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English

TECHNICAL ASSISTANCE TO THE MINISTRY OF INDUSTRY

UP/UGA/83/001

UGANDA

Technical report: Assistance in improving the performance of
Uganda Animal Feeds Ltd.*

Prepared for the Government of Uganda
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of A. W. A. Burt, animal feed adviser

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Vienna

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M. Farah/ps
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SUMMARY

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Nature: Technical Report

Title: Technical Assistance to the Ministry of Industry

Length: 58 pages

Type of Document: Restricted, Original English

Scope: Assistance was given to Uganda Animal Feeds Ltd in the improvement of its organization and production.

Conclusions: A consultant in Animal Feed has assisted, following a series of split missions, Uganda Animal Feeds, Ltd. in the technical and management performance improvement of the operations of the mill. If implemented, the recommendations are expected to result in the increase of animal feed products, upgrading of quality, and increase in capacity utilization and productivity.

Backstopping: M. Farah, Feasibility Studies Branch

<u>TABLE OF CONTENTS</u>	<u>Page</u>
INTRODUCTION	1
GENERAL MANAGEMENT	2- 4
STAFF TRAINING AND DEVELOPMENT	4 - 9
FEED MILL - Product Quality	9 - 10
Duties of the Nutritionist	10 - 12
Buying Raw Materials	12 - 13
PRICING OF FEEDS	14 - 21
Raw Material Supply	22 - 26
PRODUCTION MANAGEMENT - Major present and	
Potential Bottlenecks in Production	26 - 27
Scheduling Production	28
Security	28
Maintenance of Feed Plant	29 - 32
Immediate steps to improve plant output	32
Future Development of the Plant	33 - 34
CUSTOMER SERVICE AND MARKETING	34 - 35
PROPOSED UNIDO EQUIPMENT CONTRIBUTION TO U.G.M.	36 - 44
FUTURE PROJECT REQUIREMENTS AND CONSULTANCY	44
RECOMMENDATIONS	45 - 47

APPENDICES

1. Analysis of phosphate samples sent to U.K. by UFL
2. Note on visit to Kibimba Rice Co.
3. Notes on report on market for cattle feeds - Western Region
4. Notes on growing wheat in Uganda for U.G.M.

INTRODUCTION

This visit was the second part of this 3 part project which began in June 1986. The consultant was based at Jinja from January 21st until March 9th, having had to extend his mission in order to provide further inputs of nutritional expertise to train staff taking over from the suspended senior nutritionist.

It is very pleasing to record the progress made by Uganda Feeds Ltd since June 1986. At that time, production was running at 400-450 t/m and was planned to rise to 10,000t/y or 830t/month during August 1986 to July 1987. Production during the 6 months August '86 to Jan. '87 averaged 720t/month for a total of 4316t. In February, following the introduction of a second shift, monthly production rose to 1167t.

The introduction of this second shift coincident with the visit of the Consultant was extremely useful in highlighting difficulties which arise when output is substantially expanded, thus allowing some potential solutions to be considered and discussed with management. This report considers the requirements to further expand production to around 20,000t/year.

Because of these and other issues which needed immediate attention, the Mission paid little attention to Marketing. In spite of output almost 3X that of last June and substantial price rises in November, February and March, the output of this plant has yet to exceed demand for its products, which still leave the mill practically as soon as they are produced. We have no statistics on which to base any real estimate of the ultimate requirement for feed, but believe that saturation of the market will not occur before the output of this plant reaches its present apparent practicable maximum capacity of 25,000t/annum.

In the short term, one may expect a drop in demand for broiler and chick feeds from April onwards because of current difficulties with one of the major local hatcheries now closed due to a disease problem, and due to a current lack of foreign exchange for imported D.O.Chicks. Demand for layers feed, which is the biggest single product line, is likely to be far less affected.

Apart from the immediate problems associated with increased production, raw material supplies, formulations and pricing, the Consultant spent some time

considering general management factors which affect Uganda Feeds Ltd as part of Uganda Grain Milling Co Ltd.

The Consultant believes that his final mission late in 1987 or early in 1988 will be devoted largely to marketing strategies and the longer term development of the feed business.

GENERAL MANAGEMENT

UGM, including Uganda Feeds, has made very substantial progress since 1984. The essential ingredient leading to this has been the appointment of a very tough and determined General Manager, who has pulled the Group together and brought it out of its previous slough of slackness, inefficiency and financial ineptitude. The GM is backed by a good Financial Controller who has got the accounts up to date (in 1983 they were 3 years behind). The very marked improvement in the attitudes of the whole organisation reflect the influence of these two people. They are, however, somewhat overloaded with work, principally because of weaknesses in management lower down the organisation. This is partly because, historically, it was absolutely necessary to take firm central hold of an ailing mismanaged organisation in order to pull it together. Now, however, the time has come for unit managers to take their responsibilities properly. In general, this is not yet happening. The Consultant has the impression that managers would rather write a memo than communicate personally and properly with their colleagues about immediate difficulties which obstruct production. Their attitudes are too defensive. The first priority of a production manager is to keep production going. There are signs that this is not yet fully appreciated by the managers concerned. Examples of irresponsibility, lack of attendance to company business, poor communication and failure to properly carry out those responsibilities with which they are charged are rather common. We do not doubt that the substantial efforts being made by top management to improve the performance of unit managers will bear fruit and overcome the hangover of attitudes which developed in the days when production was low and effort was perhaps relatively unimportant.

The G.M. carries the responsibility for coordinating and ordering all imported materials, arranging for relevant pro formas to be received and progressing these supplies. This is a very sensible arrangement, although the situation would be improved if those managers responsible for stocks of spare parts etc made themselves and the G.M. aware of the forward position in sensible time for orders to be placed. On occasion, e.g. see Mill Hammers elsewhere, there has been a gross failure to do this, leading to emergency air lifting of supplies to keep production going. The Consultant has rendered some assistance to improve contact between UGM and some of its overseas suppliers. Since such business is enhanced by personal contact, it would be beneficial if the G.M. made a short visit to the UK where much of the supply of spare parts and premises emanates, in order to establish and improve such contacts with suppliers.

Finance and Buying

At present, the Financial Controllers department, in addition to its usual functions, is responsible for stores and store management and also for all buying of local raw materials and parts. He is overloaded by having to deal with many such suppliers in addition to his normal duties, which are thereby disrupted.

We recommend that UGM should establish a separate Buying Department, charged initially with the local purchase of all raw materials and spare parts under appropriate guidelines. This would be a considerable improvement on the present system where the work of mill managers, the Financial Controller and even the G.M. is interrupted by suppliers demanding discussion of their offers. Such people would rapidly learn that the buying department was the sole point of access within the Group, with consequent benefit to the progress of other parts of the operation.

The Financial Controller formerly worked for the East African Development Bank and had no direct experience of Financial Control in a Production Complex before joining UGM. He would benefit substantially from a short working visit to a similar complex in the UK to study the methods of Financial Control and Stores control applied in integrated groups involved in wheat and animal feed milling.

The Group wants very much to benefit from the study of its accounting and record systems currently being carried out by the Financial Analyst associated with this UNIDO project.

Organisation of the Group

UGM group, covering wheat milling, animal feed and maize milling, is a highly integrated operation with central management and financial control, marketing and personnel functions. Its use of raw material is also integrated, e.g. purchase of maize for maize flour and animal feed, transfer of wheat milling and maize milling byproducts to animal feed. The storage of raw materials on the Jinja site is also coordinated to make maximum use of the total storage facility for all three businesses, and the movement of raw materials is handled by gang labour and transport also available to the whole site. It would be senseless and practically impossible to split this operation into separate companies. The result would be (a) excessive overhead costs; (b) chaos; (c) gross inefficiency. We strongly recommend that no action be taken to split the group into separate companies.

Rewards to Staff and Labour

Following our last report, these were substantially improved in late 1986. However, one must note that this improvement is being eroded by the rapid rate of domestic inflation, although that proportion of rewards provided as payment in kind is effectively inflation proofed. At that time, management wisely linked payments to attendance and production, and this system is now settling down reasonably well. One or two anomalies, such as payments for Saturday shifts, remain to be ironed out, and are being attended to by management.

STAFF TRAINING AND DEVELOPMENT

Feed Mill

Plant labour is trained on the job including the skilled operations of grinder man and pellet press operator. The Grinder man is 2/IC of the shift after

the shift foreman. These two grades and higher supervisory grades have attended courses for supervisors which are run by Management Training & Advisory Centre in Jinja about once a year. It is the regular policy of U.G.M. to send candidates on such courses who have either just been promoted to supervisory grades or who are about to be promoted. This policy seems to be entirely sensible and there seems to be little reason for UNIDO to interfere with or contribute to this basic training.

The problems arise in the higher management grades. There are a number of middle management personnel in the plant and head office and elsewhere in the Group. For instance, the Feed Mill middle management consists of one Assistant Nutritionist (currently on a course in Holland), one Plant foreman and one Production Controller, and the supporting staff of one Statistician (Records Clerk?) and one secretary. This grade of personnel was recruited in the past with different qualification requirements than those for higher management. Today recruitment to this grade includes a proportion of graduates as a matter of policy. Appropriate selection, induction, training and development should therefore over time develop a number of people capable of adequately fulfilling the requirements of unit managers. U.G.M. management are interested in making this happen, but have encountered problems, some of which will now be discussed.

