus the costs and taxes in importing exceeded this price. A new scheme was therefore established through ONICL whereby the difference between the fixed buying price and import costs inclusive of all taxes and levies was reimbursed by ONICL to importers out of the *prélèvement fixe*." In essence, then, the fixed levy was transformed into a variable levy, with 150 representing the internal reference price.⁷ Although this price was initially announced to be effective for only two months, it has remained in effect throughout the spring and summer.

Comparison with other feed policies

Table 5 below summarizes the current status of the various border taxes applied to other important feeds in addition to maize and barley. It is interesting to note that the high protein products, oilseed cake and fish meal, apparently face higher customs duties than the cereal products and bran. However, fish meal and bran are apparently not subject to reference price levies, and so may face lower overall protection. Currently oilseed cake is not allowed to be imported, although import tax policies are elaborated, because of a wish to encourage oilseed imports to sustain the domestic oil-pressing industry. A reform has been elaborated, however, that will create a tariff that reflects differences between current internal prices and a five year average of world prices. Estimates in 1992 suggest that the levy rate would be only 13% for this year.⁸ Imports of prepared feeds are also currently prohibited, resulting in total protection.

⁶ Hard wheat is subject to the same conditions as for Barley, with the exception that the fixed levy is 185 Dh/ql. Circulaire No. 6 ONICEL/3 of 5 Feb. 1992.

⁷ Circulaire number 08/ONICL/9, 10 February, 1992.

⁸ "Methodologies de fixation du prix des grains oléagineux des huiles et des tourteaux, mars 1992.

Table 5
TAX POLICY REGARDING FEED PRODUCT IMPORTS

	"Prélèvement Fiscale"	"Droits de douane"	Ref price "Prel.Variab."	Value added tax "TVA"
	-----	-----	-----	-----
Maize	12.5%	2.5%	188	19%
Barley	12.5%	2.5%	150	19%\0%*
Cereal bran	12.5%	2.5%	--	19%
Fish meal	12.5%	12.5%	--	19%
Oilseed cake**	12.5%	12.5%	??--	19%
Mixed feeds**	12.5%	12.5%	--	19%

Note: ~ since June 1992,

* The TVA does not apply to barley imported for human consumption, and since 1 May 1992, barley for animal feed is also exempt.

** importation is currently prohibited.

Cereals market conduct

In principal, since liberalizing the cereals and feed markets in 1987, all licensed merchants, as well as the SCAM, the CMA and the feed sector have been free to import these products. An import licensing regulation remains, but it is supposed to be *pro forma* upon submission of the necessary official forms, a *pro forma* bill, and a bank guarantee for payment of the tariff.

In fact, however, with the exception of a few imports that were apparently made directly by the private sector at the beginning of 1992, the government continues to control the cereal importing process through ONICL, which continues to manage a bids and tenders (*appel d'offre*) procedure for ordering imports. ONICL's management role is justified by the need to insure that a competitive process occurs in establishing import prices. Without such a system, it is argued that there would be a strong incentive for importers to collude with sellers to raise the CAF price and split additional profits rather than paying these profits to the government in the form of the variable levy. The *appel d'offre* procedure is also defended by ONICL because it allows the administration to monitor imports and thereby keep track of cereals availability.

Importers and feed millers complain, however, that the process is not only managed, but manipulated by ONICL in several ways. First, it appears to use delaying tactics in some cases to group orders together, and thereby reduce freight costs. By so doing, the buyers note, ONICL is able to lower CAF prices, and therefore increase the size of the levy that it collects. ONICL argues that this is a proper cost saving function.

A second policy that contradicts the liberalization is the government's retention of the right to close the border to cereal imports during the domestic harvest. The determination of when imports may begin each year is to be made by ONICL and announced based on the judgement that domestic production has been sold. This determination appears to be arbitrary, however, since no specific price or quantity guidelines exist.

In addition to the policies mentioned above, the government has taken a variety of other measures that demonstrated its willingness to intervene in the market for feed cereals. They have included:

- authorization to the industry to import 50,000 tons of sorghum without the levy in 1988.
- provision of barley to the feed milling sector at low prices in 1988.
- reduction in TVA on mixed feeds from 14% to 7% in 1989.
- exoneration of oilseed cake from the TVA in 1989.
- removal of the value-added on barley destined for animal feed (May 1992).

Many of these policies were designed either lower costs or raise demand in response to the crisis in the feed milling industry. Nonetheless, such arbitrary action reduces predictability in the market, and stifles private initiative to take risks.

Despite these constraints, the internal market for maize and barley appears to have adjusted to market liberalization. A cereals wholesale market has developed in Casablanca, which clearly represents the reference market for other markets around the country. Though unorganized, it appears to be relatively large, with forty or fifty sellers representing cooperatives, individual farmers, and stockers present each day. For the major feed cereals, maize and barley, the principal buyers are the feed millers. There are ten members of AFAC, a milling association, as well as a number of large poultry producers who buy directly in the market and do their own feed mixing.

Transactions begin to take place at a café across from the wholesale market early each morning. Quality is determined by displaying samples of stocks in bags to the buyers. The stocks themselves are kept in sacks in trucks parked around the café. Cereals that are not sold immediately, can be moved into the wholesale market for sale throughout the day, though a tax of 0.1 DH/ql is paid to do so. There is no formal contracting process or registry of transactions. Apparently, verbal forward contracts are sometimes made, though they are not common and are apparently conducted only between a few actors who are well known and trusted. Likewise, credit may be extended to buyers, in exchange for a higher price. A rate of about 5 Dh/ql per week was quoted by one merchant.

IMPACT OF CEREAL POLICIES ON THE FEED AND POULTRY SECTOR

It has been suggested above that the liberalization of internal feed commodity markets in 1987 and government initiatives to protect these markets through protectionist policies at the border have resulted in an increase in the prices of these products, which in turn have created

rising prices and therefore a drop in demand in the feed milling and poultry sectors. The section that follows examines these claims with respect to the maize and barley policies in particular.

The effect of maize and barley protection on domestic prices

Annex Tables 3 and 4 provide a reference price calculation of the combined effects of the border policies, outlined in the preceding section, on domestic maize and barley prices. The analysis finds that the implied protection offered by these policies is more than 100% (Nominal protection coefficient, inclusive of the TVA, is 2.08) for maize, and about 61% for barley (NPC = 1.61). This high protection suggests that internal prices should be on the order of 210-220 DH/ql for maize and 180-200 DH/ql for barley. Graph 6 below illustrates that these price levels do lie squarely within the range of domestic prices for maize since current policy conditions were applied in 1989. For barley on the other hand, actual prices have risen as high as 275 in 1991, despite much lower world prices. Estimates of real nominal protection, comparing observed internal and world market prices during this period, suggest that nominal protection has varied between 1.95 and 2.59 for maize, and from 1.52 to 1.89 for barley (see analysis in Annex Tables 3 and 4). The parity of the implied and observed estimates for maize suggests that importing markets have worked relatively well to stabilize domestic prices. For barley, on the other hand, the much wider range in real protection levels suggests that imports have not always buffered domestic price rises.

Impact on feed sector costs

The impact of input taxation on the feed sector is considerable. An analysis by Mejjati-Alami estimates that the total tax burden on the feed sector amounts to about 13.9% of its product price, net of TVA reimbursements.⁹ In an analysis of financial costs over the last six years, he found the following tax components of total industry revenues.

Feed industry taxes as percent of gross revenues

	1986	1987	1988	1989	1990	1991
% tax	7%	15.9%	20.6%	10.3%	9.8%	13.9%

These estimates suggest that the tax burden in 1991 was almost double that in 1986, before the value-added tax was instituted, but is significantly less than the level reached in 1988 before the TVA rate was adjusted downward from 14% to 7% on milled feeds. These results appear to confirm the complaint of the feed milling industry that taxes on inputs are not completely recuperated because taxes paid for inputs are not always sufficient to cancel the taxes on the

⁹ Mejjati-Alami, "La problématique du secteur provende," (AFAC) 4eme journées avicole de l'ANAP, 10-20 juin, 1992.

product.¹⁰ However, this complaint is unwarranted to the extent that the sector does generate a value-added, in which case net taxation should be positive. Moreover, the overall level of taxation does not appear to be excessive, particularly when compared to effective taxation in other industries.

