

Computers In Production Systems

Computer technology has a major role to play in the industry, both in the farm office and in the poultry house. But successful use depends as much on the attitude of the user as on the software program.

Poultry production is well suited to the use of computer technology and yet, the industry has been comparatively slow to adopt it compared to other sectors of agriculture. Its suitability stems from the fact that in many countries the industry revolves around large production units and can be an industry of both small and variable margins which can be influenced by management responses to circumstances. Consequently, there is often a need for instant data. 'Back-of-envelope' calculations are no longer good enough and modern computing techniques are so cheap and easy that there is really no excuse for failing to exploit them.

Traditionally, when considering computer technology it would be normal to think of the office micro, processing production information and statistics. This is certainly a significant and relevant application of such technology but more recently a new and exciting use of computers has come about, namely the micro-processor based control system for the poultry house. It will become apparent that the two can be linked together to provide the user with a sophisticated and cost effective management package.

Computers in the farm Office

Many farmers are sceptical about what a computer in the farm office can do for their business and yet others expect great things from it. There has been an increase in the use of computers with the development of word processor, payroll and general accounting packages. However, the use of computers for maintaining flock records is not particularly widespread.

There are some fundamental points which have to be made at the outset. Firstly, it is not the computer which is the most important thing but the software which is run on it and secondly, computers cannot really do anything that cannot be done by hand but, of course, can operate much quicker which consequently means that much more would be done by the average program than would be done by hand.

Processing flock information

In immediate problem when developing computer software for poultry farmers is producing a single package which will cater for the needs of all egg producers or poultry growers. It isn't feasible but as many as possible of the different requirements of end users must be accommodated. Consequently, a modular approach can be an advantage enabling people to start off with a basic package but allowing them to build-up modules as their requirements or business grows. A good software package should require only limited changes in on-farm procedures. It is inevitable that some will be necessary.

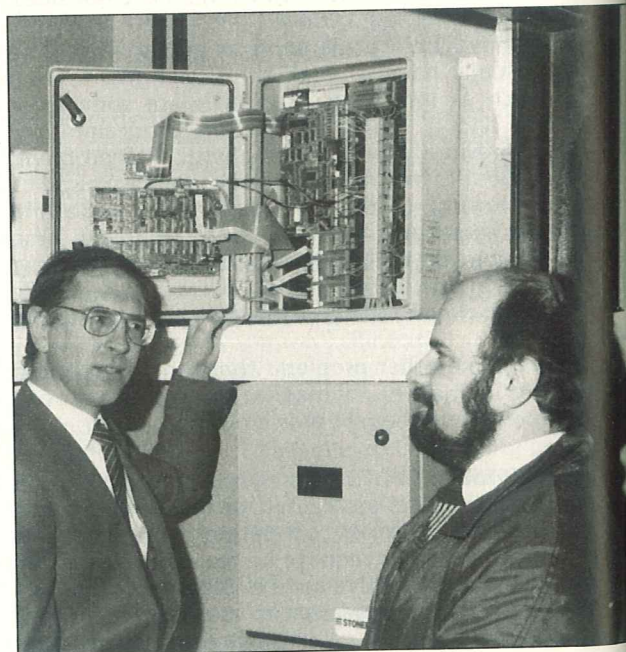
What is required from an on-farm computer?