1. Quality of and Attitudes of Graduates - The experience has been that these are often not good enough. This reflects the ingrained social attitude that graduation is a passport to a comfortable and not very taxing job. Graduates in Uganda are not unique in showing this attitude. They have to be taught that properly run industry is taxing, challenging, tough but rewarding. U.G.M. Group has acquired a

substantial reputation because of its success. Perhaps this could be exploited by Senior Management taking time to talk to students at Makerere about the realities and challenges of industry. At the same time efforts might be made to provide temporary vacation employment to selected undergraduates in appropriate disciplines such as Science or Commerce to give them direct experience of the Company, and U.G.M. management an opportunity to assess their quality as future potential recruits.

The opportunity might also be taken yearly for several Managers in the Group to spend a day at Makerere giving preliminary individual interviews to interested candidates for future or current vacancies. U.G.M. could and should contribute to enhancing the knowledge and quality of future graduate recruits for itself and for the rest of industry in Uganda.

2. Selection Selection interviews are notoriously difficult. Experience is inevitably lacking, character difficult to judge and knowledge of the candidate relevant to the vacancy often non-existent. Nevertheless U.G.M. management as individuals should continually strive to improve their selective judgement. This will happen over time, as the fruit of hard and bitter experience.
3. Induction and In-house Attitudes After recruitment, not all graduates will turn out to be satisfactory and a proportion will always have to be dismissed at the end of their probationary period. However, individual members of management must ensure that the recruit is properly treated, is being clearly instructed in his duties and responsibilities and is allowed to carry these out under proper supervision. Sometimes Unit Managers or Supervisors will re-act adversely to having to train a deputy or assistant who may be better qualified or brighter than they are, and

will make every attempt to frustrate the man's progress. Such a happening is a substantial failure in his duty on the part of that Manager or Supervisor and should be treated as such. Senior management will have to get across the message that the development of the abilities and potential of recruits is an essential part of a manager's duties.

4. Management Development Potential unit managers need to acquire the technical skills necessary in that unit e.g. become fully qualified flour millers. They also need to gain proper supervisory experience within the unit. When this has been done they need to be positively presented with knowledge of the specific duties and priorities of a Unit Manager and finally to acquire some experience of taking over the duties of a Unit Manager under supervision. Only then can they be considered potential temporary replacements for Unit Managers and would then have to finally prove themselves capable of carrying out the task when such a situation arises. The most important portion of management training is carried out on the job, and training is an important part of the duties of Unit Managers.
5. Appraisal A formal system of yearly appraisal is in place, but the Personnel Manager does not regard this as being fully developed because of lack of training of Managers in appraisal. Because of all the problems previously faced by the U.G.M. there is not yet any list of potential candidates for development
6. Overseas Training It has been the general experience of U.G.M. that those Managers, who have at some time during their careers spent a period overseas, have benefited from exposure to the attitudes, working practices

etc. of other countries, and are better Managers in consequence. Short periods of work experience/training overseas are therefore recommended in future for those who are rising in the Company and are very likely to become Unit Manager.

7. Present Proposals for In-house Training Present top management take a deep interest in the further development of management staff and have taken positive steps to improve this. An in-house management course was conducted by local (East African) consultants last year and management propose to follow this up by a seminar conducted with the same consultants reviewing the progress that has been made and discussing the problems that remain. Management also propose that the problems being encountered in the accuracy and validity of performance appraisals conducted by Managers on their subordinates should be tackled by a short in-house course on performance appraisal provided by the same organisation. We strongly support these proposals.

Further Specific Requirements

1. Foreign exchange to cover the cost of correspondence courses from London for 3 trainee millers.
2. The personnel Manager feels a need for a systematic survey of training needs to be carried out by an outside body ? U.N.I.D.O. The Consultant however, believes that most of the problems will be capable of solution by management action within the Group, and their use of local (East African) based consultants.
3. There is a specific requirement to provide a short period of training overseas for the superintendent of the proposed laboratory (see separate Laboratory section) say 3 months at T.D.R.I., another feed laboratory and equipment suppliers, in order to obtain experience in the use of the

equipment for the proposed laboratory and training in laboratory management elsewhere.

4. Training of Managers in performance appraisal is best covered by a local short course in-house.
5. The Feed Mill Manager, Mr. Joshua Nabende, would benefit from exposure to the working practices of feed mill managers elsewhere. We recommend that he be provided with U.N.I.D.O. support for a 3-4 week working visit to a U.K. feed mill which might include a course for 1 week on feed mill management if the timing were right. The consultant will investigate the possibilities further on his return to the U.K.
6. Reference has already been made to the need for a short-term (3-4 week) training visit by the Financial Controller, Mr. Lee-Ogong, to enable him to study methods of financial control and stores control applied to a similar integrated wheat milling/animal feed group in the U.K.

FEED MILL

Product Quality

Product quality has been improved over the past year, principally because, following the visit of the consultant in June, greater attention was given to the provision of adequate supplies of fish. Unfortunately, for various reasons, satisfactory supplies of oilseed cakes were not obtained, so that practically none was available in December and early January. The position was somewhat improved in February following the measures taken to improve buying, which are described elsewhere in this report.

One difficulty with product quality has been the performance of the former Senior Nutritionist (see below, but the major difficulty is the irregularity of premix supplies, due to 'hiccups' in the provision of foreign exchange and failure of Kenya suppliers to keep their promises.

This situation led to reduction in the inclusion of premix to less than optimum levels, which the consultant had to re-inforce on arrival.

Premix inclusions were still below optimum when he left, because otherwise some feed would have had to be manufactured with no premix, while other feed contained the correct amounts.

We recommend that:-

1. The Central Bank be requested to provide foreign exchange for premixes in one lump sum annually to be drawn on as required, since premixes are perishable and have a shelf life of 3 months. The sum required for premixes for 20,000 t/year would be around \$100,000.
2. That U.F.L. purchase its premixes from reputable European suppliers. Locally available premixes are very expensive and of poor specification compared with those from reputable European suppliers. Supplies from Kenya are manifestly unreliable because of failure to obtain export permits from the Kenyan Authorities even when the foreign exchange is available.

The Duties of the Nutritionist

The Plant Nutritionist should be responsible for the following:-

1. Keeping all formulations and costs up to date, according to the procedure laid down.
2. Adjusting formulations according to forward estimates of raw materials supply and transient shortages caused by delivery failures.
3. Checking the cost of each formulation according to the target formulation cost tied to current selling price and alerting management to any significant overage (1/2 or amount to be laid down by management).
4. Adjusting raw material prices monthly to agreed levels to cover stocks and purchases to be delivered during the next month.

5. Checking weekly, the raw material cover available to the plant and making the necessary adjustments to formulations.
6. Reporting monthly through the Mill Manager's monthly report on the approximate length of cover given by current stocks of major difficult raw materials, at current formulations and expected production rates.
7. Liaising in all these matters with those responsible for the purchase of raw materials.

Following his mission in June, the Consultant expected that formulations would be reasonably up to date on his arrival in January. This was not the case. Most of the current formulations being manufactured were backed by no calculations of their composition and were below the specifications for nutrient requirements set up by the Consultant on his previous visit. It was evident that the current formulations had been derived by ad hoc substitution and not by proper calculation, and that, compared with the time elapsed with the previous consultancy, the amount of nutritional calculation which had been done was negligible. The Senior Nutritionist had not properly grasped the nutritional principles and priorities which have to be borne in mind when making ingredient substitutions. The Senior Nutritionist had not carried out the duties expected of him and the Consultant was involved in considerable reformulation and the almost immediate preparation of a new price list. The Assistant Nutritionist was away on a study course in Holland.

The Senior Nutritionist was suspended indefinitely for disciplinary reasons, to do with matters other than his nutritional work, on February 24th. 1987. The Consultant therefore extended his mission by 10 days in order to assist the Mill Manager and a temporary assistant acquire the necessary knowledge to keep formulations going until the return of the Assistant Nutritionist in May 1987.

The Consultant will be available for consultation by telex meanwhile and it is hoped that he will receive a short visit by the Assistant Nutritionist prior to the latter's return to post. Management have suggested that this be re-inforced by a very short visit by the Consultant in about early July to check on formulation and product quality.

Buying Raw Materials

This is a very important function in animal feed manufacture. Its purpose is to ensure the correct flow of materials to the plant at the most economic price, taking account of storage facilities, formulation and output and the seasonal supply of the individual materials. Up until now, the Uganda Feeds Ltd., requirement for raw materials has been largely supplied by wheat offals on site, maize, and maize bran from the Uganda Grain Milling Co.Ltd. mill at Kawempe, which together have accounted for some 70% of total raw material requirements. At outputs of 2000 to 5000 t. feed per year from 1983 to 1986, the purchase of the remaining 30%, excluding imported materials, while not going smoothly has generally been accomplished. However, we are now planning to raise production to 20,000 t/y. The supply of wheat offals is unlikely to increase above about 2500 t/year and will therefore not be more than about 10% of total production. Some of the shortfall may be replaced by increasing amounts of maize bran and broken maize from Kawempe and whole maize, but these materials must be balanced with additional protein which means that the proportion of oilseed cakes in the product must increase, or more expensive fish must be used. In short the total amount of local protein sources must increase. A first estimate of the quantity of oilseed cakes required is over 300 t/month.