Annex Table 5 presents a budget analysis of mixed feed production. It suggests that the overall implicit tax burden on mixed feeds is approximately 31% of the total costs of feed production inclusive of the TVA. This result is considerably higher than results of Mejjati-Alami's study, in part because the budget analysis compares financial costs to economic prices, whereas Mejjati-Alami's study looks only at direct taxes, but ignores indirect taxes and implicit taxation due to other restrictive policies.

Impact on the poultry sector

Mejjati-Alami has also documented the price effect of feed taxation on the poultry industry by examining the share of feed taxes in the price of poultry meat. The results below suggest that under the current system, between five and six percent of the poultry product price is due to taxes on feed. This is a significant but not exorbitant tax burden, however, it does not incorporate other taxes paid by the poultry industry.

Feed industry taxes as percent of poultry prices (Dh/kg)¹¹

	1986	1987	1988	1989	1990	1991
poultry price	10.09	9.23	11.44	11.60	12.10	14.60
tax %	4.7%	10.6%	10.7%	5.3%	5.1%	5.9%

The combined impact of protective measures on the poultry sector is examined in Annex Table 6, which presents a budget for a typical industrial poultry producer. It suggests that the combined effect of taxes on all tradeable inputs in poultry production results in a nominal protection on these inputs of 1.35. Effective protection is, however, significantly lower because of nominal protection on poultry products. Assuming 1988 levels of product protection (NPC = 1.32) the effective protection rate is 25% (EPC = 1.25).¹² If 1992 poultry prices are assumed, however, the rate nominal protection is over 100% (NPC = 2.10), and the effective protection

¹⁰ A second, uninvestigated complaint is that there are delays in reimbursements from the government.

¹¹ Mejjati-Alami, "La problématique du secteur provençe," (AFAC) 4eme journées avicole de l'ANAP, 10-20 juin, 1992.

¹² This analysis is based upon production costs in 1988. It updates the breakdown of feed costs to the 1991/92 situation, but leaves absolute values in 1988 costs.

rate rises to 251% (EPC = 3.51). These exceptionally high rates reflect current unusually high internal poultry prices.

A multi-market model analysis conducted by the DPAE linking cereal and livestock sectors further illustrates the sensitivity of the poultry sector to increasing cereal prices.¹³ An analysis evaluating the impact of an independent 5% increase in protection on each important cereal suggests the following effects.

Table 6
EFFECTS ON THE POULTRY SECTOR OF INCREASING
BARLEY OR MAIZE PROTECTION BY 5%
(% change from base case levels)

	Barley	Maize
Poultry price change	1.85 %	2.09 %
Poultry Production	0.85 %	-0.32 %
Rural poultry consumption	1.01 %	-0.06 %
Urban poultry consumption	0.70	-0.34

Source: Aloui, Dethier and Houmy, p. 18.

The results in Table 6 suggest that poultry prices would rise by 12% and poultry production would contract by 6% for every 100% increase in maize prices. This suggests that poultry prices are highly responsive to changes in maize prices, but poultry production is much less sensitive. This is principally because poultry price increases raise prices of substitutes (particularly red meat) as well. As a result, consumption demand does not drop significantly, particularly in rural areas, because poultry is an inferior good to red meat. Consumers' incomes decline with rising prices, so the move away from poultry consumption is mitigated by substitution of poultry for more expensive meats. Of course, this scenario assumes that no imports of any meats are allowed to mitigate price increases.

Surprisingly, an increase in barley protection and therefore price has almost as large an effect on poultry prices as does maize, despite the fact that it is a much less important input into poultry production. Moreover, in contrast to maize price increases, the increasing barley price has a positive effect on poultry consumption and therefore production. These unusual results are due to the dramatic adverse effects that barley has on costs, and therefore production, of red meat and milk. Because poultry is a substitute for these products, their rising prices and concurrent declining income result in a shift to poultry consumption.

These results suggest that barley price increases or protection actually stimulate the poultry sector while dramatically reducing demand for other livestock products. At the same time, it should be noted that in most years, barley is not an importable, and therefore border

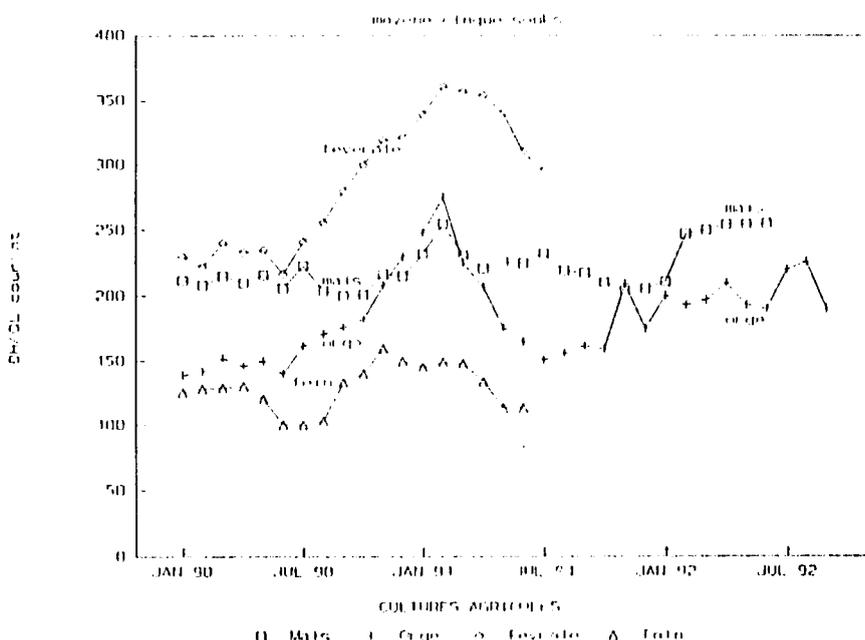
¹³ Aloui, O., J.J. Dethier and A. Houmy, L'Impact de la politique d'ajustement sur les secteurs d'élevage et de l'élevage au Maroc, Version provisoire, 1989.

protection is unapplied and therefore ineffective in obtaining these results. (Further examination of these results is presented in the section below on ruminant livestock.)

Effects on price stability

A further expected effect of current maize policy is a reduction in internal price variation due to the use of a domestic reference price to operate a variable levy against imports. Graph 6 plots monthly price movements for a variety of feeds since 1989. Maize prices do appear to have been less volatile than other feed prices, although prices have varied by about 25% over the period from 1987-1992.¹⁴ Clearly, despite the variable levy, significant variation does

EVOLUTION PRIX DES ALIMENTS DE BÉTAIL



Graphique 6

remain in the maize price. This may be explained in part by the fact that the variable levy does not actually set the imported maize price, because of the value-added tax, which varies directly

¹⁴ An analysis of price variation conducted by the CMR project for the period 1974-1990 found coefficients of variation for maize to be slightly higher than for hard or soft wheat, although they were significantly lower than for barley. However, this analysis does not shed light on the effects of the variable levy because of the much longer period over which it was conducted. See: Commerce, transformation et stockage des céréales: Rapport principal, DPAE/CMRP, Janvier 1992, pp. 45-46.

- with the world price and is assessed independently of the variable levy. A second source of variation is the fact that imports are suspended for part of the year while the domestic harvest is sold. The arbitrariness of this import ban is, in itself, a probable cause of market uncertainty and therefore instability. Lastly, because a few large feed mills are the principal sources of demand for the feed market, their buying decisions can dramatically influence day to day prices, although there appears to be sufficient competition to prohibit price manipulation. (See discussion of feed milling sector above).

Nonetheless, the DE is concerned about the stabilizing effects of the variable levies on feeds, because of the implications they have for livestock product protection, particularly poultry, under this mechanism. This issue arises because the government is committed to removing quantitative restrictions on livestock products and moving to an *ad valorem* tariff scheme by February of next year. The DE is worried about the inconsistency of having a variable levy on maize and, in effect, on barley as well, while livestock product protection is based on an *ad valorem* tariff rate. The DE notes correctly that while the livestock producer faces fixed input costs that are well above the world price, protection on its product varies with the world market. Theoretically, this problem could place the Moroccan livestock producer at an important disadvantage if, say, world maize prices should fall dramatically. In such a case, foreign poultry competitors would be able to lower poultry prices commensurately because of lower maize prices, while domestic producers would be squeezed because the landed price inclusive of tariff would fall for poultry while the domestic price of maize would remain high.

