Software review

FEEDMAN A feed-to-dollars beef management package

By K.J. RICKERT and P.J.M. THOMPSON. Published by Department of Primary Industries, Brisbane, Queensland, Australia, 1996. Hard cover manual and six 3.5″ disks. Price A$345. ISBN O 7242 5983 X.

The value of FEEDMAN to the 'literature' on pasture- and forage-based beef production in the 'endowed zone' of central and southern Queensland varies from outstanding to dangerous. It depends on where the user is coming from. To me, it is outstanding, despite being warned by a practising grazier of the model's inability to give a good approximation of the performance of his cattle, particularly in dry times. The model predicted the animals would have lost weight. In fact they gained weight.

My reasons for persisting with my support of the FEEDMAN package are grounded in the results of a simple test of the model. The problem was to estimate the likely annual beef output of a Darling Downs grain farm if it was converted to a pasture-based beef property. I compared what I would do without FEEDMAN with what I did because FEEDMAN was available.

Without FEEDMAN, I followed the usual steps of deciding on the pasture, guesstimating its year-round carrying capacity per ha and hence that for the farm as a whole, deciding on the class of stock to run that would probably make best use of the feed, guesstimating their individual performance, and so finally arriving at an estimate of the potential of the place for beef production.

The approach is crude and surrounded by uncertainty. It is entirely dependent on broad assumptions about safe, average year carrying capacity, and the individual animal performance at this intensity of pasture use.

With FEEDMAN, the steps are much the same. FEEDMAN calculates the animal performance and residual feed after the user nominates feed source settings and the numbers of animals to be run. The contrast was in the amount of detail employed in the analysis, both with respect to inputs required, and outputs produced.

To model the expected feed supply, FEEDMAN needs to know the type of country, the fertility and water holding characteristics of the soil, the type of pasture or forage and its condition, and an indication of timber density. It also needs to know the likely rainfall the pasture will receive. Surprisingly, these requirements are easily met. There are 27 types of country, and 42 types of pasture or forage to choose from. Each paddock can have a mixture of country and of forages, and a sensible range of choices is offered for the other factors. This multiple-choice process enables FEEDMAN to model the grazing land and forage status of any property east of a line from Barcaldine to Bollon. For information on the likely rainfall, FEEDMAN contains sets of rainfall patterns (very dry year, dry year, median year, wet year, very wet year) for 3 SOI states for 41 recording stations scattered across the whole of central and southern Queensland. Thus, in the absence of our own forecast, the historical figures for a site close by are available.

Feed demand is expressed in terms of 'mobs'. The characteristics of each mob *i.e.* class, number, age and starting weight, along with the months for which the numbers are on hand, are easily entered into FEEDMAN. In performing the prior hand calculation of the likely stock numbers and classes that could be carried, I had a ready-made set to enter in the model. By accident, then, the key role for FEEDMAN had emerged: providing a cross check of our intuitive guesses as to the likely performance of a given grazing scenario.

All that remained was for the results to be calculated. This takes no time. A full set of printable reports feeds back the information we have entered as well as the calculated feed supply/animal performance information we could only guess at without FEEDMAN. The reports efficiently summarise for us and communicate to others the merits or demerits of a grazing system choice. I consider the most valuable of the reports is the overall system performance report displayed in Table 1.

The main point of the table is to illustrate the wealth of system performance information generated by FEEDMAN. Given the class of country, the water holding ability and fertility of soil, the pasture and its condition, the tree density, and the number and class of stock on hand during the year, this rainfall pattern, indicative of the long-term climatic outlook for

Table 1.

Performance : Average performance of mobs and forages in each paddock   *13-Feb-97*

Farm Name:-**DALBYIMP**   Rainfall   **SOI Ignored ; Median Year**   Rainfall **DALBY**

Item of Performance	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall mm/month	91	71	67	36	31	34	43	28	38	61	74	95

Mob:-300 Yearling steers ; XBS class **ID2:-1Paddock:-one**   **Forage:-TropG_lucerne**

Supplementation:- none   **LW (kg/head), start:-300max:-417**

AvLiveWeight kg/head	327	351	371	388	404	417	0	0	0	0	0	0

Mob:-300 Yearling steers 2 ; XBS class **ID2:-2 Paddock:-one**   **Forage:-TropG_lucerne**

Supplementation:- none   **LW (kg/head), start:-300max:-425**

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AvLiveWeight kg/head	0	0	0	0	0	0	317	339	361	386	407	425
AvForageYield kg/ha	3299	4126	4660	4605	4340	3806	3467	3405	3844	4436	5550	7277
AvForageUtilisation %	25	23	23	25	26	28	29	29	29	28	26	24

(For the hypothetical Dalby grain farm, there is a surfeit of feed under median rainfall conditions. The anticipated animal performance of 0.7 kg/d with terminal weights of 425kg is achieved.)