The system of purchase of such materials has for many years been essentially passive, relying on sellers of oilseed cakes approaching the plant and Uganda Grain Milling Co.Ltd. management, and upon direct contact with oil mills in Jinja. This system of purchase is no longer adequate and was failing to acquire a sufficient flow of oilseed cakes to the plant. A principal reason for this was that no single person was charged with the responsibility of finding and acquiring oilseed cakes which was shared between plant management and the Financial Controller. Secondly, such a system failed to respond quickly enough to price changes in the market place to ensure a continuous flow of material. When Uganda Feeds Ltd., offered a price for a material which was rather high they got an excess, when it lagged behind the market they got none. After discussions between the Consultant and Senior Management, the Assistant Financial Controller, Mr. Juma Kabugo, was given responsibility for actively seeking out and purchasing oilseed cakes within guidelines laid down by the Financial Controller. The Group as a whole lacks a buying department separate from financial control and we recommend:-

- a) That this system of purchasing oilseed cakes, the feed plant be extended to cover all local feed materials other than maize (which is an overall Uganda Grain Milling Co.Ltd. purchase) i.e. Nkejje, Cassava, Limestone etc.
- b) That this change in approach is regarded as the foundation for establishing a buying department within Uganda Grain Milling Co.Ltd. (see P3 above)

Previously too many people have had an involvement in purchasing materials for the feed plant. It is essential that suppliers learn to deal with one person who is in a position to take rapid decisions. The person undertaking this responsibility must, of course, collaborate with his colleagues and they with him in matters of needs, supplies, stocks and usage, so that a smooth efficient flow of material is achieved.

PRICING OF FEEDS

Costs of Raw Materials

Raw material costs are subject to a high rate of inflation like everything else in Uganda, fuelled by a restricted supply and substantial unsatisfied demand. In consequence the quarterly price rises applied to the products of Uganda Feeds Ltd. have been very substantial e.g. an average of 33% in early February, following a price rise in November last. It has not yet proved possible to adopt the policy of monthly price increases suggested in our last report. In consequence, if the correct margin is applied in the new price this can be very rapidly eroded by inflation in raw material prices during the 3 month period, so that margins are very much reduced by the end of the period. A further difficulty has been that full formulations including ingredients costs have not been kept up to date. We must repeat our earlier recommendation that a policy of monthly price reviews based on current formulations and raw material costs projected for the next month should be adopted as quickly as possible, thus reducing the amount of the price rise and keeping margins reasonably constant.

(Prices were raised again on March 2nd by 47% for main line feeds following the adoption of some of our recommendations).

Pricing Raw Materials

Raw materials are usually priced into feeds at what they are expected to cost. e.g. anyone preparing a feed price list in the U.K. for the forthcoming month would use prices at which they were currently acquiring materials. The Uganda Feeds Ltd. system until February 1987 showed an undue attachment to historic cost. This means that in a period of rocketing raw material prices the money actually earned by the incorporated raw material at its historic cost into feed, failed to cover the replacement of that raw material, often

by a substantial margin. We therefore recommended, and the recommendation was adopted, that the raw material costs used to compute formulation costs for the preparation of price lists should be current rather than historic, thus hopefully allowing the sale of these materials in feeds to cover most of the cost of replacing them.

Transfer Price of Wheat Bran and Pollard

These are currently costed into feed at 4/- and 6/-/kg. respectively, that is they are essentially free raw materials. This value was adopted in 1983 when the total raw material costs of a feed was around 18/-/kg. This produces severe distortions in the price of finished feed. When all feeds contain substantial amounts of these materials they are being subsidized at the point of sale by a considerable amount. Furthermore the amount of subsidy varies from product to product e.g. cattle feeds are subsidised more highly than broiler feeds. Again as output rises and the average inclusion of bran and pollard is reduced, so will be the element of subsidy. The distortions enter into the market place, where cattle feeds produced by Uganda Feeds Ltd. are relatively cheap and the whole of the product range is subsidised. This policy of pricing bran and pollard in feed at practically zero cost should cease. We recommend that these materials should be priced at their approximate value in real terms as sources of nutrients in feeds, thus:-

- a) Allowing these materials to earn their real value to the organisation and
- b) Formulation raw material costs not to be subject to violent fluctuation due solely in the level of inclusion of bran and pollard.

At a first attempt at a simple way of fixing the value of bran and pollard, the following formula could be used:-

Bran = $0.486 \times \text{Price of cotton Seed Cake}$

Pollard = $(0.421 \times \text{Price of Cotton Seed Cake}) \times 1.5$

At present prices with Cotton Seed Cake @ 530/-/kg., the values are

Bran 257/- and Pollard 335/-/kg.

These are based on the value of protein in bran or pollard being similar to that in cotton seed cake, while the energy value of pollard is 50% greater than either bean or cotton seed cake. (This recommendation was adopted for the March 2nd price change).

Cost of Premises

Premises have to be purchased with hard currency. We repeat our earlier recommendation that they should be priced at the market rate of exchange.

Cost of Spare Parts

These are essential to keep the mill in production and incur hard currency cost. For example a current pro-forma covering a reasonable stock of spares and some refurbishment of existing plant e.g. getting the second grinder back in commission, amounts to some £134,000 or 2680/- million at current market rates of exchange (20,000/- = £). Applying this cost to one years future production of 20,000 tonnes gives a charge of 134/-/kg.feed. This charge must be compared with current raw material costs per kg. of feed ranging from (Feb.1987) 220/- to 503/- and production and packing charges of 116/-/kg. It is clear that production costs must rise substantially to cover the full costs of a proper supply of spare parts to keep the mill running at its greatly increased output. We recommend that a realistic figure be included in the costing at the earliest possible moment to cover the costs of a continuing supply of spare parts and that this addition should be above 100/-/kg.

Depreciation and Replacement/Extension of Machinery and Fixed Equipment

In 1985-86 the accounts of Uganda Feeds Ltd. appear to include no allowances for depreciation or obsolescence or any contribution to a replacement reserve. This appears to be totally unrealistic. The mill machinery is 20 years old

and a substantial and progressive programme of replacement and extension will be needed over the next 10 years if production is to continue to expand. For example, outline proposals exist to uprate the mill to a nominal 20t/h. computer controlled facility by 1996 at a total cost of £825,000 for imported milling machinery, to which must be added fork lift trucks and sundry building work to accommodate the new plant, thus a round figure of £1 million is not unrealistic. A realistic initial output for such a plant would be 40,000 t/y. i.e. over twice present production rates. Depreciation and amortisation @ 20% per year would amount to £200,000/year or £5/tonne on an output of 40,000t. or 100/-kg. at current market rates of exchange. That a further substantial charge of some kind will have to be carried in the feed price to cover such replacements and for expansion of output.

Finance and Effects on Feed Pricing

It is true that this mill, thanks to its substantially increased output, has been turned around from loss to profit. However, the author feels very strongly that its feed prices are too low by a substantial amount because:-

- a) Price increases lag behind inflation.
- b) 30-40% is priced as being free (wheat offal)
- c) There is no allowance for the real costs of imported spare parts.
- d) There is no real provision for depreciation and replacement

He regards this as a dangerous long term financial weakness of this Company, which should be corrected progressively over the coming year. It arises because the local costs of feed ingredients and finished feed are very low in international terms e.g. raw material cost of broiler mash £25 or \$38/tonne in February 1987 compared with about £140/t. in U.K., while imported spare parts and machinery can only be purchased at international prices.

(A good start to correcting this situation was made in the price rise of March 2nd)

Price of Feeds and Price of Animal Products

The apparently insatiable demand for feed reflects the fact that formulated feed from the Jinja Plant is cheap compared with the value of the animal products produced with it, so that the animal producer can make very substantial profits if his operation is reasonably efficient. This means that substantial price rises have practically no effect on demand and that middlemen make substantial profits as selling agents for Uganda Feeds Ltd. There appears to be no reason why this Company should not substantially increase its margins to cover the real costs outlined above and to begin to build the financial base necessary to ensure its own future. This feed mill is not in place in order to subsidise animal production in Uganda at the expense of the Mill's own future or to fight a lone and inevitably losing battle to reduce the rate of inflation in food prices.

Such substantial price rises would also have the effect of bringing feed demand more in line with supply, which will eventually have to happen as the supply of feed ingredients and the demand for animal products are not likely to continue to expand indefinitely. It is true that such a pricing policy carried to extremes provides an umbrella under which competition may shelter, but they also have the problem of purchasing, and paying for imported equipment, and the earlier Uganda Feeds Ltd. starts the process of accumulating the necessary financial reserves, the less its impact on prices need be.

General Points on Accounts

In 1985-86 Uganda Feeds Ltd. made a profit after many years of losses. This profit (before tax) amounted to 12% of sales. In gross terms it amounted to 116.8m/- or £5,850 or \$ 8,750 at current market exchange rates. This amount is minute compared with the future foreign currency capital needs of the business.