At current market prices of 22 Dh/kg, imports may already be financially attractive. The poultry analysis suggests that with a 136% tariff wedge, imports would only cost 20 Dh/kg. However, it should be noted that these prices are not expected to persist because they are not thought to reflect long run internal costs; rather, they are the result of an unusual coincidence of problems (disease and chick producer failures). Under such circumstances it probably desirable that the international market be competitive to prevent the price hikes that have in fact occurred. The probability of imports ruining the domestic industry in the long run, with an *ad valorem* tariff of 136% over CAF prices, is much more remote. With this high protection of poultry meat, international poultry prices would have to fall by more than half, or internal production costs double, in order for international products to compete with domestic production. Holding other variables constant, this would require that internal maize prices be more than 300% above world prices. If such a situation should arise, the government could obviously adjust the maize reference price to be more in line with world markets.

Other problems with current cereal pricing policies

A number of problems are identified by the feed and poultry sectors regarding the current set of policies. First of all it is pointed out that the TVA structure creates an incentive for poultry producers to mix their own feeds rather than buy from the milling sector, since they must pay an additional 7% value-added tax if they buy premixed feeds. This critique appears to be borne out by the fact that poultry producers have begun to invest in their own milling equipment and import feed components directly rather than purchase from the feed millers.

A second and related critique is that the TVA structure creates a differentiated market for maize. This is because domestically produced maize is not assessed the TVA, resulting in a price differential between local and imported maize. Larger millers who are within the AFAC, and therefore have easier access to imported maize, use more imported maize in milling and therefore are able to recuperate more of the TVA on their product. Evidence of this differentiation is also provided by the fact that no imported maize is found in the domestic wholesale market. Lastly, domestic maize prices have consistently been 10 to 20% higher than the import reference price. However, this margin also reflects quality differences since local dryland maize is dryer and preferred by feed producers.

ROLE OF CEREALS IN RUMINANT LIVESTOCK SYSTEMS

In addition to the feed milling industry, an important component of cereal products are feed directly to ruminants. In particular, of the 50% of barley production that goes to animals, almost 90% is fed directly to ruminants. Table 7 below presents most recent estimates of the relative contribution of various feed sources to ruminant livestock production. As can be seen, overall, cereals provide about 7% of energy requirements to ruminant livestock. In the irrigated and *biour favorable* areas noted in the other studies cited, one sees that the relative percentage of cereals is even higher, reaching 21% of total energy requirements in the Fès-Meknès area.

Table 7
SOURCES OF RUMINANT FEED ENERGY REQUIREMENTS
(percentages)

Study	Morocco 1986	Ghrah 1987	Loukkos 1986/87	Safi 1987	Fès-Meknès 1988
forage	10	22	14	9	15
fallow	6	-	3	5	14
range	28	8	11	13	8
hay, stubble	38	43	38	43	30
crop byproducts ~	2	9	26	10	8
cereals	7	9	3	14	21
industrial byproducts*	8	9	8	6	4
Total	100	100	100	100	100

Notes: ~ This category includes barley, maize, oats and feed concentrates.

* This category includes cereal bran, dry beet and other pulps, and molasses.

Source: Guessous, 1991, p.49.

However, a far more important contribution to livestock feeds comes from hay and stubble. These represent the greatest source of feed among the categories listed, providing almost 40% of total ruminant energy requirements on a national basis. This contribution is easily overlooked because of the low value of hay.

Table 8 provides more information on the relative importance of each type of feed source by livestock production systems. It is derived from a study of feed use on a number of ORMVA conducted between 1986 and 1989.¹⁵ The table illustrates clearly that cereals are important in improved dairy herds, with somewhat less importance in mixed herds, and of almost no importance in local breed herds. Among pastoral sheep systems, cereals appear to be the exclusive commercial feed, whereas agro-pastoral and oasis systems also use commercial crop byproducts.

Table 8
FEED SOURCES FOR RUMINANT SYSTEMS
% of forage units by source for each system

	Range	Forage	Hay/stover	Crop by prod	Cereals & concentrate
Milk herds with Irrigation (dairy breeds)					
Ghrab	--	42	10	26	20
Tadla	--	70	12	12	--
Loukkos	--	47	18	33	33
Basse-Moulouya	--	38	8	33	8
Dual purpose cattle (crossed breed)					
Ghrab	12	28	15	34	11
Tadla	3	21	44	32	--
Basse-Moulouya	14	1	28	36	21
Beef cattle (local breed)					
Zones bours					
Ghrab	42	8	--	5	5
Loukkos	7	26	37	10	--
Loukkos	21	13	41	16	--
Tadla irrigué	5	53	28	14	--
Tadla	3	12	68	16	--
Khenifra	37	20	31	6	6
Pastoral sheep					
Ghrab	62	2	32	--	4
Loukkos	59	--	32	--	7
Basse Moulouya	50	--	36	--	13
Khénifra	63	5	22	--	10
Agro-pastoral sheep					
Loukkos (irr/bour)	29	7	32	22	10
Basse Moulouya (irr)	8	4	24	25	39
Tadla (irr)	25	18	25	17	15
Tadla (bour)	36	3	51	--	8
Oasis sheep					
	--	27	28	7	38

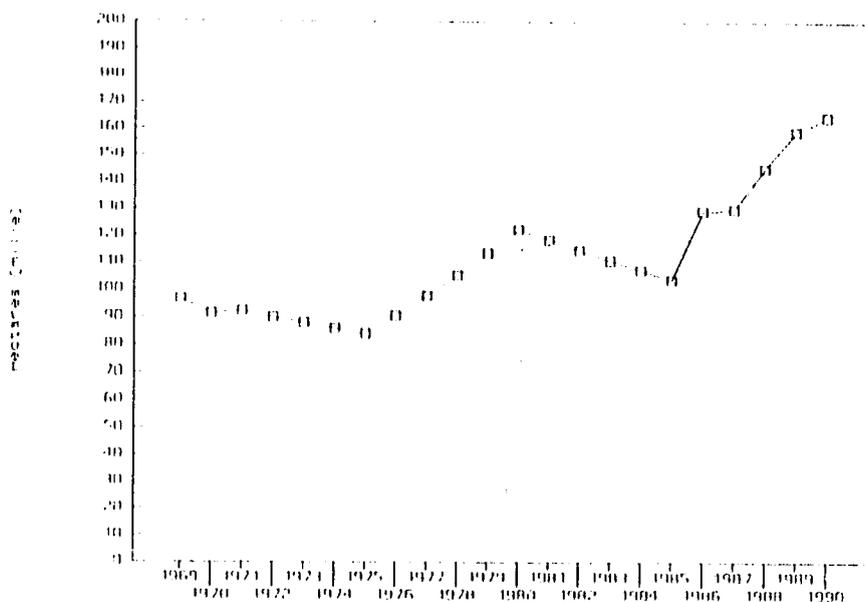
Source: Adapted from Guessous, 1991, pp. 17, 23, 28, 39, 41, 44.

¹⁵ F. Guessous, Productions fourragères et systèmes animaux, Rapport de Synthèse Editions Actes, Maroc, 1991.

These parameters suggest the importance of cereals as an important supplement to ruminant feeds, particularly for agro-pastoral sheep and dairy cattle. They also demonstrate that in nearly all systems, particularly where rangeland is unavailable, forage crops play a critical role. This role is also important for the cereals sector, not because forages represent a replacement for cereals in animal rations, but because they represent an alternative use of agricultural land.

Graph 7 demonstrates a trend toward expansion of forage production areas. An initial growth trend in the late 1970s appears to have been arrested in the early 1980s. However, since 1986, a dramatic increase in forage area has occurred, which appears to coincide with higher prices of crop by-products and concentrate feeds. (See graphs 2 and 3) It is not clear yet what the effects of this expansion may be on other agricultural activities. Some experts suggest that this may be occurring primarily on fallow lands in the *bour*, thereby representing an intensification in the use of land, but not necessarily a displacement of other crops.

EVOLUTION DE LA SUPERFICIE FOURRAGERE



Graphique 7

This trend will have important implications for cereal production if forage crops should become a competitive alternative to cereal crops. A cost of production survey in Meknes in

1991 suggests that vetch oats, forage oats, and barley forage had production costs of between 57 and 62 DH/ql.¹⁶ These costs are significantly below forage prices during the same growing season, which ranged from a low of 1 DH/kg in summer to 1.6 DH/kg in the winter. In a separate study, Staatsen has calculated net financial returns to alternative crops per unit labor, land, and water, and has found that forage crops are competitive with some cereals and legumes, particularly in the drylands, although their relative attraction falls rapidly if commercialized. The study results suggest that these crops are best grown in conjunction with mixed farming operations. However, the study does not examine how these crops fit into the farm enterprise as competitors for scarce labor, water, land and capital resources.