The expectations of different farmers of what

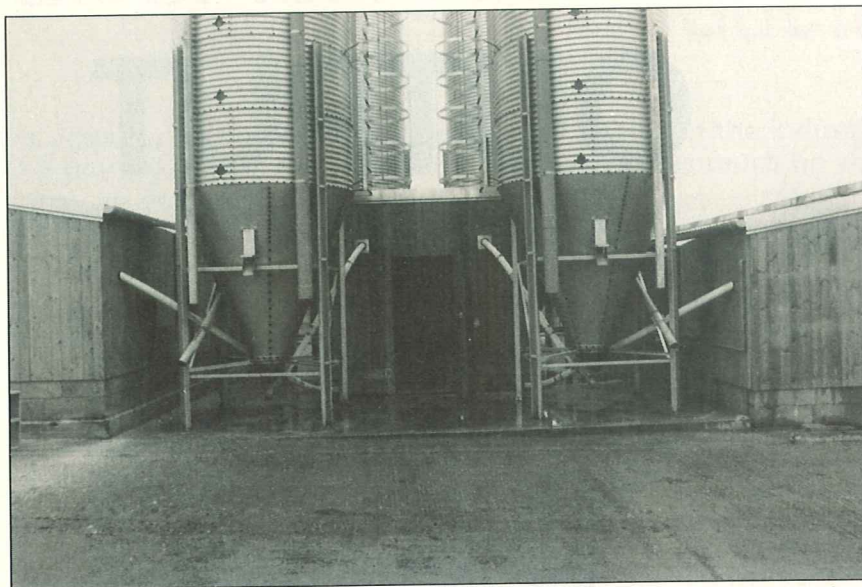
computer software can do for them varies. There are those who simply want to convert a simple manual recording system of flock performance to a slightly more sophisticated computer-based one and there are those who want a computer system which incorporates aspects of planning, forecasting and modeling. Both are possible. An enterprise of, say, 16 layer flocks, produces a lot of information to process by hand and keep up-to-date. Although it is possible to do this in terms of weekly performance of each flock, the analysis by hand of cumulative flock performance to date, including both physical and financial performance data, is more difficult. With a computer and the right software it can be done at the press of a button.

Therefore, a clear benefit of using a computer for data processing on a poultry farm has to be the ability to produce a full analysis of flock performance beyond just physical performance but including financial performance as well, not only for a flock but for the business or site as a whole. The farmer can establish the state of the business on a weekly basis.

If a computer is going to be used successfully for processing poultry records then the will to use it has to be there and a degree of discipline is essential. How many times has it been said that "I have not had time to process the figures this week"? It is true that this is more often the case with the smaller producer rather than the large production company but, in all cases, time should be allocated to do the task.



A small box on the wall can monitor and control the house and report back to the office micro.



Pictured above are twin feed bins for each poultry house located alongside the feed weighing cabin.



A combined feed weigher and blender which can service more than one house.

Information should be passed from the production or growing unit to the farm office for processing. A suitable data recording and input form is important and the computer operator should ideally have some understanding of poultry production so that obvious errors can be detected. The processed data should then be both filed and also passed to the manager in a summarised form to enable management decisions to be taken. If the operation is well organised then the results from six flocks could be easily processed in about half an hour.

Targets and performance

Computer programs can provide an opportunity for the user to set up targets for stock performance. Each week the system can compare actual flock performance with either the breeder's target or a company target on a weekly and cumulative basis. It is very easy to see if a flock has failed to achieve optimum production, egg weight or feed intake, for example, but to be of use, and what is important, a system needs to go beyond this basic step and provide a financial evaluation of any difference between actual and target performance. For example, a layer flock may be below target for egg production and feed intake but may be in a more profitable situation if the savings in feed cost outweigh the lost income from production.

The use of targets can go beyond this. A system can highlight a result in excess of an acceptable deviation from target but can also look at a pre-set management programme and produce prompts indicating that a change in light pattern or feed pattern is imminent or that a vaccination is due in the case of a grower flock.

In broiler flocks where depletion at the end of the growing cycle may be spread over a number of days, a computer programme can rapidly calculate overall flock performance by means of a staggered depletion module and compare it with a target.

Forecasting and planning

Computers come into their own in the way that they can be used for forecasting and planning. The value of

models in the commercial application may be questionable but forecasts based on actual flock information for an enterprise do have some use.

It is possible to predict future performance for a flock in terms of production and egg grades and to evaluate the effects of using an alternative light pattern. By having a micro in the farm office smaller producers can have the same flock forecasting capabilities as the larger produce packers enabling them to predict the balance between future egg supply and demand. Similarly, for the breeder flock owner, such software has a role in forecasting hatching eggs supply and consequently day-old chick availability.

In many countries around the world the successful management of laying flocks depends on exploiting the market at the time. That may involve manipulating management depending on feed prices and differentials between diet types and also egg prices and differentials between sizes. The use of computer technology with actual flock performance data can assist with the implementation of the correct management decisions.

Programs do not have to be sophisticated to yield great benefits. One egg production company found that by collating regular production and egg quality information on a computer, it was possible to identify factors which influenced downgrading and other egg quality characteristics. Changes in management could then be implemented to rescue the incidence of second quality eggs.