Calculation of Margins

We recommend that a system of a basic standard margin/tonne or/kg. of feed produced be applied to the raw material cost to give the selling price rather than the present system as it would be simple and more realistic.

A method of arriving at such a margin is given below:-

Calculation of a Standard Margin/kg. Feed

1. Add sack costs/kg. to raw materials.
2. Omit standard % raw material losses from calculation but monitor month by month actual loss. Include a sum within monthly costs to cover this.
3. Monthly (from budgeted, adjusted for actual cost changes) :-
 - a) Direct costs)
 - b) Administrative expenses) as in existing budget
 - c) Spare parts - annual budget for imported spares, updated for real cost of forex divided by 12
 - d) Depreciation, amortisation and plant replacement
 - e) Estimated raw material losses and bad debt provision
4. Margin - for profit and etc.

Convert total of 2. and 3. to a margin/kg. finished feed, according to budgeted tonnage output expected. Adjust these margins for individual products e.g. increase for pelleted feed because of manufacturing cost, increase for specialist diets which should have greater care taken e.g. broiler, pig creep, and reduce slightly for run of the mill products e.g. layers compleat and dairy meal.

(N.B. Pelleting feed reduces rate of output in present system by 50%).

Overall Effect of Suggested Changes in Pricing Policy

The attached sheet gives some indication of the effects upon the costs and selling prices of layers compleat of some current increases in raw material

prices, additional costs of sacks, proper pricing of bran and pollard and proper allowance for spare parts and plant replacement. The increase in selling price indicated is 70%. This is the sort of exercise which should be contemplated to get the financial future of this feed plant on a sound footing.

Taxation and the Utilisation of Cash Reserves

Such a pricing policy would substantially increase the apparent profits of Uganda Grain Milling Co.Ltd., because of:-

- a) Increased returns for bran and pollard
- b) The substantial provision for replacement

The author is not familiar with the local taxation system, but it seems likely that unless this, as it should, allows a substantial provision for depreciation, obsolescence and replacement before striking the taxable profit then substantial sums of tax would become payable. Initial investment allowance of 20%, followed by substantial depreciation of historic values seen a grossly inadequate provision in times of high inflation. A system of allowing the whole of capital expenditure on plant and machinery against tax in the year of investment would be an improvement and is recommended.

Any money being set aside for plant replacement or other future spending should be immediately invested in physical assets which would inflation-proof the sums involved.

Present and Cost of Layers Compleat and
Selling Prices Revised (| - | kg)

	<u>£</u>	<u>Old Cost</u>	<u>New Cost</u>
Maize	30	105 (@ 350)	180 (@ 600)
Pollard	10	1 (@ 6)	34 (@ 335)
Bran	21.2	1 (@ 4)	54 (@ 257)
Maize Bran	15	38	38
Lime	7.5	21	21
Premix	0.3	47 (@ 15,600)	120 (@ 40,000)
Bone	0.2	1	1
Cassava	5	14	14
Fish	7.5	135 (@ 1800)	135
Soya	3.0	27 (@ 900)	27
Salt	0.3	<u>4</u>	<u>4</u>
		<u>394</u>	<u>628</u>
Existing Margin		265	265
			29 2000/gunny (Additional cost of sacks)
			100 (Provision for Spares)
			100 (Provision for real depreciation and re-equipment of mill)
Selling Price		659 (Feb.1987)	1122
		Current	Projected
			(Paired to 890/- 2/3/87)
			+ 25% increase in raw material prices due to changes in formulation structure due to raw material supply - see Raw Material section)

Raw Material Supply

This has changed since the last report, in that the supply of oil seed cakes in total is not keeping up with the increased output of the plant. In particular, for various reasons, no supply of cotton seed cake was available to the plant from December to February, the supply of sunflower is very sporadic due to trouble in the production area and the supply of soya bean cake is very limited. Maize and wheat and maize offals are relatively plentiful, and indeed, a substantial proportion of the formulation has been made up of wheat offals. In future this will change since the output of wheat offals is 200t/month and the planned future output of animal feed is now approaching 1800t/month, so that the percentage of wheat offals in the feed must fall to be replaced by maize and oil seed cakes.

The supply of local dried fish has been relatively favourable. It has had to be included at considerable expense to in part replace oil seed cake. This situation will continue in future. The table attached shows a rough projected raw material supply likely to be feasible for production at the rate of 20,000t. ear.

It is based upon the following factors:-

1. The total supply of wheat offals and maize bran within Uganda Grain Milling Co.Ltd. will only provide 15% in total of the formulation.
2. Sunflower is not likely to be regularly available for some time and only limited amounts of soya. The shortfall will be made up by fish.
3. Cassava will remain plentiful.

The main consequences of this are that:-

- a) The inclusion of maize will rise to about 50% of most poultry formulations giving a total demand for maize of about 10,000t/year.

- b) Cassava will continue to be used to the nutritional limits imposed upon the formulation, in spite of its effects on demand for protein, in order to spare the maize requirement.
- c) Every effort must be made to find other materials e.g. rice bran etc. to reduce the requirement for valuable wheat offals in cattle feed and to spare these for pig and poultry feed.
- d) Every effort must be made to increase supplies of oil seed protein thus sparing expensive fish. One does not know whether over 1500t. Nkejje will be available (125t/month).
- e) Because of the change in the structure of the formulation and charging properly for bran and pollard, formulation costs must rise substantially. In particular, increased use of maize at its higher price will have a substantial effect.

Approx. Raw Material for 20,000 t. Layers Compleat Meal (New Formula)

		<u>Availability</u>
Maize	10,000	?
Pollard	1,000 Restricted	1200 (ex-UGMC)
Bran	1,000 Restricted	1200 "
Maize Bran	1,000 Restricted	980 (ex-Kawempe)
Lime	1,000	? OK ?
Bone /DCP	100	OK ?
Salt	100	? OK
Cotton Seed Cake	1,600	? Doubtful
Nkejje	1,500	?
Soya	200	Probably covered
Cassava	2,000	OK ?

NB a) Soya, fish and oil seed requirements higher than this for

Chick and Duck and Broiler, hence estimate of protein requirement minimal

b) The more oil seed cakes found, the cheaper the product, because of the replacement of expensive fish.

c) The estimate of protein requirements although minimal, amounts to 1600 t. of protein (8% of layers formulation) and can be spread in various ways:-

e.g.		<u>t. Protein</u>	OR	<u>t. Protein</u>
Soya	1000t. @ 45% =	450t	200t =	90t
Nkejje	1000 t @ 60% =	600t	1500t =	900t
Sunflower	1000t. @ 20.6% =	206t	-	-
Cotton	1000t. @ 38.5% =	<u>385t</u>	1600t =	<u>616t</u>
		<u>1641t</u>		<u>1606t</u>
		Crude Protein		Crude Protein

? Through-put currently expected at Kawempe:-

100t maize/week @ 20% offals = 20t/week = 80t/month
 = 960t/year maize bran + broken maize to Jinja.

New Layers Compleat (Revised according to likely Raw Material Supply)

	<u>%</u> <u>Present</u>	<u>Cost/Kg.</u>	<u>%</u> <u>New</u>	<u>Cost/kg.</u>
Maize	30	350	* 50	600 *
Pollard	10	6	* 5	335 *
Bran	21.2	4	* 5.2	257 *
Maize Bran	15	250	5	250
Lime	7.5	280	7.5	280
Premix	0.3	15,600	0.3	40,000
Salt	0.3	1,300	8.0	1,300
Cotton Cake	-		8.0	530
Soya	3.0	900	1	900
Nkejje	7.5	1,800	7.5	1,800
Cassava	5	280	10	280
Total Cost	393		713	(+ 320/-)
	(Current price list basis Feb. 1987)			

N.B. * Change

If the revised formula is costed using old raw material prices, its price is 474/-/kg i.e. (+ 81/-)

25% of the rise is due to the enforced changed in formulation structure by raw material supply, remainder due to raw material price changes.

Behaviour of Suppliers

Some suppliers are totally unreliable and dishonest and are a principal cause of failure to obtain adequate supplies of oil seed cake. A prime example are O.K. Oil Mills of Jinja, who when given money up front to supply cotton seed cake on a contract, have kept most of the money and then sold the produce for cash through their mill gate. Given a re-negotiated contract at a much higher price, to bag cotton seed cake in U.G.M.C. gunny sacks for collection by Uganda Feeds Ltd., they have immediately started selling the bagged produce for cash. O.K. Oil Mills is managed by Ms. S. Angoma. The behaviour of such people is a disgrace to Uganda and a major cause of difficulty to those relying upon them to keep their contracts.

PRODUCTION MANAGEMENT

Major Present and Potential Bottlenecks in Production

The initiation of a second shift and increased output to well over 1000t/month has revealed certain weaknesses which can be readily corrected.