Effect on relative prices for ruminant feeds

At a broader level, it is interesting to ask how market liberalization of the feed sector has changed the relative value of various feed products for the livestock industry. To assess this issue, Table 9 presents an analysis that attempts to value commercial feed product on the basis of the implicit value of its usable energy and protein components. It separates commercial feeds between those providing primarily energy (ruminant total digestible nutrients) and protein (ruminant digestible protein). Using these subgroupings of feed as separate estimators of energy and protein component values, it then derives the implicit energy and protein component price by solving the two equations for the two unknowns. These component costs are then used to reconstruct the implicit feed price for each feed. The analysis relies on estimates of average feed availability for traded feeds between 1986 and 1989 as well as average market prices for feeds in 1991. Implicit energy and protein values are also compared to results for a similar exercise using 1988 prices to illustrate the evolution in relative value of these two important feed ingredients.

¹⁶ Cout de production des produits agricoles 1990-1991, Province de Meknes, Juillet 1992, MARA/DPAE/Division des Affaires Economiques.

Table 9
EVALUATION OF IMPLICIT VALUE OF COMMERCIAL FEEDS IN MOROCCO

	Avail- ability	Energy (RTDN) -----1000 MT-----	Protein (RDP) -----	Market value	Implicit value ----(Dh/tn)----	Ratio Market/ Implicit	Econ. Value (Dh/tn)	Ratio Implicit/ Economic
Energy feeds								
weighted average value ---- > 1597								
maize 1.79	50.00	40.00	2.90	2320	1424	1.6	1295	
barley 1.33	265.00	196.10	22.79	2160	1562	1.4	1623	
cereal bran	786.00	487.32	90.39	1530	1614	0.9	1269	1.21
straw	10.40	3.85	0.31	790	696	1.1	NA	NA
dry beet pulp	125.00	85.00	5.38	2460	1203	2.0	969	2.54
molasses	177.60	108.34	7.10	900	942	1.0	1475	0.61
hay	392.00	301.84	11.76	1300	1216	1.1	NA	NA
dry citrus pulp	14.00	10.36	0.42	1000	1196	0.8	NA	NA
Protein feeds								
weighted average value moyen ----> 3686								
soya bran	20.10	15.68	7.24	3500	3559	1.0	2976	1.18
sunflower bran	5.40	3.29	1.73	1700	3194	0.5	1181	1.44
rapeseed bran	10.50	6.72	3.36	1800	3234	0.6	NA	NA
cotton seed bran	5.22	3.71	1.72	2736	3329	0.8	1837	1.49
fish meal	44.00	30.80	23.19	5000	4798	1.0	3690	1.35
fever beans	75.80	54.58	16.37	3440	2459	1.4	NA	NA

TOTAL		1347.58	194.66					
IMPLICIT VALUE OF COMPONENTS		1444	7978					
				RATIO PRICE RDP/RTDN				
				5.52				
COMPARISON OF RESULTS FOR 1987-88								
IMPLICIT VALUE OF COMPONENTS		1002	3740	3.73				
PRICE RATIO 1991-92:1987-88		1.44	2.13					

- Notes: a) Estimates of availability for animal consumption are from : "Bilan Fourraggere, Service d'Alimentation" 1985 a 1987.
- b) Coefficients of dry matter, energy (Ruminant Total Digestible Energy) and protein (Ruminant Digestible Protein) are from Feedstuffs, 1987 Reference Issue, pp. 23 ff.
- c) Market prices are means for rural markets. They are calculated using data from the Enquete d'Elevage of the SA/DE/MARA and DV/MARA.
- d) Implicit prices are calculated using financial values for energy and protein components. The equation is presented in the AIRD/DPAE Livestock sector analysis, 1989.
- e) Economic values represent reference prices of products at 80 km from the port of Casablanca.

The results suggest that most energy feeds, including the cereals and cereal byproduct feeds (maize, barley and hay) are overvalued with respect to their implicit feed values. The only exception to these are bran and citrus pulp. On the other hand, most of the protein feeds, including all locally produced oilseed cake (cotton colza and sunflower), are undervalued. Comparing these results with a similar analysis in 1988, shows that despite this fact, feed energy

costs have risen much less than protein energy. This suggests that other sources of animal feed energy, such as forage, which is not considered in the analysis, have become more important.

The multi-market analysis cited in the previous section also provides an interesting analysis of the impact of cereals policy on ruminant livestock. Table 9 repeats some of these results.

Table 10
EFFECTS ON THE LIVESTOCK SECTOR OF AN INCREASE IN CEREALS PROTECTION
(% change from base case levels due to 5% increase in cereal price)

	Hard wheat -----	Soft wheat -----	Barley -----	Maize -----
Beef price	0.53	1.13	2.62	0.44
Mutton price	0.29	0.61	2.26	0.23
Mkt milk price	0.64	1.21	2.25	0.36
Beef production	-0.11	-0.39	-0.88	-0.01
Mutton production	-0.18	-0.58	-3.33	-0.07
Mkt Milk prod'n	0.16	0.04	-0.10	0.05
Off Milk prod'n	-0.92	-2.07	-4.31	-0.63
Rural beef consum.	0.07	-0.23	-0.66	0.03
Urban beef consum.	-2.13	-0.48	-1.00	-0.03
Rural mutton cons.	-0.01	-0.47	-3.23	-0.06
Urban mutton cons.	-0.30	-0.64	-3.39	-0.08
Rur. mkt milk cons.	0.30	0.15	0.12	0.10
Rur. off milk cons.	1.66	2.42	3.68	0.72
Urb. mkt milk cons.	-0.14	-0.19	-0.57	-0.05
Urb. off milk cons.	0.30	0.58	1.98	0.24

Source: Aloui, Dethier and Houmy, p. 18.

The analysis results demonstrate clearly the importance of barley as the principal link between cereals and livestock sectors. In almost all cases, the impact of a barley price change is in the same direction, but much higher than for other cereals.¹⁷ An important exception is with respect to the milk market. Barley price increases have a significant negative effect on this market because of rising costs in milk production, for which barley is an important concentrate. Official market milk production falls most dramatically because its prices are fixed and therefore profit margins are cut. On the other hand, free market milk prices rise by about 5% for every 10% increase in barley price. However, price increases for the other cereals, particularly hard wheats, have a strong positive effect on free market milk production, primarily because rural

¹⁷ The only other important exceptions concern opposite effects from maize with respect to poultry. See discussion in previous section.

incomes rise, increasing rural milk consumption. The free market responds dramatically (a 6% increase for each 10% increase in hard wheat price) because the official market is stifled by fixed prices.

Several other relationships should be noted. First, protection of cereals raises their value and in all cases results in a dramatic reduction in forage areas due to the greater attraction of cereal crops, and declining demand for ruminant livestock products overall. However, this result contradicts trends noted above, which suggest an expansion in forage area with higher feed prices. Two explanations may be offered for this. First, the increasing feed trends referred to above are primarily with respect to products other than cereals for which subsidies were removed, including cereal bran and dry beet pulp. Moreover, the model does not allow for the possibility that forage is expanding in fallow lands, and is not in direct competition with cereals area. Nonetheless, the model conclusions are interesting because they suggest that forage expansion will not displace cereals if cereals prices are increasing, rather the reverse will occur.

CONCLUSIONS AND RECOMMENDATIONS

The discussion above illuminates several important issues that link cereals market reforms to livestock:

- Rising prices for commercial feeds, which have accompanied liberalization of feed markets, have contributed to rising costs in the livestock sector in general.
- The poultry sector receives significant negative protection from border taxation policies on cereal feeds. This negative protection has risen since the implementation of reforms and has contributed to rising feed prices and therefore to increasing poultry prices, resulting in a stagnation in poultry sector growth.
- The stability provided to domestic maize prices as a result of the variable levy is diminished by continued government intervention to limit imports during domestic harvesting and to schedule the flow of imports.
- Strong oscillations in poultry prices are not, however, attributable to variations in feed price but rather to issues of disease on the one hand, and structural problems in the poultry market on the other.
- The inflexibility of the maize price to world market conditions in combination with an ad valorem protection of poultry meat could result in a creation of uncompetitive conditions for domestic producers if world poultry prices should fall or domestic production costs rise dramatically. However, given high proposed ad valorem protection on poultry, these conditions are not likely unless the internal reference price of maize is allowed to rise to more than triple the world price.

barley policy is currently incoherent, because of the simultaneous effort to establish a fixed levy and to introduce of an internal fixed price. As a result, the levy is being administered as a variable levy rather than as a fixed levy.