Dalby, will result in the forage yield, and individual animal performance shown.

Having established that a particular grazing strategy is satisfactory under median rainfall conditions, we would like to know how well our strategy is likely to cope under poor and very poor conditions. Without FEEDMAN, we can guess. With FEEDMAN, water use efficiency-based estimates for these scenarios are available at the press of a few buttons. The capacity of FEEDMAN to give this kind of additional information instantly makes it outstandingly helpful for managers eager to make best use of a fluctuating and uncertain resource like pasture- and crop-based forage.

The very high information content of FEEDMAN was revealed further by accidently selecting 'native pasture' instead of the 'grass-lucerne' pasture for the converted grain farm. The result amounted to an instantaneous demonstration of the productivity benefits of pasture improvement. From this, I could see that, by systematic variation of the different parameters in FEEDMAN, many serious technical issues, *e.g.* the productive value of additional winter, summer, or supplementary feed to any given feed resource base, the productive effects of woody weed infestation and/or the productive effect of nitrogen tie-up problems under aging improved pastures, could be explored quickly.

Although I used FEEDMAN solely for deriving informed pasture and stock performance estimates, there is an economics component in

FEEDMAN that allows easy and comprehensive per head costs to be recorded and expected per head net increase in value over time to be monitored, along with other whole-herd financial information.

The foregoing analysis highlights the main benefits of FEEDMAN, namely, a high-speed technically-based analysis of a great variety of grazing scenarios. Other benefits are : the ease with which the beginner can learn how the model works, particularly if he/she uses it as a cross check for a grazing analysis already done by hand; and the transparency of the assumptions in the model via the comprehensive technical manual 'hidden' inside the model. This information is readily accessed via the printable 'help' notes that accompany every window. The six floppy discs and accompanying folder of notes that make up FEEDMAN are attractively packaged in the usual 20 × 20 × 5 cm white plastic box open along one edge. The front of the box has a collage of photos and graphics communicating the "feed to dollars beef management" function of the software. On the back of the box is a half page of text giving the authors' summary of what FEEDMAN offers. Finally, the beginner is well catered for in that: the package loads easily on to a computer with Windows; and there are 'getting started' notes and tutorial exercises in the folder, contact phone numbers of the authors, and an offer of a complimentary one-day training workshop for small groups of new owners.

The Potential Audience

As well as graziers, the agricultural professionals, and aspiring professionals at colleges and universities, who specialise in farming systems economics, business management extension, tactical and strategic decisions for drought, and beef cattle and pasture productivity could all make good use of the package.

So much for the strengths of FEEDMAN. What of its limitations?

The Problem of Reliability

Accompanying the package is a prominent disclaimer of legal liability for financial outcomes arising from decisions made on the basis of FEEDMAN results. In a sense, the package expresses an 'all care but no responsibility expert opinion'. It is up to the individual decision maker to decide the use and value of the information generated by the package. The mathematical relationships underlying the model results are based on decades of grazing trials. I am aware the authors achieved remarkable coincidence of actual and predicted performance across a wide range of seasons for a number of trials at Brian Pastures. Thus, for mainstream grazing conditions encountered across the target region, the relationships in the model appear robust.

When the model fails to predict well, it will be due to poor specification of the input conditions. Dr Rickert (one of the authors) told me: 'if the model isn't giving realistic outcomes, check that the nitrogen and tree density parameters are correct. After rainfall, these are the key determinants of pasture growth.'

The great limitation of FEEDMAN is not the fact that it can't predict with reasonable accuracy every possible situation. It is the potential for mis-use by unthinking users. Its role is to provide additional information. It is best viewed as a generic model with default values put in by the designers, based on the best information they can get. There is room in the model for customising and re-calibrating by experienced graziers to better accommodate their circumstances. Users must always critically evaluate the model's predictions using their own knowledge and other sources. Other limitations are: FEEDMAN does not model breeding herds; and the feed planning year is the calendar year. With a little imagination, the users can accommodate these problems.

In essence, seen as a supplement to, not a substitute for, our existing knowledge, FEEDMAN is an important action learning tool for all concerned with the profitable and sustainable management of grazing systems in southern and central Queensland, and a major contribution to the 'literature'. At a cost of A$345, it represents very good value for money and should become an integral part of the decision making tools of all interested in beef property management in the target area.

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