1. Raw Material Supply - This has been dealt with elsewhere. Supplies are just adequate to maintain production but could become critical as production rises.
2. Plant Maintenance/Spare Parts - Until the next major delivery of spare parts which is probably at least 6 months away and which should enable the second grinder to be run, the plant is on a knife edge and its production would be stopped by a major breakdown at any time.
2. Movements of Raw Materials - The plant inputs are all in the form of bagged raw materials. Loading/unloading gangs have to offload those delivered directly to the plant by road and rail and also to load and unload maize and wheat offals which are stored on the flour milling

site across the road and are lorried into the plant. In addition they have to offload soya beans for grinding in the small maize mill prior to loading the ground material for transfer to a local oil mill and then reloading the finished soya cake. In addition there is a frequent requirement to load other materials stored off site and oilseed cakes from other local oil mills. The system is not keeping pace with the load placed upon it at the higher levels of production now current, or the demands placed upon it following the introduction of the night shift, which means that gangs which are on day shift have to move 24 h. supply of raw materials. Too frequently materials are exhausted by the end of the night shift and the start of the day shift production is delayed until raw materials have been loaded, hauled and unloaded into the plant. It seems likely that this problem may well require the addition of 1 lorry (hired) and 1 gang for its resolution. The standard of supervision of the gangs moving materials could also be improved.

It would be a major step forward if it were possible to rehabilitate or replace the main plant weighbridge, because at the moment all in-coming raw materials from outside Uganda Grain Milling Co.Ltd. have to be weighed on platform scales by individual bags or pairs of bags which greatly slows down the unloading process. If it were possible to weigh delivery lorries before and after unloading this would save considerable time. We recommend that management immediately takes up the question of weighbridge rehabilitation or replacement, which would have a noticeable effect on the speed of unloading.

4. Moving product to the finished product store raises a minor bottleneck frequently occurring towards the end of the day shift. At that time

the finished product store gang are overwhelmed by customers waiting for the vehicles to be loaded with finished product and have to concentrate their full attention upon that task so that clearance of the mill has to await the end of sales at 5 p.m. or even until the start of the night shift

5. Scheduling Production - There has been a pleasing move away from too frequent changes in the product being produced to longer production runs for storage. It is hoped that this trend will continue as production increases. A further improvement would be to schedule production each morning for the whole of the day and night shifts.
6. Security - Gunny sacks are now worth 6000/- each and one tonne of feed about 1 million/- Security could be and is being improved. The following suggestions should be considered:-
 - a) Ensuring that entrances to the plant are subject to a Security Guard at all times.
 - b) Taking great care to ensure that all batches of feed manufactured are recorded.
 - c) Ensuring that records of raw material stock and usage, which are available, are used every month to determine actual stock losses, within the limits of accuracy of these records.

This determination is essential if management is to know the size of the problem which confronts it. The only possible counter to a situation where the temptations are so great is to determine the loss and progressively tighten the system.

Maintenance of the Feed Plant

Currently this is very poor and sluggishly executed. At the higher rates of output now expected production will be grossly and continually interrupted by major and minor breakdowns unless the standard and rate of execution of maintenance work is dramatically improved. The following points are of importance:-

1. On Wednesday mornings the mill is out of production for weekly maintenance. The schedule for repairs should be prepared the previous day and everything organised for an immediate start. Too much time is lost by late starts and long meal breaks.
2. Jobs are unnecessarily extended into the afternoon, thus preventing the resumption of production sometimes until the night shift. This appears to be due to poor overall supervision and to the fitters expecting their assistants to do practically all the work, whereas the assistants should be there to assist the fitter.
3. It appears that workshop staff are reluctant to work in the feed mill and much prefer the wheat mill.
4. Where the workshop is itself responsible for maintenance e.g. balancing mill hammers and repairing screens, such work is neither successfully followed up or progressed in spite of continual pleadings from feed plant management. On at least one occasion the grinder ran with badly worn hammers for 2 days while awaiting supply and installation of a new properly balanced set. At times the workshop has installed unbalanced hammer replacements thus threatening severe damage to the grinder bearings and a major breakdown.

5. With the inauguration of a night shift primarily to make pelleted cattle feeds, the supply of steam becomes important. On occasions no steam is available because the boiler man has been working on the day shift and in any event when he starts his night shift at 6 p.m. no steam is available for pelleting before 9 p.m. so that 3 hours production has to be devoted to the production of mashes.
6. It has only just been realised by the workshop staff that an old plant which is now producing at nearly 10 times its 1983 level and 4 times the level of early 1986, must need more maintenance time and effort than earlier maintenance schedules provided, or breakdowns will inevitably occur.

We recommend:-

1. That immediate serious consideration be given to the points raised above.
2. That a change to maintenance work on Saturday might be considered, although this is perhaps a secondary issue and it might be better to schedule additional maintenance at that time.
3. That consideration be given to employing one Chargehand fitter and one Electrician on the day shift in the mill, working in positions of medium level responsibility in production. In the event of breakdown, they are then in a position to immediately tackle the problem, they would soon get to know the mill intimately and they would enjoy the unskilled assistance of their milling colleagues. This system is practiced successfully in numerous mills elsewhere in the world.
4. There must be a list of routine maintenance actions which are carried out daily or weekly in addition to repair and responsibility for supervising these must be clearly defined. A marked improvement in the standard and speed of maintenance and repair is essential. The standard was appalling when

the Consultant arrived and was still in the same state when he left in spite of discussions and exhortations etc.

5. A workshop supervisor should be appointed, who is a mechanical engineer.

Other Relevant Issues and Individual Plant Items

Grinder - The rate of wear of hammers and screens is very high. Hammer wear is accelerated by the abrasive nature of some of the raw materials used, such as crushed limestone and lake shells. The supply of grinder hammers was down to 4-5 weeks in mid-February due to lack of warning from those responsible for stocks of these and arrangements were put in hand to air freight some hammers from the U.K. in order to keep the mill running. Lack of bolts has delayed elevator repairs. The control of stocks and their replenishment on time is appalling. Grinder screens are also a major problem. Screens are continually being repaired by welding in pieces of old screen. Very often, the piece welded on has holes of smaller diameter than the original, creating a pressure build-up which tears through the original screen around the welded patch. New screens are reputed to be being fabricated locally but there appears to be serious delay in this actually being achieved. The situation is becoming increasingly serious as the repaired screens have an average life of 24 hours.

Apart from abrasive materials there are problems with tramp metal. The replacement of the main magnet was discussed with the Simon Barron representative on February 26th, as the old magnet was completely worn out.

The boiler badly need its annual overhaul. With only one boilerman the pelleting process can only be run on one shift. It currently takes 3 hours to raise sufficient steam to start running the pellet press so that production of pelleted feed is only possible for part of one shift. If the proportion of pelleted feed continues to rise it is probable that a second boilerman will be needed.

The crusher used to crush limestone has an output which is not sufficient to keep up with the needs of the plant. The use of ready ground limestone produced locally should be investigated.

Immediate Steps to Improve Plant Output

These were discussed in depth with the visiting Simon Barron representative on February 26th with the following conclusions:-

1. The existing plant with repair and good maintenance has a maximum capacity of around 30,000t./year. This limit is set by the mixer cycle time. The vertical 1 tonne mixers need 10 min. per mix, so two mixers with filling and emptying time can handle 5 mixes (tonnes)/hour, giving a capacity of 48t/8h shift or an absolute maximum of 150t approx./24 hour day. $150t. \times 200 \text{ effective working days} = 30,000 t.$
2. The capacity of the present grinder is reduced because it is driven by a rewound motor. The general experience of Uganda Grain Milling Co.Ltd. is that locally rewound motors begin smoking if run at normal current loading (10% below maximum rated capacity) For reasonable life of the rewound motors, local experience dictates that they be run at 20-25% below normal loading. This drops output by a similar proportion. The existing second grinder in the plant has never been used since it was new in 1972, and a new motor is included in the pro-forma for spares which has just been submitted. It is proposed to change over the grinders, ultimately providing the plant with an effectively new grinder with a new motor which should noticeably improve output, and to set up the second grinder to pre-grind some raw materials as well as acting as an emergency spare grinder to the plant.

3. **Pre-grinding Raw Materials** - certain raw materials, particularly Nkejje, and local cassava pieces, obstruct the flow of material to the grinder. Others, such as shells and the limestone currently in use, cause excessive grinder wear. It is proposed to use the second grinder to pre-grind these.

5. **Flow of meals after mixing** - in the 1970s the second pelleting machine was installed, presumably to convert the whole of the output to pelleted products. The present material flows are set up in such a way that all the meals, which are by far the greatest part of the output of the plant, have to pass through the kettles of the pelleting presses and hence by a circuitous route to the existing packing bins which each hold less than 1 tonne. These packing bins are provided with semi-automatic weigher fillers which are suitable for pellets but one rather slow for meal. It is proposed to provide an additional conveyor line to take meals from the mixer direct to the sifter and to install two suitable packing points for meals with a larger holding bin. The replaced packing points will be used to pack pre-ground materials from the second grinder.

Apart from the present pro-forma for spare parts sufficient to keep the mill running and to enable the second grinder to be run, a further pro-forma is being prepared to cover parts for allowing the second grinder to be used to pre-grind raw materials and to remove the limitations to packing meals.

Future Development of the Plant

Outline proposals to replace existing equipment with modern equipment capable of producing at 20t/hour and ultimately computer controlled have been put forward by Simon Barron. This programme would take 8 to 10 years to complete and would cost £0.8million sterling at present prices.