Ruminant livestock is also sensitive to rising protection for cereals. Ruminant production and price are most sensitive to the barley price because of its importance in production and in rural incomes. Moreover, it is also key to the poultry sector because of the substitution from red and white meat as meat prices rise, and real incomes fall.

Increasing feed prices appear to have contributed to an increase in demand for forage crops and an expansion in their area. This trend appears to be occurring at the expense of fallow lands, and primarily in the hour. However, forage crops could begin to displace cereals if the relative prices of cereals fall with respect to livestock products.

Recommendations

Reevaluation of the merits of a protectionism for maize and barley policy

In the future, more attention should be given to the impact of border protection policies for feed cereals on the livestock sector. Maize is particularly important because of its predominant role in poultry production. The sensitivity of poultry to rising feed costs suggests that priorities should be reexamined regarding the relative costs of protecting maize producers versus encouraging the poultry sector. If protection of maize production is a priority, means other than trade policy should be considered to encourage domestic maize production such as targeted subsidies.

As a nontradeable in most years, protective policies on barley are usually unapplied and therefore without effect. However, in years of crop failure such as the past year, these policies do apply. Ironically, it is in these bad years that protection is least desired, since domestic production is likely to be in severe shortfall, and ruminant livestock systems, for which barley is the principal supplemental energy feed, are in most need of supplementation. Protective measures to raise barley costs in these years are therefore especially damaging to the livestock producers.

Fortunately, in this year, ad hoc measures have been taken to reduce the real taxation effect of border policies by deducting import and ad valorem tax costs from the levy. Moreover, the *Programme de Sauvegarde de Cheptel* has provided some feed at subsidized rates, thereby relieving the impact of a bad year for some producers. Unfortunately, this scheme is insufficient to meet all demand at its subsidized rates, and therefore it must use rationing. The difficulties of providing an equitable and responsive rationing system suggest that more generalized relief would be provided by simply eliminating protection on barley and allowing free imports.

Modeling of the cereals and livestock markets.

A multi-market model has been developed by the DPAAE and the World Bank that focuses on cereals-livestock interactions. Results of the initial model, which have been cited above, provide interesting insights into the impact of cereals policy on the livestock sector. However, this model is based on 1987 data, and its structure reflects 1988 policies.

The model should be revised to update baseline data to reflect recent changes in production levels and relative prices. In particular it has been argued that feed prices have risen overall, and protein feeds in particular have risen in value. Moreover, protection levels on cereals are much greater now than were assumed in the model. The baseline data in the model may also be improved by the results of an exercise underway to derive better estimates of demand elasticities for cereal and livestock products. Once revised, the model should be used to reexamine effects of cereals protection on the livestock sector.

A second, more difficult step will be to revise the structure of the model to reflect recent or expected policy changes. In particular, the current model treats prices for livestock products as endogenous because imports are assumed to be prohibited. However, reforms envisioned for next year will allow imports. Assuming protection levels are not so high as to make these products nontradeable, this should make livestock product prices exogenous. Changing this model's structure to reflect this and other changes is, however, a major programming task and may not be worth the effort until these reforms are in place. Moreover, a separate trade modeling exercise underway by the CMRP will also examine some interactions between cereals and livestock sectors, and should be able to incorporate changes in border policy for livestock to examine the issues that these changes raise.

Economic analysis in the livestock department.

The Direction de l'Élevage is currently facing a broad array of new policy questions that stem from the ongoing liberalization of international trade in livestock products. In particular, the DE is faced with a series of complaints by the poultry and feed sectors concerning the negative effects of cereals policy on their industries. It currently lacks the tools to examine many of the issues being posed, including:

- the possible effects of world price movements in livestock and cereals markets on domestic production;
- the effect of changing relative prices for feeds and livestock products on production incentives in mixed farming enterprises;
- the impact of proposed reforms on livestock and feed producer profits.

The DPAAE has already developed a number of tools, including the multi-market model of cereal-livestock interactions, partial equilibrium analyses of specific markets, and linear program models of mixed farms that can respond to many of these issues. An understanding

of the utility of these analytical tools and an ability to request analyses from the DP&E and apply the results to the issues at hand should be developed at the DE.

Clearly, while this recommendation is not a central concern of the Cereal Market Reform Project, it should be part of its agenda to encourage others to undertake this task in order to assure the understanding and the support of the livestock sector in the efforts to promote cereal market reforms.

**MOROCCAN CEREAL MARKET REFORM PROJECT
MARA/DPAE**

**THE IMPACT OF CEREALS MARKET REFORM ON
THE FEED AND LIVESTOCK SECTORS**

ANNEXES

October 1992

ASSOCIATES FOR INTERNATIONAL RESOURCES AND DEVELOPMENT
55 Wheeler St.
Cambridge MA, 02138

Annex Table I
EQUILIBRE RESSOURCES -- EMPLOIS DE L'ORGE,
MAIS, AVOINE, ET SORGHO (1,000 Qx)

Année	-----ORGE-----				-----MAIS-----				-----AVOINE-----				-----SORGHO-----			
	Prod.	Impor.	Total	Cons.	Prod.	Impor.	Total	Cons.	Prod.	Imp	Total	Cons.	Prod.	Impor.	Total	Cons.
1969	19380	0.0	19380	10199.48	4085.0	15.5	4100.5	451	104.5	0.0	104.5	88.3	460.8	0.20	461.0	115.2
1970	18555	0.0	18555	6781.64	3036.0	0.1	3036.1	370	115	0.0	115.0	98.8	511.7	0.06	511.8	127.9
1971	24433	0.0	24433	7629.57	3704.0	104.1	3808.1	400	145.4	0.0	145.4	125.7	1144.8	0.05	1144.9	286.2
1972	23426	0.0	23426	7418.17	3492.0	104.6	3596.6	569	324.6	0.0	324.6	206.1	560.3	0.05	560.4	140.1
1973	11919	542.0	12461	7361.78	2064.0	321.0	2385.0	479	115.9	0.0	115.9	99.2	494.7	0.04	494.7	123.7
1974	22677	0.0	22677	5730.61	3705.0	298.4	4003.4	509	188.1	0.0	188.1	161.3	833.2	0.47	833.7	208.3
1975	15060	894.0	15954	9021.97	3523.0	344.0	3867.0	360	271.7	0.0	271.7	241.6	708.9	0.25	709.2	177.2
1976	27174	0.0	27174	6899.95	4679.0	0.8	4679.8	690	344.3	0.0	344.3	322.3	183.4	0.54	183.9	45.9
1977	12777	261.0	13038	8963.72	1751.0	415.3	2166.3	879	74.2	0.0	74.2	54.9	44.2	0.65	44.9	11.1
1978	22099	150.0	22249	6511.25	3709.0	755.6	4464.6	1317	107.6	0.0	107.6	95.6	343.3	0.06	343.4	85.8
1979	17919	103.0	18022	9085.18	2940.0	1021.5	3961.5	1533	56.2	0.2	56.4	50.7	220.8	1.31	222.1	55.2
1980	20992	102.0	21094	6906.57	3161.0	1147.2	4308.2	1642	313.2	0.0	313.2	271.8	216.9	0.31	217.2	54.2
1981	9871	2043.0	11914	7325.77	851.8	1809.0	2660.8	1164	359.2	1.9	361.1	204.8	142.6	1.00	145.2	28.6
1982	22171	1703.0	23874	4692.52	2345.5	1437.0	3782.5	1744	705	0.0	705.0	664.5	272.3	1.40	273.7	68.1
1983	11663	21.7	11685	5448.00	2454.4	1728.0	4182.4	2012	420.5	0.2	420.7	377.0	226.5	0.06	226.6	56.6
1984	13344	972.0	14316	6309.31	2507.6	1297.0	3804.6	2213	419.3	0.0	419.3	383.7	233.6	141.80	375.4	58.4
1985	24143	110.0	24253	9213.80	3019.5	1655.0	4704.5	2465	334.8	5.0	339.8	355.0	202.4	100.10	302.5	50.6
1986	35629				3067.6				767.5				0.0			
1987	15433				2400.2				330.6				142.6			
1988	34540				3579.9				562.1				138.2			
1989	29986				4028.4				583.8				138.3			
1990	21376				4356.2				472.4				156.1			
1991	32525				3350.5											