Graphics

There seems to be a degree of uncertainty about whether a graphics option should be included in software packages. There are those producers who believe that production graphs should be included and those who do not.

Those opposed to the inclusion of graphs say that by plotting information by hand the producer has to study the data properly rather than just filing it away.

On balance, the opportunity to produce graphs should be included in performance recording packages and important changes or deviations in performance should

be highlighted on such graphs. Graphical presentation of data can help with its interpretation and reduce the output of paper and now with the availability of sophisticated spreadsheet packages is comparatively easy and cost effective.

Dedicated processor based systems

The difference between a computer and a dedicated processor is basically that the computer can be made to undertake many functions by loading different programs on disk, whereas the dedicated processor carries out a specific function, which may involve many complex stages and the instructions to undertake the task are located in a chip. Chicken houses are not good places to put computers but processors can work well.

It is in the field of micro-processor based technology that the most exciting developments have taken place in the poultry industry. Such systems are now in use in large integrated broiler operations and are proving to be cost effective with a financial payback inside two years. This is the case even though the capital outlay is quite high.

The objectives of a dedicated processor system

The major application of these systems is in broiler growth. However, there is no reason why ultimately the technology should not be applied in layer and replacement pullet housing.

The objective of the broiler grower is to maximise the return on capital by optimising the combination of

nutrition and the climatic environment for a particular breed of chicken, strain or sex within a given set of economic conditions. How can the dedicated processor help?

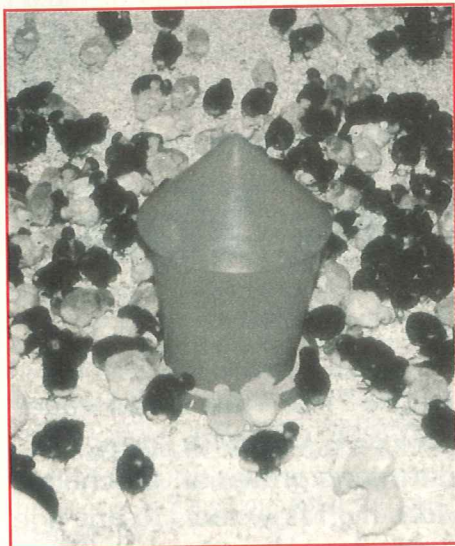
How does it work?

A unit similar in size to a conventional fan control box is installed in each shed on the site and these, in turn, are linked back to a micro-computer in the farm office. Farm offices across a number of sites can then be linked via modems and the telephone network to a central office or the company processing plant.

Target weight for age and equivalent target daily intakes of critical nutrients are set up at the start of each crop. Environmental targets for temperature, relative humidity and ammonia are also set for each day with the aim of achieving a predetermined feed intake profile.

A major advantage of a control system working in real time is that deviations from target performance, feed intake or feed composition that take place during the life of the flock, can be compensated for before any adverse result has long term permanent effects.

The controller in each house monitors the various sensors and weighers in the house as well as outside temperature and relative humidity. It then switches heaters (or coolers) or fans in conjunction with air inlets (or curtains) to maintain the predetermined environment. The operation of feeders and lights is also included. Manual override of the system must be possible.



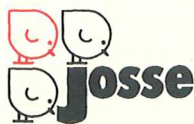
Start off their growth with

PIC ' ASSIETTE

The new starting feeding trough with a greater capacity

Easy to mount, dismount and clean. . .

START OFF WITH PIC ' ASSIETTE A HEAD START TO THE SLAUGHTER HOUSE GATE ! . . .



SOLE DISTRIBUTOR : ETS JOSSE

Les Quatre Vents - 35360 BOISGERVILLY - BP 36 - FRANCE

Tél : 33 99 06 46 97 - Fax : 33 99 06 66 12

siret : Rennes A 381 481 217 000

Circle No. 21 on Inquiry Card

The data are then downloaded to the office micro. This enables the site operator to see on simple graphs on the VDU how actual performance compares to targets. As well as bird weight and feed consumed, liveweight gain, feed conversion ratio, water intake and mortality are displayed. Percent deviation from target is shown as well as absolute values. Graphs showing actual daily nutrient intakes necessary for bird weight achievement can also be produced by the system.