The first stage in such a programme would be to replace the existing hand weigh and tip system with a modern blending plant handling and automatically weighing raw materials in bulk, batch by batch. A proposal for this was discussed and is being prepared by Simon Barron. The quotation will include some storage and blending bins which can be filled from a bag tip. This development would substantially reduce the amount of labour involved in getting materials into the mix, and improve the accuracy of proportioning.

When this proposal comes forward it should be considered principally in the light of its effect upon the output and economy of the existing plant. The possibility of the complete replacement of the existing plant with a 20t/hour plant over 10 years requires much more detailed consideration. The cost £ 0.8 million, plus fork lift trucks and building works etc. (say £1 million) begins to become comparable with that of a new 20t/hour plant on a green field site. Should one make this investment in the existing plant or build a new mill elsewhere or in Jinja while merely obtaining spares and replacements to keep the old mill running.

We recommend that a full feasibility study be carried out at a later stage to enable the correct decisions to be taken with regard to long term expansion of the production capacity of Uganda Feeds Ltd.

CUSTOMER SERVICE AND MARKETING

At the moment the marketing effort is very small, as the time of this department is largely occupied in allocating limited supplies of feed to customers. Comments on one market survey are included in the Appendix. This persists even though production is now much higher than formerly. Most of the feed produced disappears from the finished product store within 24 hours. Major difficulties arise with finished product loading out which is almost

entirely concentrated in the second half of the afternoon. Ostensibly this is because the finished feed available at the end of the night shift has to be allocated to purchasers by the marketing department in the morning. The purchasers then have to obtain their drafts from the bank, return to the plant and obtain payment certificates and invoices before the feed can be loaded. This system needs considerable improvement. Customers should be encouraged to book feed orders in advance for collection on particular days and when they have done so, no effort should be spared to ensure that this reserved production is available in the store and not allocated to someone else on the day of collection. The longer term answer to this problem is more production, but meanwhile we feel that priority should be given to regular farmer customers, particularly those running larger units, who should have priority in feed allocation over agents. In the long run the foundation of Uganda Feeds market are these larger better managed animal units, who will never be prepared to pay agents mark-up in order to obtain regular supplies of feed. These people should therefore be looked after.

In the longer term, more attention will have to be given to the development of a Technical Service to customers in support of feed supply. This aspect will be considered during the next mission.

REVIEW OF THE PROPOSED UNIDO EQUIPMENT CONTRIBUTION TO
UGANDA GRAIN MILLING/UGANDA FEEDS LTD.

The tripartite review of this project decided to support UNIDO financial assistance to provide the following equipment:-

Laboratory	§ 30,000
Fish Drying Equipment	§ 20,000
Microcomputer	§ 10,000 (including contingency for maintenance, probable computer cost substantially less.

Total provision of § 60,000

This section of the report reviews the relevance of this equipment provision item by item and suggests detailed amendments to the proposed provision.

1. Fish Drier. Price FOB Antwerp 2,225,000 B.Fr.

The proposed fish drier is a thermostatically controlled machine subjecting fish to gentle drying in an air flow at 27°C and up to 50-55 RH.

This drier is designed to produce human grade dried fish and appears to be unnecessarily complex and slow.

The intention was to use this machine to dry Nile Perch, which are large fatty fish readily available locally, to supplement supplies of Nkejje. The machine does not appear to be likely to be successful in doing this, its output would be inevitably slow and expensive and the material produced would probably be too oily for sensible storage and use.

We recommend that this provision be deleted.

There may, however, be a need to consider the utility to Uganda Grain Milling Co.Ltd. of obtaining a more robust drier at a later stage to dry local raw materials e.g. spent brewery yeast and/or to process the fish

mentioned above. Before this is contemplated, it should be the subject of a proper feasibility study covering supplies of material, type of drier, costs of drying and processing, use of end products and overall economic costs/benefits to the Group.

2. Computers

In the long run one can see several applications for computers in the Uganda Grain Milling Co.Ltd. business e.g.

- a) Process control in the feed mill. This has been mentioned by Simon-Barron in their letter of 7th January 1987 to the General Manager. It is significant that while they suggest any major replacement of units in the feed plant should be capable of future computer control, they suggest, and I agree, that the actual installation of computer control is at least 10 years away.
- b) Formulation of animal feeds. Elsewhere computers are used at two levels in doing this - namely simple formulation and least cost formulation, and in some instances stock and raw material control, but the latter is relatively rare even in developed feed industries.
 - i) Simple formulation can be done using microcomputers and a domestic television, indeed the author operates such a system, using the computer to take away the laborious process of calculating the composition and cost of any formula and allowing very quick calculation of formula modifications and relatively rapid production of a final formulation reflecting specification, raw material supply constraints and cost. As with all formulation calculations, however carried out, the end result depends upon the skill of the person carrying out the formulation. A number of mills in the U.K. still use this system. Its merits and demerits are as follows:-

- 1) It is simple and can be readily replaced by hand formulation in the event of a breakdown.
 - 2) Adjustments can fairly easily be made to take account of raw material supply.
 - 3) With the right programme, formulations can easily be repriced. Its principal disadvantage is relative lack of effectiveness of least costing and slower speed compared with a full least cost system. These disadvantages are minor (a) when the system is run by a skilled nutritionist (b) when applied to mills with a restricted spread of raw materials - where opportunities for exploiting full least cost formulations are inevitably limited and can in any event be practically achieved by the skill of the nutritionist.
- ii) Full least cost formulations are now possible using the larger microcomputers e.g. IBM PC and its clones. In fact the feed consultant is setting up such a system as soon as he returns to U.K. In the hands of a skilled nutritionist such a system:-
- a) Calculates the least cost formulation of a particular feed from the cost and analysis of the raw materials available.
 - b) Puts indicative values on all the raw materials offered i.e. a range of costs within which they would be included in the formulation, including those rejected on grounds of cost.
 - c) Shows the costs imposed on the formulation by the most expensive nutrient constraints e.g. the cost of the last 0.1% available P is x/-/kg finished feed thus informing the nutritionist about the additional cost incurred by meeting the specification level of particular nutrients.

d) Gives the same information about the costs incurred by raw material constraints e.g. maximum bran % 30% if increased to 35% would save x/-/kg. on cost of finished feed. However, the practical use of such a system in mill management demands considerable experience. For example the constraints applied to the inclusion of certain raw materials in a given feed must always reflect the nutritional requirement e.g. maximum cassava for layers 10%, but must also reflect supply constraints, or be adjusted to take them into account. For instance, it is little use knowing that a least cost cattle feed would contain largely wheat bran with cassava and cotton seed cake if two of these three are in very limited supply. Furthermore, the least cost formulation must be modified into a practical production formulation as the quantities e.g. 15.863% cotton seed cake, are not precisely applicable to production.

Having laid out some of the potential uses of computers in animal feed formulation we can consider if and how they can be applied to Uganda Feeds Ltd., and the restrictions which are likely to interfere with their use.

First, it is clear that, with no constraints, a company producing 20,000 t. feed/year can make good use of a small computer dedicated to feed formulation. The constraints are as follows:-

First, the nutritionist needs to gain more in depth experience of feed formulation by using existing methods and needs to gain a greater understanding of the formula structure and interrelationships and

which nutrients are crucial, because unless this happens, the computer - which is mindless - tends to take over and begins to produce stupid results. This can be overcome by proper progressive application by the nutritionist to the present system. (To be reviewed when the present nutritionist returns from his course in Holland).

The major and possibly presently insuperable constraint, is the lack of back-up and supporting computer service in Uganda. In Europe and the U.S.A. computers are part of the culture. Hardware (machine) supplies and replacement parts are generally readily available as are the very skilled people who can diagnose faults and repair equipment.

Software (computer programming) services are also available so that if difficulties are encountered e.g. malfunctions of a programme, they can be rectified within a reasonably short time. Computers in feed mills do malfunction on occasions and quick easy access to such back-up services is vital to maintain their operation. Such services are relatively expensive in Europe. In Uganda they do not appear to exist.

Supposing one installed such a system in Uganda Feeds Ltd., back-up, repair and support services could be extremely expensive in foreign currency, and would probably take a very long time to arrive.

- c) Knowing the problems which have beset companies in the developed world attempting to install computerised accounting systems, one would hesitate to recommend that such a system be installed in Uganda Grain Milling Co.Ltd. for some considerable time to come. The first requirement is a satisfactory system which has been shown to operate satisfactorily elsewhere in similar circumstances. Secondly appropriate

hardware and software back-up must be available as for the other applications mentioned above. Finally computer staff must be very numerate and able to work very accurately. As far as one can see, none of these prerequisite conditions can yet be met.

Conclusion

1. The present nutritional calculations in the mill are not kept up to date to cover the frequent raw material supply changes. Mill staff must apply themselves more fully to this task to gain in depth formulation experience before the use of computers can be considered.
2. The Consultant should undertake some least cost formulation work on his own facilities for Uganda Feeds Ltd. during the next 6 months and send copies of fully documented examples.
3. The possible purchase of a micro-computer for full least cost formulation should be considered in the light of the back-up available. When this is satisfactory, the purchase of a robust micro-computer for feed formulation should be considered. Its delivery would be immediately followed by a working visit from the Consultant to train staff in its use.