Annex Table 2
CAPACITE INSTALLEE

Societes	Tonnes/h	Capacite Annuelle
Inaam	30	216.000
Cicalim	21	126.000
Atlas	18	108.000
SNV	15	108.000
El Alf Fes	20	96.000
Eddik	15	90.000
Sonabetail	12	86.400
Calimab	4000 t/mois	50.400
Sotalab	4	48.000
Somalim	10	24.000
Sabt	12000 t/mois	14.400
Alf Chtouka	6	14.400
Alf Doukkala	6	14.400
Sudalim	5	12.000
Sman	5	12.000
Sopromal	5	12.000
Selima	5	12.000
Pravimar	5	12.000
B. Aliment	3	9.000
La Fontaine	2	5.000
Dar El Fellous	2	5.000
		1.078.000
		arrondi a 1.100.000

Annex Table 3
ANALYSE DE PRIX DE REFERENCE, MAIS

PRIX DE REFERENCE: MAIS IMPORTEE	QUANTITE	PRIX D'ACHAT	DEPENSE FINANCIERE	TAXES/SUBVENTIONS		COUT ECONOMIQUE
				ECHANG.	NON ECHANG.	
	UNITES					
PRIX FOB	\$/QL		9.4	0.0	0.0	9.4
FRET	\$/QL		1.3	0.0	0.0	1.3
ASSURANCE	\$/QL	3.0%	0.3	0.0	0.0	0.3
PRIX CAF	\$/QL		11.0	0.0	0.0	11.0
TAUX DE CHANGE OFFICIEL		8.5				
PRIX CAF	Dh/QL		93.8	0.0	0.0	93.8
FRAIS PORTUAIRES						
MANUTENTION	% Peaf	0.50%	0.5	0.0	0.1	0.4
TRANSPORT SUR 25 KM	Dh/QL.KM	25	0.060	1.5	0.4	1.0
PEAGE	% Peaf	0.40%	0.4	0.4	0.0	0.0
GARANT DU POIDS	% Peaf	0.80%	0.8	0.0	0.1	0.7
FORMALITE DOUANIERES	% Peaf	0.10%	0.1	0.1	0.0	0.0
COMMISS. D'ACCREDITIF	% Peaf	1.25%	1.2	0.0	0.0	1.2
COMMISS. D'IRREVOCABILITE	% Peaf	1.25%	1.2	0.0	0.0	1.2
COMMISS. CONFIRM. BANQUE	% Peaf	1.00%	0.9	0.0	0.0	0.9
COMMISSION CAUTION	% Peaf	2.00%	1.9	0.0	0.0	1.9
DESARRIMAGE	% Peaf	0.20%	0.2	0.0	0.0	0.2
STEVDORING	% Peaf	0.30%	0.3	0.0	0.0	0.3
ACCONAGE	% Peaf	0.90%	0.8	0.0	0.1	0.8
SURVEILLANCE	% Peaf	0.30%	0.3	0.0	0.0	0.3
MAGASINAGE	% Peaf	2.50%	2.3	0.0	0.2	2.1
FINANCEMENT 30 JOURS	% Peaf	1.25%	1.2	0.0	0.1	1.0
FRAIS GENERAUX	% Peaf	2.50%	2.3	0.0	0.0	2.3
AUTRES	% Peaf	1.00%	0.9	0.0	0.0	0.9
SOUS TOTAL FRAIS PORTUAIRE			110.5	0.9	0.7	108.9
INTERVENTIONS DE POLITIQUE (sauf TVA)						
DROITS DE DOUANE	% Peaf	2.5%	2.3	2.3	0.0	0.0
PRELEVEMENT FISCALE	% Peaf	12.5%	11.7	11.7	0.0	0.0
TAXE DE COMMERCIAL.	Dh/ql	1.0	0.45	0.5	0.0	0.0
PRELEVEMENT VARIABLE	Dh/ql	188.0	125.0	63.0	63.0	0.0
PRIX DE REVEINT Sans TVA	DH/m		188.0	78.4	0.7	108.9
COEFFICIENT DE PROTECTION NOMINALE THEORIQUE, sans TVA			1.8	0.0	0.0	0.0
TAXE SUR VALEUR AJOUTEE	% Peaf (ml,dl,pf)	19.0%	125.0	23.8	23.8	0.0
PRIX DE REVEINT AU PROVENDEUR	DH/m		211.8	102.1	0.7	108.9
COEFFICIENT DE PROTECTION NOMINALE THEORIQUE, avec TVA			2.1	0.0	0.0	0.0
PRIX AU PROVENDEUR, reel	200.0	à	200.0			
COEFFICIENT DE PROTECTION NOMINALE, reel	2.0	à	2.6			

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Annex Table 4
PRIX DE REFERENCE: ORGE IMPORTE

	UNITES	QUANTITE	PRIX D'ACHAT	DEPENSE FINANCIERE	TAXES/SUBVENTIONS		COUT ECONOMIQUE
					INTRANTS DIRECTE	INDIRECTS NON ECHANG.	
PRIX FOB en \$EU	\$/tonne	1.00	108.00	108.0	0.0	0.0	108.0
Fret, Assurances	\$/tonne	1.00	15.00	15.0	0.0	0.0	15.0
PRIX CAF en \$EU	\$/tonne			123.0	0.0	0.0	123.0
TAUX DE CHANGE NOMINAL	Dh/\$			8.5	0.0	0.0	9.0
PRIX CAF en DIRHAMS	Dh/tonne			1045.5	0.0	0.0	1045.5
PRIX CAF en DIRHAMS	Dh/ql			104.6	0.0	0.0	104.6
FRAIS DE LIVRAISON, PORT-MINOTERIE							
Pertes	% CAF		2.5%	26.1	0.0	0.0	26.1
Manutention	Dh/tonne		5.0	5.0	0.0	0.0	5.0
Transport	Dh/tonne	25.0	0.5	11.5	0.0	0.0	11.5
Frais de Reception				0.0	0.0	0.0	0.0
Peage	Dh/tonne		4.0	4.0	4.0	0.0	0.0
Garanti du poids	% CAF		0.8%	8.4	0.0	0.8	7.5
Formalites douanieres	Dh/tonne		1.0	1.0	1.0	0.0	0.0
Commission d'accréditif	% CAF		1.25%	13.1	0.0	0.0	13.1
Comm. d'irrevocabilité	% CAF		1.25%	13.1	0.0	0.0	13.1
Comm. confirmation banque	% CAF		1.00%	10.5	0.0	0.0	10.5
Comm. caution	% CAF		2.00%	20.9	0.0	0.0	20.9
Desarrimage	Dh/tonne		2.0	2.0	0.0	0.2	1.8
Stevedoring	Dh/tonne		3.4	3.4	0.0	0.3	3.1
Accoage	Dh/tonne		9.0	9.0	0.0	0.9	8.1
Surveillance	Dh/tonne		3.0	3.0	0.0	0.0	3.0
Magasinage (15 jrs)	Dh/tonne		26.0	26.0	0.0	2.6	23.4
Desensillage	Dh/tonne		0.5	0.5	0.0	0.1	0.5
Financement (30 jrs)	% par an		0.90%	0.0	0.0	0.0	0.0
Frais generaux	% CAF		2.50%	26.1	0.0	0.0	26.1
Autres	Dh/tonne		10.0	10.0	0.0	0.0	10.0
SOUS TOTAL FRAIS PORTUAIRE				1219.0	5.0	4.9	1229.1
INTERVENTIONS DE POLITIQUE (sauf TVA)							
DROITS DE DOUANE	% Peaf	2.5%		26.1	26.1	0.0	0.0
PRELEVEMENT FISCAL A L' IMPORTATION	% Peaf	12.5%		130.7	130.7	0.0	0.0
TAXE DE COMMERCIALISATION	Dh/ql	1.0	4.5	4.5	4.5	0.0	0.0
PRELEVEMENT FIXTE	Dh/ql	1.0	500.0	500.0	500.0	0.0	0.0
PRIX DE REVENT AU PROVENDIER	Dh/tn			1900.4	666.3	4.9	1229.1
COEFFICIENT DE PROTECTION NOMINALE THEORIQUE sans TVA				1.6	0.0	0.0	0.0
TAXE SUR LE VALEUR AJOUTEE	0.0%		1400	0.0	0.0	0.0	0.0
PRIX AU PROVENDIER, reel				1800	h	2200	
COEFFICIENT DE PROTECTION NOMINALE, reel				1.5	h	1.9	