The objectives, therefore, give the opportunity for much more detailed management of individual flocks, by providing concurrent management information. Simple analyses of actual versus target performance and clear messages are given if particular performance measures or control variable start to go off course. This information is therefore seen before serious consequences arise, and when there is still time for remedial action to be taken to achieve targets.

Relative humidity

Relative humidity can play an important part in broiler production, yet the number of broiler houses fitted with humidity control systems is still small, even in countries where it is a problem, leading to stock health and grading problems as a result of poor litter condition. The incorporation of humidity control into an overall control strategy is possible with a micro-processor based system and can lead to benefits although the optimum strategy may not yet be defined.

Feed strategy

It is the introduction of new approaches to feeding broiler chickens that are yielding substantial financial returns from these systems. The concept is based around on-site feed blending. It requires two feed bins/shed and a means of weighing and mixing the feed prior to distribution around the poultry house. This obviously involves additional capital expenditure but the extra cost is rapidly recovered. So how does it work?

In some European countries, one bin on each house is filled with one compound feed and the other with either whole wheat or a second compound feed. The weighing/blending device is linked to the system controller which can change the ratio of the products in the two bins at any time. The secret is to feed an optimum blend without reducing daily protein and other nutrient intakes below the birds' critical needs.

Nutritionists can define the average intake of lysine, methionine etc needed by a flock of birds for every day of their lives to enable them to grow at a given rate and to produce a final carcass of optimum type for the proposed market. Clearly the sex and breed of bird is important as well. Normally, nutritionists assume that a flock's feed intake profile will be typical. However, in reality feed intake is often not in line with breed company figures. For example, if stocking density is high birds eat less, particularly if they become crowded. If feeder space is inadequate, or feeders are too high, feed intake is reduced. If pellet quality is poor, feed intake can also be lower and in hot weather feed intake can drop by 20-30%.

In order to overcome all these problems, the controller can be set by the producer to deliver to the birds each day, the quantities of key nutrients defined in the nutrient intake profile. It takes the actual feed intake each day into account, calculates the diet composition needed to deliver the daily lysine required and then

works out the blend from the two feed bins to produce this diet composition. It then actions the feed weigher to blend this ratio to the birds, monitors and controls the blending process and finally produces a graphical report of actual versus planned daily nutrient intakes.

Effects on feed conversion efficiency

An ultimate measure of flock performance is feed conversion efficiency. In commercial use on integrated broiler sites, gains in FCR of at least 4% are being achieved. Table 1 shows results to 42 days of age from a commercial farm in the UK, comparing two houses each accommodating 36 000 birds under conventional management and control and two houses using a processor-based system including feed blending.

Financial evaluation

This type of equipment is expensive. However, based on the figures shown in Table 1, taking into account

Table 1: Improvements in broiler performance resulting from the use of a micro-processors based control system.

Characteristic	With micro-processor	Without micro-processor	Benefit
Liveweight (kg)	1.818	1.814	+0.00
FCR	1.78	1.88	-0.10
Mortality (%)	3.09	3.62	-0.53

savings in feed costs, a payback period of five crops is possible. In addition to the benefits shown in the table an increase in eviscerated carcass yield may also be obtained by feed blending.

Processor-based control systems in poultry sheds should be seen as aids to management and certainly not as replacements for it. They should enable the producer to implement and to evaluate new management strategies and to apply the best strategies to all similar houses. Ultimately, they should improve the health, welfare and living conditions of the birds and the quality of the human food produced, whilst at the same time improving the profit for the grower or egg producer.

It is not true that the computer or micro-processor can take over. The operator has ultimate power in that he or she can switch it off! — Dr Chris Belyavin, 2 Pinewoods Church Aston, Newport, Shropshire, UK.

"Haider Amayreh establishment for Agriculture and Trading is seeking for a modern factory new or used for producing mainly carton egg trays at a capacity of 5000 trays per hour.

Interested and competent companies/manufacturers are invited to share in this bid and to send their offers and catalogues to the following address not later than 28/2/93".

Haider Amayreh est for Agriculture and Trading.

Zerka, P.O. Box 7070, Jordan.
TEL: 09/988342, 09/984842.
TLX: 41420 TIJARA JO
FAX: 09/994774

Circle No. 40 on Inquiry Card