3. Laboratory

At various times there has been proposals to provide a laboratory for the feed mill in order, principally, to analyse incoming raw materials and carry out quality control tests on the finished product. Indeed this suggestion was the subject of some discussion in our last report. It is plain that any laboratory in Uganda Grain Milling Co.Ltd. should provide for the whole of the analytical requirements of the Group and not only for animal feeds. In particular the wheat mill and bread plants have a substantial requirement for such facilities. This section attempts to set out the total analytical requirements and how they might best be met.

A. Wheat Milling and Bread

1. Protein (N) on grain and flour (as in feeds)
2. Ash on flours (as in feeds).
3. Moisture (as in feeds) and quick electrical conductivity test for incoming grain.
4. Bushel weight (already being done)
5. Hagberg falling number for milling wheat
6. Test milling of 5-10 kg. samples to estimate milling potential/ extraction rate.
7. Chittick Co₂ test on flours (gassing potential)
8. Colour test on flour - Kent-Jones colour grader
9. Dough testing - Chopin Alveograph or Brabender Farinograph.

B Feed Milling

1. Moisture
2. Oil
3. Protein (N)
4. Crude fibre
5. Ash
6. Lysine - Specialist analysis to be done overseas
7. Methionine " " " "
8. Calcium)
9. Phosphorus) Equipment for minerals somewhat expensive and complicated.
10. Sordium) Sample load probably not sufficient to justify initially.
11. Magnesium) Best done overseas. Pro.Tem. but price of equipment being checked.
12. Contaminants:- Gossypol in cotton seed cake, Trypsin inhibitor (urease test) in soya bean cake. Cyanide in cassava - specialist analysis best done overseas.

The minimum initial list would be most of that for wheat milling, plus Nos.1-5 on animal feed. Equipment for major minerals would be priced but the sample load probably does not justify its inclusion.

Probable Sample Load

Feeds - Initially monthly samples of current incoming raw materials plus special sample when supplier/source changes. Say 12 samples per month. Plus monthly samples of all main line feeds say 12 plus sundries say 3. Total per month 27, say 324 per year. Plus analyses of raw materials offered and customers feeds for advisory purposes etc. Total 350 plus samples/year.

Wheat and Flour

Wheat - 100 samples/year; flour 250 samples

Staffing - 1 Working laboratory supervisor plus 2 technicians.

Training - The supervisor selected will need to have a short intensive training on the individual pieces of equipment and also on laboratory organisation and management say 3-4 months in U.K. (? through TDRI?).

IT IS ESSENTIAL THAT THE PERSON SELECTED TO BE LABORATORY SUPERVISOR HAVE PREVIOUS EXPERIENCE AND THE ABILITY, CHARACTER AND PAINSTAKING HONESTY TO DO THE JOB PROPERLY. Otherwise the whole exercise is a waste of time and money. This person should be selected as soon as possible, so that they are trained and in place when the equipment is delivered.

First Proposed Site - Main laboratory in right hand unused offices in small pack area of wheat plant. Flour tests in existing test baking area

Civil Works - Design of structural alterations and benching etc. should be put in hand immediately. specialist advice will be needed and layout plans checked by a specialist who knows the proposed uses in detail.

Future Actions - Subject to approval by UNIDO of the expenditure involved, the Consultant will arrange for the listing and costing of the laboratory equipment as soon as possible, so that the necessary orders can be placed and the UNIDO funding made available.

Requirements of PAPCO

The requirements of PAPCO for chemical analysis were discussed with their Production Manager, Mr. Mindra. Apart from testing pulp and paper for tensile strength, thickness, porosity and smoothness, they require a microscope to examine the structure of the fibre in their pulps. This provision might be considered by UNIDO. All these tests are best done within the PAPCO plant.

Test requirements which might be met by the proposed Uganda Grain Milling Co.Ltd. laboratory are:-

- 1) Ash in starches - (already proposed for flour and feeds)
- 2) Colour of starch - presumably similar to colour testing of flour - already listed above.
- 3) Degree of gelatinisation of starch - not listed but might be useful for milling/baking.

PAPCO also require determination of the level of Arsenic in kaolin used for sizing. This may be difficult to include, but the possibility will be examined. It is understood that such a test can be done by a Government laboratory in Kampala.

FUTURE PROJECT REQUIREMENTS - CONSULTANCY

The following items are proposed as further requirements under this project.

- 1) Provision is needed for the cost of turning the list of laboratory analysis into a full list of equipment and supplies so that orders can be placed quickly.
- 2) The Consultant has undertaken to give tuition for 2 to 3 days in the U.K. to the present assistant Nutritionist following his present course on feed formulation in Holland, to attempt to ensure that he is fully conversant with the salient features of feed formulation in UFL for which he will be responsible on his return to Jinja.
- 3) UGM management have suggested, and the Consultant agrees, that there may well be a case for a very short mission in early July 1987 to ensure that formulations and product quality are satisfactory after all the changes in the personnel involved.
- 4) The last mission in this project of three main missions should be of 6 to 8 weeks duration in October to December 1987 or January to March 1988, by which time it is hoped that production will have risen to still higher levels and revealed further problems, particularly in marketing, which will require the attention of the Consultant.

RECOMMENDATIONS

We recommend that:-

- 1) No action be taken to split U.G.M. into separate independent companies.
- 2) That U.G.M. establish a Central Buying Department, separate from the Financial Controller's Office, to be responsible for the purchase of all local raw materials and other supplies.
- 3) That U.G.M. proceed with its proposals for in-house management training.
- 4) That U.G.M. takes positive steps, on the lines indicated in this report, to improve its graduate recruitment and in-house management development.
- 5) That the Central Bank be requested to provide foreign exchange for premixes in one lump sum annually to be drawn as required to prevent unmanageable variations in the supply of premixes with its consequent adverse effects on product quality.
- 6) That U.F.L. purchase its premixes from reputable European suppliers, avoiding the high price, poor quality and doubtful availability of other sources.
- 7) That buying local raw materials, other than maize, for feeds be made the responsibility of one person prior to the establishment of the Buying Department (already adopted in part).
- 8) That feed prices be based on current costs of raw material used not historic costs, because of the adverse effects on margins at high rates of inflation.
- 9) That feed prices be revised at least monthly for similar reasons (already adopted)
- 10) That bran and pollard be included in feed costs at their real value in order to avoid distortions in the market place, and between different types of feeds caused by using values of practically zero (already in part adopted).
- 11) That the price of feeds should include proper provision for the cost of imported spare parts.
- 12) That the price of feeds should include realistic provision for plant depreciation and replacement charges.
- 13) That the fiscal authorities should seriously consider allowing the whole cost of the purchase of new plant or machinery to be deducted from taxable profit in the year of expenditure occurred thus reducing the adverse effects of high inflation upon the real value of depreciation allowances.

- 14) That a system of standard margins/kg. of feed determined month by month be added to raw materials to arrive at selling price with variations for type of product, high quality v run of mill, actual production costs (pellets v meal) etc. (Already adopted in part)
- 15) That every effort should be made to improve the supply of oilseed cakes to the plant.
- 16) That considerable attention be given to improving the performance and reliability of the labour and transport involved in moving raw materials to the feed plant from within and around the Jinja site.
- 17) That high priority be given to rehabilitating/replacing the existing weighbridge in order to substantially reduce the labour required.in (16)
- 18) That drastic steps to be taken to ~~improve maintenance~~ of the feed plant including a properly supervised maintenance programme, stationing a fitter in the feed plant, improvement in the speed and standard of repair and maintenance, and the appointment of a mechanical engineer to supervise the workshop and maintenance staff.
- 19) That the future expansion of the plant v building a new additional plant, or other alternative means of increasing total feed output beyond the limits of this plant should be the subject of a full feasibility study before commitments are made.
- 20) That the system of allocating feed to purchasers should be revised to give priority to orders submitted in advance and to give priority to direct supply to the larger animal units.
- 21) That UNIDO should provide the following training inputs:-
 - a) A 3 month training course based at T.D.R.I. London, with extension to working in equipment supplies laboratories, for the Superintendent of the proposed laboratory as soon as he or she is appointed.

b) A 1 month Training Fellowship for a working visit to the U.K.

for the Feed Mill Manager, Mr. Joshua Nabende, to enable him to gain experience of the methods of operation of U.K. feed mills.

c) A similar 1 month Training Fellowship for the Financial Controller, Mr. Lee-Ogong, to enable him to gain experience of financial and stores control as applied to integrated wheat milling/animal feed operations in the U.K.

- 21) That the provision of equipment by UNIDO should be largely confined to that required for a laboratory for wheat milling, bread and animal feeds by UGM together with some of the requirements of PAPCO, that UNIDO should fund the small amount of work required to turn the proposals in this report into a list of items and prices, so that this project can proceed without delay. The provision of a small computer might be considered when the present systems are working satisfactorily, when the training and abilities of the plant nutritionist have been assessed and when it has been established that adequate services and back-up facilities exist in Uganda.
- 22) That the future consultancy inputs provided by this project should be:-
- a) A short visit (1-2 weeks) by the Consultant in late June/early July, following the return of the present assistant nutritionist from his training in Holland (if necessary).
 - b) Remaining full mission to be carried out in late 1987 (Oct.-Dec.) or early 1988 (Jan-March), plus continuing contact and support between missions.