Annex Table 5
ALIMENTS COMPOSES

HYPOTHESES:

TVA	7.0%
PRODUCTION ANNUELLE (QUINTAUX)	401040.00
TAUX D'ACTUALISATION	16.00
PRIX MONDIAL PONDERE FOB (\$/QUINTAUX)	23.25
PRIX PONDERE A L'USINE (DH/QUINTAUX)	278.00
TAUX DE CHANGE OFFICIEL (DH/\$)	8.50
TAUX DE CHANGE DE REFERENCE (DH/\$)	10.00
DISTANCE DU PORT A L'USINE (KM)	80.00
COUT DU TRANSPORT PORT-USINE (DH/TONNE KM)	0.60
MAIN D'OEUVRE JOURNALIERE (DH/JOUR)	38.81
MAIN D'OEUVRE SPECIALISEE (DH/MOIS)	2841.67

ANALYSE PROTECTION ET AVANTAGE COMPARATIF:

	TCO	TCR
PROTECTION NOMINALE, PRODUCTION TCO	1.29	1.52
PROTECTION NOMINALE, INTRANTS TCO	1.46	1.72
PROTECTION EFFECTIVE TCO	0.09	0.10
SUBVENTION EFFECTIVE TCO	0.51	0.59
COUT EN RESSOURCE DOMESTIQUE TCO	0.86	0.73

ALIMENTS COMPOSES

PRODUCTION INDUSTRIELLE

TEMARA PRIX INTERNATIONAUX DE REFERENCE

PRIX FOB SPOT	\$/QUINTAL	21					
FRET ET ASSURANCE	\$/QUINTAL	2.10					

PRIX CAF	\$/QUINTAL	23.10		23.10	0	0	23
TAUX DE CHANGE OFFICIEL	DH/\$		8.50				
PRIX CAF EN MON. LOCALE TCO	DH/QUINTAL	196.35		196.35	0	0	196

CHARGES DE LIVRAISON, PORT-DETAILLANT							
MANUTENTION	0.5% C&F	0.98		0.98	0	0	1
PEAGE	0.4% C&F	0.79		0.79	1	0	0
FORMALITES DOUANIERES	0.1 C&F	0.20		0.20	0	0	0
COMMISSION D'ACCREDITIF	1.25% C&F	2.45		2.45	0	0	2
COMMISSION D'IRREVOCABILITE	1.25% C&F	2.45		2.45	0	0	2
COMMISSION CONFIRMATION BANQUE	1% C&F	1.96		1.96	0	0	2
COMMISSION CAUTION	2% C&F	3.93		3.93	0	0	4
DESARRIMAGE	0.2% C&F	0.39		0.39	0	0	0
STEVDORING	0.3% C&F	0.59		0.59	0	0	1
ACCONAGE	0.9% C&F	1.77		1.77	0	0	2
SURVEILLANCE	0.3% C&F	0.59		0.59	0	0	1
MAGASINAGE	2.5% C&F	4.91		4.91	0	0	4
COUTS FIN. POUR 2 SEM.DE STOCKAGE	1.25% C&F	2.45		2.45	0	0	2

PRIX SORTIE PORT TCO	DH/Q	219.81		219.81	1	1	218
TRANSPORT PORT USINE	DH/Q	4.80		4.80	1	0	3

PRIX DE REFERENCE CAF TCO, EQUIV.USINE DH/Q		224.614		224.61	2	1	221

ALIMENTS COMPOSES, PRODUCTION INDUSTRIELLE COMPTE EXPLOITATION USINE TEMARA PRODUCTION INDUSTRIELLE	UNITE	QUANTITE	PRIN D'ACHAT	HORS DEPART	DEPENSE ECONOMIQUE	TAXES/SURVENTIONS INDIRECT	COUT FINANCIER DIRECTE
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COUTS DE PRODUCTION A L'USINE

MATIERES PREMIERES	% INCORPORATION							
ORGE LOCAL	0.064	25667	165	165	4234982	1484911	10979	2739093
ORGE IMPORTEE	0.000	0	165	139	0	0	0	0
MAIS LOCAL	0.132	52857	230	230	12157127	5067717	48275	7041135
MAIS IMPORTE TCO	0.429	172126	230	193	39589065	19690563	630352	19268150
TOURTEAUX DE SOJA IMP.TCO	0.042	16844	350	294	5895288	894201	96603	4904483
TOURTEAUX DE SOJA TCO	0.042	16844	350	350	5895288	-235812	176859	5954241
TOURTEAUX DE TOURNESOL	0.040	16042	170	170	2727072	109083	54541	2563448
FARINE DE POISSON	0.070	28073	500	500	14036400	0	0	14036400
SON DE BLE	0.142	56948	150	150	8542152	0	85422	8456730
PETITS POIS	0.010	4010	240	240	962496	-19250	0	981746
PULPE D'AGRUMES	0.010	4010	95	95	380988	-38099	-26669	445756
UREE	0.007	2807	132	132	369157	-136588	7383	498362
CMV	0.012	4812	1500	1261	7218720	1066429	389447	5762844
TOTAL MATIERE PREMIERE TCO	1.000	401040			102008735	27883156	1473191	72652388

AUTRES FRAIS								
TRANSPORT MAT. PREM. 50 km.			0	0	12031200	3368736	721872	7940592
TRAVAIL								
JOURNALIER	JOUR	27650			1073000	0	107300	965700
SPECIALISEE	MOIS	240			682000	0	68200	613800
GESTIONNAIRE	MOIS				1703959	0	828709	875250
ENERGIE, fuel	#/AN				276717	161924	3511	111282
FRAIS GENERAUX DE GESTION					0	0	0	
FRAIS DIVERS DE GESTION	#/AN				326775	9803	32677	284794
FRAIS FINANCIERS	#/AN				35919	0	4310	31609
AMORTISSEMENTS	#/AN				346924	20815	38162	287947
AUTRES FRAIS	#/AN				918999	27570	91900	799529
AMORTISSEMENT DES IMMOBILISATIONS					0	0	0	
CONSTRUCTIONS	#/AN				123479	7409	13583	102487
MATERIEL ET OUTILLAGE	#/AN				325327	6507	3253	315567
MATERIEL DE TRANSPORT	#/AN				221727	20110	15170	186447
AGENCEMENT INSTALLATIONS	#/AN				36612	2197	4027	30388
FRAIS FINANCIERS: equipement			113143		0	35357	77786	
TERRAIN	I/A				95390	0	20867	74524
COUTS TOT. A L'USINE TCO	MIL.DH				120319907	31508226	3462090	85349590
VALEUR TOTALE DES PRODUITS DH/QL					300	79	9	213
TAXE SUR LE VAL AJOUTEE % prix vente	278.00	0			19	16	4	0
moins TVA SUR MATIER PREMIER				21	19	2	0	
TAXE SUR VALEUR AJOUTEE NEDH/QL					-2	-3	2	0
COUT DE PRODUCTION TAXES COMPRISES	DH/QL					298	75	213

Annex Table 6
POULET DE CHAIR

TAUX D'ACTUALISATION		12%	
TAILLE DE BANDE		1.500	
NOMBRE DE BANDES PAR AN		4.80	
RENDEMENT (KG/TETE)		2.24	
TAUX DE MORTALITE (EN %)		0.05	
FACTEUR DE CONVERSION DE TRANSFORMATION		75%	
FACTEUR DE CONVERSION DE QUALITE		10%	
PRIX MONDIAL FOB (\$/TONNE)		1043.00	
PRIX A LA FERME (DH/KG)		17.00	10.65
PRIX DE GROS (DH/KG)		11.20	22.00
TAUX DE CHANGE OFFICIEL (DH/\$)		3.50	
TAUX DE CHANGE DE REFERENCE (DH/\$)		10.00	
DISTANCE DU PORT AU GROSSISTE (KM)		100.00	
DISTANCE DU MARCHÉ DE GROS A LA FERME (KM)		15.00	
COUT DU TRANSPORT PORT-GROSSISTE (DH/TONNE-KM)		1.25	
COUT DU TRANSPORT MAR.DI' GROS FERME (DH/TONNE KM)		1.25	
MAIN D'OEUVRE JOURNALIERE		30.00	
MAIN D'OFUVRE SPECIALISEE		60.00	
COUT GESTIONNAIRE		260.00	
LOCATION DE LA TERRE (DH/HA)		8000.00	
DROIT DE DOUANE		0%	
TVA SUR LES ALIMENTS		0.07	
ANALYSE DE LA RENTABILITE FINANCIERE FIN			
PRIX A LA FERME	17.00		NPC ₀
ECHANGEABLES, PRIX FINANCIERS	12.68		NPC _i
VALEUR AJOUTEE AUX PRIX FINANCIERS	4.32		EPC
NON ECHANGEABLES AUX PRIX FINANCIERS DRC			
TRAVAIL FAMILIAL	0.00		
TRAVAIL SALARIER	1.68		
CAPITAL	1.85		
TERRE	0.12		
TAXES	0.51		
NONECH TOTAL	4.16		
BENEFICE NET (Dh/kg)	0.16		
ANALYSE ECONOMIQUE			
TCO			
PRIX A LA FERME	8.10		
ECHANGEABLES, PRIX FINANCIERS	9.04		
VALEUR AJOUTEE AUX PRIX FINANCIERS	-0.94		
TCR			
PRIX A LA FERME	9.53		
ECHANGEABLES, PRIX FINANCIERS	10.63		
VALEUR AJOUTEE AUX PRIX FINANCIERS	-1.10		
NON ECHANGEABLES AUX PRIX FINANCIERS			
TRAVAIL FAMILIAL	0.00		
TRAVAIL SALARIER	1.68		
CAPITAL	1.85		
TERRE	0.12		
NONECH TOTAL	3.65		
BENEFICE NET (Dh/kg) TCO	-4.59		
BENEFICE NET (Dh/kg) TCR	-4.75		
BUDGET DE PRODUCTION A LA FERME			