1. ANALYSIS OF PHOSPHATE SAMPLES SENT TO U.K.
BY UGANDA FEEDS LTD. JANUARY 1987

Samples originally from Tororo - the results were as follows:-

	<u>Soil</u> <u>(Phosphate Rich)</u>	<u>Apatite</u> <u>Concentrate</u>	<u>Sugar</u> <u>Phosphate</u>
% Calcium	9.1	33.1	17.2
% Total P.	5.45	17.65	8.0
% Available P.	0.33	9.35	7.75

Fluorine (mg/kg):-

Water soluble	11		
Acid soluble		2480	1540

Only the Apatite concentrate appears to contain sufficient P to warrant further consideration as a source of P for livestock feeds. Its content of Fluorine is high however.

APPENDIX

2. NOTE ON A VISIT TO KIBIMBA RICE CO. BUGIRI 3-3-87

The Consultant visited this Government owned project with Mr. Joshua Nabende, Uganda Feeds Ltd., Mill Manager, and had discussions with Mr. Atwii, Manager of the Rice Mill about the possibility of obtaining rice bran from the project for use in Uganda Feeds Ltd.

The project produces about 3,500t. of Paddy Rice/year from 1400 acres, with crops being harvested in June/July and December/January. This yields about 280 - 300 t. of Rice Bran. Because there are no means of parboiling the rice or heating the bran, this material spoils very rapidly. A 20 kg. sample milled that morning and taken back to Jinja had begun to heat up by 6 p.m. In consequence they use most of this production for feeding to their own pig and poultry and direct sale to local farmers. They feed their own animals rice bran and maize with fish and soya beans etc.

There is a proposal to import an expeller in order to expel some of the oil from the bran as it is produced, but the annual output is relatively small and may not be sufficient to make this worthwhile. Daily production is also low as the rice mill only has a capacity of 1 t. white rice/h. They are proposing to add a dairy unit to their animal units.

There is little possibility in the area of the project of its production expanding as the additional water required is not available from the present dam. In consequence they are attempting to promote rain fed production of rice.

For the foreseeable future, no material from this source will be available to Uganda Feeds Ltd. but they should keep in touch since if a means were found to heat stabilise the bran and/or to expel oil from it, a usable product might be obtained.

APPENDIX

3. SOME NOTES ON THE REPORT ON MARKET FOR CATTLE FEEDS -
WESTERN REGION

This report prepared following a survey by the Marketing Manager and senior Nutritionist gives an excellent picture of the dairy cattle situation in 7 districts of Western Uganda. Its general conclusion is that a substantial market for cattle feeds in that region exists which is yet to be satisfied, and that a proportion of this market could be served from the Jinja plant. The following comments are made in the hope that they will help to improve the effectiveness of future similar studies.

- a) Quantities of feed required have been estimated by the team as being required in total for different areas and for individual farms in these areas, but there appears to be no clear statement of the method used to arrive at the estimated total feed market for any particular area. This is important as it would allow a view to be formed about the validity of the market estimate made by the team.
- b) The area generally suffers from a pronounced dry season. No attempt appears to have been made to estimate the effects of this on the demand for feed, that is the amount of seasonal fluctuation in the demand for total feed and the types of feed required. This is an important omission as it affects production planning.
- c) No consideration is given to the availability and price of competing feed materials e.g. the mixture of cottonseed cake and maize bran commonly fed, and to how far Uganda Feeds penetration into this market is likely to be limited by these factors. Such information is very valuable as an aid to determining the initial price and initial tonnages to be supplied to this market. This consideration should also include the local values of the relevant animal products e.g. milk and the ratio of these to potential prices of feed sold locally from Jinja mill in order to help to assess the effect of this feed on output and profitability.

APPENDIX

3. (Contd.)

- d) A little more consideration might be given to the technical aspects of the feeds required. For instance what are the principal mineral deficiencies of the area and whether or when energy or protein supply are the principal deficiencies, as this might affect the types of feed supplied and their formulations.

APPENDIX

4. GROWING WHEAT IN UGANDA FOR UGANDA GRAIN MILLING CO.LTD.

I have examined the various reports and documents on this, have had a discussion with the Acting Production Manager, and would like to make the following comments:-

- a) Actual wheat growing appears to be confined to high land areas in the West and Sebei in the East, and gives yields of 400 to 800 kg./acre. The cash price received by farmers appears to be relatively high compared with that of other grain e.g. 800/-/kg. August 1986 compared with 300-350/- for maize at Jinja plant. In spite of this vast price difference, wheat growing does not appear to have increased. This suggests that the crop can only be grown reasonably well in the higher, colder parts of the country.
- b) Partly because of a) above I am somewhat doubtful about the validity of the Sango Bay area scheme mentioned by DFCU in association with Magric(U) Ltd. From the map this area is swampy and right on the lake shore. At first sight it would seem to be more suitable for rice than wheat. Before investing in a pilot scheme for such an area, I would like to see a fully costed feasibility study properly prepared by a very experienced and reputable tropical agronomist. Such a study will deal with soils, climate, method and cost of land reclamation, alternative crop rotations, labour and machinery costs and returns etc.
- c) Quality of wheat produced. Wheat suitable for flour milling must command a higher price, with a lower price offered for the remaining wheat for animal feed. It is possible that only the milling category

4. (Contd.)

will be capable of carrying the transport charge to Jinja. It would be futile to purchase non-milling wheat at over 500/-/kg. and then transport it to Jinja to replace cheaper maize in animal feed.

d) Prices to be paid. A first estimate of these is :-

- i) Milling Wheat - to maximum moisture, maximum impurities and subject to a milling quality test (? Hagberg) and minimum bushel weight. Price equals imported wheat CIF Jinja cost converted at market exchange rate less transport from West and collection/grading costs.
- ii) Other Wheat - local maize free Jinja mill less 10% (nutritional value) (this can be debated, although energy value of wheat lower, protein content is higher) less transport and collecting charges. To be purchased on maximum moisture and maximum impurities.

Only a realistic and practical pricing system will induce the producer to strive to produce milling wheat of acceptable standard. It might be sensible to only purchase the produce of known varieties supplied by U.G.M.

- e) Use of the Kalengyere Highland Crop Research Centre - one should either talk this over with Nile Breweries, for wheat and barley growing experimentally and commercially and to act as a collection centre, and headquarters for the Officer in Charge of this scheme, or leave it alone. One would have to evaluate the cost, managerial inputs, labour, machinery etc. involved together with the total tonnage of wheat and barley likely to be made available by this scheme, and the short and long term economic benefits to both companies or Uganda Grain

APPENDIX

4. (Contd.)

Milling Co.Ltd. alone. In addition the scheme would have to be acceptable to the Ministry of Agriculture. The danger is that unless a full scale feasibility study, including a proper negotiation with the Ministry, is carried out then one will be merely wasting inputs with little prospect of any real return.

- f) Contract Purchases - it should be possible to provide selected seed on credit to registered growers, to be paid for when the crop is harvested and to contract at the time of planting to purchase the crop at minimum prices calculated as under d) above for milling and non-milling wheat. Should these prices move substantially between seeding and harvest, the contract prices could be increased to maintain the incentive.
- g) I cannot find anywhere in these papers any real estimate of the total quantity of wheat grown in these districts, that quantity which is likely to be available to Uganda Grain Milling Co.Ltd. now and in the future, or the relative cost and returns to the producer of growing wheat versus growing alternative crops. (Quantity now suggested to be of the order of 10,000 to 20,000 t/a).
- h) Finally, the whole subject needs more serious and detailed consideration than it has yet received. The first aim of this must be to estimate present and future supplies of wheat likely to be available to Jinja Mill at what price. If this outline looks reasonable then one should attempt to get down to the detail of some of the questions raised in this note.

APPENDIX

4. (Contd.)

i) Further discussion with the Acting Production Manager has revealed:-

- 1) That practically all the wheat presently available is soft wheat, although some small amounts of hard wheat are available in the West.
- 2) That the only quality tests currently available are moisture, impurities and bushel weights.
- 3) That the January harvest has just passed by without any further attempt being made to purchase wheat in the growing areas.
- 4) That he shares my doubts as to the feasibility of taking over the Highlands Research Centre.
- 5) Both of the wheat growing areas are adjacent to frontiers and across which wheat can be smuggled and traded for foreign currency.

CONCLUSIONS

1. Expansion of wheat growing is likely to be very limited.
2. Uganda Grain Milling Co.Ltd. most promising course would be to send someone to the growing areas at harvest to attempt to purchase quantities of wheat of suitable standard at the maximum price which could be sensibly afforded by Uganda Grain Milling Co.Ltd., taking account of collection costs and transport to Jinja. The offer of a good price and the rigid application of quality standards would help to rapidly educate the growers towards the production of the necessary quality.
3. It may well be that the price offered in local terms for smuggling to other countries is such that Uganda Grain Milling Co.Ltd. cannot sensibly

CONCLUSIONS (Contd.)

3. (Contd.)

compete, but this should be established not just suggested.

4. If 3) proves reasonably successful, the other more expensive measures mentioned in this note might be considered in more depth.