POULET DE CHAIR AVEC TVA GRANDE EXPLOITATION BENSLIMANE	UNITE	QUANTITE	PRIX D'ACHAT	PRIX HOR TAXE	DEPENSE FINANCIERE	TAXES (SUBVENTIONS)		COUT ECONO- MIQUE
						Echang.	Nonchang	

TRAVAIL								
JOURNALIER	JOUR	750	30	30	22500	0	0	22500
SPECIALISEE	JOUR	200	60	60	12000	0	1440	10560
GESTIONNAIRE	JOUR	80	260	260	20800	0	0	20800

POUSSINS D'UN JOUR								
VIVANT	#/AN	64800	3	3	162000	0	0	162000
COUT DE MORTALITE	5 %	3240	3	3	8100	0	0	8100

AUTRES INTRANTS								
LITIERE	DH/Tt	63179	0	0	5686	-126	66	5746
COUTS VETERINAIRES	DH/Tt	63179	1	1	32221	-6444	322	38343

ALIMENTS								
ANTI-STRESS	KG	22952	3	3	78588	20580	2261	55747
DEMARRAGE	KG	70585	3	3	217515	56961	6259	154295
CROISSANCE	KG	423510	3	3	1259774	329898	36249	893628
FINITION	KG	147587	3	3	429537	112483	12360	304695

ENTRETIEN ET EQUIPEMENT								
PETIT MATERIEL AVICOLE								
ABREVOIRS		120	10	8	1200	168	54	978
MANGEOIRS		120	29	24	3480	486	157	2837
ELEVEUSFS		12	550	462	6600	922	298	5380
GROUPE ELECTROGENE		0	30000	30000	7500	750	300	6450
PUIT		0	50000	50000	7500	550	650	6300
FUEL	T	2	1876	1876	3751	1825	0	1926
GAZ	Bt	126	35	35	4410	2822	0	1588
NETTOYAGE ETC...					280	14	0	266

FRAIS FINANCIERS								
COURT TERME: ALIMENTS, POUSSINS					64665	0	7760	56906
LONG TERME: MATERIEL AVICOLE, EQUIPT					56210	0	6745	49465

CHARGES INDIRECTES: AMORTISSEMENTS								
MATERIEL AVICOLE								
PUIT					3550	496	160	2894
GROUPE ELECTROGENE					941	69	82	790
BATIMENT					1054	105	42	906
TERRE	HA	0			44214	442	-265	44037
					2000	0	0	2000

SOUS PRODUITS								
FIENTE	KG	259200	0	0	25920	2826	1272	21822

COUTS TOTAUX A LA FERME MIL/DH				2430	519	73	1837	
COUT NET DES PROD. VIVANTS MIL/DH/Tt				2404	516	72	1815	
RENDEMENT	KG/Tt	2						
COUT UNITAIRE NET TOTAL A LA FERME (VIVANT) DH/KG (AVEC TRAVAIL FAMILIAL)							17	143

DISTRIBUTION/FRAIS GENERAUX (FERME-GROSSISTE)								
TAXE MARCHÉ DE GROS (DH/KG)				0	0	0	0	
TRANSPORT	DH/KG KM	15	0	0	0	0	0	0
MARGE GROSSISTE	DH/KG				-6	0	-6	1
COUTS UNITAIRE TOTAUX DE DISTRIBUTION DH/KG						0	0	00

COUTS TOTAUX INCLUANT PRODUCTION								
DISTRIB. NIVEAU GROSSISTE	DH/KG				12	4	-6	14
BUDGET DE PRIX DE REFERENCE								

POULET DE CHAIR AVEC TVA GRANDE EXPLOITATION BENSLIMANE	UNITE	QUANTITE	PRX D'ACHAT	PRX Hor Taxe DIRECT	DEPENSE FINANCIERE		
CALCULE PRX CAF							
PRX FOB SPOT	\$/TONNE	1043					
FRET ET ASSURANCE	\$/TONNE	104					
AJUSTEMENT PAR FACTEUR DE TRANSFORMATION			75%				
AJUSTEMENT PAR FACTEUR DE QUALITE		0					
PRX CAF	\$/TONNE		1147		1147	0	0
TAUX DE CHANGE OFFICIEL	DH/\$		9				
PRX CAF EN MONNAIE LOCALE	DH/T		9752		9752	0	0
PRX CAF EN MN LC. AJUSTE	DH/T		8045		8045	0	0
CHARGES DE LIVRAISON, PORT-DETAILLANT							
MANUTENTION	0.5% C&F	40		40	0	4	36
PEAGE	0.4% C&F	32		32	32	0	0
FORMALITES DOUANIERES	0.1 C&F	8		8	8	0	0
COMMISSION D'ACCREDITIF	1.25% C&F	101		101	0	0	101
COMMISSION D'IRREVOCABILITE	1.25% C&F	101		101	0	0	101
COMMISSION CONFIRM. BANQUE	1% C&F	80		80	0	0	80
COMMISSION CAUTION	2% C&F	161		161	0	0	161
DESARRIMAGE	0.2% C&F	16		16	0	2	14
STEVDORING	0.3% C&F	24		24	0	2	22
ACCONAGE	0.9% C&F	72		72	0	7	65
SURVEILLANCE	0.3% C&F	24		24	0	0	24
MAGASINAGE	2.5% C&F	201		201	0	20	181
COUTS FINAN. 2 SEM. STOCKAGE	1.25% C&F	101		101	0	12	88
TAXES PORTUAIRE TOTALE	136% C&F	10942		10942	10942	0	0
PRX SORTIE PORT	DH/TONNE	19848		19848	10982	47	8819
TRANSPORT PORT MARCHÉ DE GROS	DH/TONNE	125		125	35	8	83
TRANSPORT MARCHÉ DE GROS FERME	DH/TONNE	19		19	5	1	12
PRX DE REFERENCE CAF, EQUIV. GROSSISTE (DH/KG)		20		20	11	0	9
PRX DE REFERENCE CAF, EQUIVALENT FERME (DH/KG)		20		20	11	0	9

Tableau 7
EQUILIBRES RESSOURCES - EMPLOIS DES FOURRAGES
SUPERFICIE (EN HECTARES)

	BOUR	IRRIGUE	TOTAL	JACHERIE
1969	69600	27000	96600	
1970	61250	30145	91395	
1971	58582	33657	92239	
1972	52556	37578	90134	1779500
1973	46120	41956	88076	1593000
1974	39222	46843	86065	1641300
1975	31800	52300	84100	2097400
1976	37376	53264	90640	1800000
1977	43445	54245	97690	1836100
1978	50042	55245	105287	1973600
1979	57212	56263	113475	2150400
1980	65000	57300	122300	2218200
1981	61624	56729	118353	2498700
1982	58371	56163	114534	2610700
1983	55235	55603	110838	2137100
1984	52212	55049	107261	2334400
1985	49300	54500	103800	1966600
1986			129400	1051800
1987			129900	1841900
1988			145300	1585200
1989			159100	1649800
1990			164600	1699900