DEALING WITH RISK AND UNCERTAINTY IN FARMING

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Farmers never could predict weather or markets with any certainty, and nowadays, they are also beset by changing regulations, a fluctuating currency, potential shortages in critical inputs, and even in some cases, wives who are changing their minds about the role they choose to play. I offer no prescription for recalcitrant wives, but will discuss some management techniques that have proven useful in making business decisions under uncertainty.

Incorporating uncertainty into business decisions doesn't mean eliminating risks; it may not even mean minimizing them. Profits are made by taking risks, so the objectives are to understand the risks posed by the different alternatives and to improve the ability to take the right risks.

A wide range of topics is discussed in this paper. Money must be borrowed, so financial risk is dealt with first. Then, since time is the only resource which cannot be borrowed or stretched, a time management technique is explained; a side benefit of the technique is that it makes cash flow planning easier. Most farming adjustments to uncertainty are made by choosing between different enterprises, so an example of including price and yield uncertainty in a crop planting decision is given. Longer-term decisions such as buying land involve uncertainty about inflation, so an approach is explained which can estimate inflation's impact on land

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value. Finally, since government regulations are causing so much consternation, some tips are given for coping with regulatory agencies.

The attempt throughout the paper is to present techniques which managers can use to supplement their common sense. Computer calculations can never substitute for common sense.

Financial Risk

It is clear that growth is necessary: To stay up with inflation, to educate children, or perhaps to be able to afford the new technology that comes along. And we know that bragging size growth rates required borrowed money. Leverage, the ratio of debt to equity (L=D/E), is a measure of the amount of borrowed funds that are supplementing the equity capital. The role of leverage is illustrated in Table 1. The column headings associated with "r" are net rates of return (except for interest and income taxes) on total farm assets. The rows, under the "L" heading, represent the different rates of leverage. For any given rate of return and leverage, a value in the table is the annual increase in equity when consumption (such as family living expenses) is 50 percent of net income, income taxes take 20 percent, and the cost of borrowed money is 10 percent. Notice that when the rate of return on total assets (r=.08) is less than the cost of borrowed money (10 percent), increases in equity diminish as leverage increases. The benefits to leverage can be seen by comparing the "0" row with the results of being leveraged at a rate of "2". When no borrowed capital is used (0 leverage), growth in equity can come only from the remainder of net farm income after consumption, taxes, and interest are paid. Annual increases in equity for a full equity farm ranges from 3.2 percent for a firm making an 8 percent return on total assets, to an 8 percent increase in equity if

Table 1. Annual percentage increases in equity

L \ r	.08	.12	.16	.20
0	3.20	4.80	6.40	8.00
.5	2.80	5.20	7.60	10.00
1.0	2.40	5.60	8.80	12.00
2.0	1.60	6.40	11.20	16.00

Source: Hopkin, John A., Peter J. Barry, and C.B. Baker, "Financial Management in Agriculture." Interstate Printers and Publishers, Inc., Danville, Illinois.

a 20 percent return on total assets could be made. For a leverage rate of two, increases in equity range from 1.6 to 16 percent. Thus leverage does not help unless the rate of return is greater than the cost of borrowed capital. But under favorable conditions such as a 20 percent return on total assets, growth is double that of the unleveraged case.

Probably there is not a 100 percent equity farmer in the audience; all of you likely have a sizable leverage rate, so one more point about leverage before turning to some risk management ideas. The leverage sword cuts deeper on the backswing than on the forward stroke. Table 2 makes the point: As leverage increases, unfavorable events have a greater effect than do favorable events. This is because of the interest and principal payments associated with the additional debt. Notice in Table 2 that for each leverage ratio, a loss (negative rate of return) has a greater effect than the same size positive return. Even a break-even situation (.00 return), there is a loss in equity at any leverage rate above 0, due to the debt commitments.

Table 2. The effect of leverage on growth rates at different rates of earning: demonstrating the principle of increasing risk[1]

L \ r	.25	.10	.00	-.10	-.25
	a	b	c	d	e
			(Annual percentage change in equity)		
0	10.0	4.0	0.0	-4.0	-10.0
1.0	11.6	4.8	-3.2	-11.2	-23.2
3.0	30.4	6.4	-9.6	-25.6	-49.6
5.0	44.0	8.0	-16.0	-40.0	-76.0
10.0	78.0	12.0	-32.0	-76.0	-142.0

[1]This table assumes rates of consumption, taxes, and interest of .50, .20, and .08 respectively.

Source: Hopkin, John A., Peter J. Barry and C.B. Baker, "Financial Management in Agriculture." Interstate Printers and Publishers, Inc., Danville, Illinois.

The 10 percent leverage rate is irrelevant to farmers less financially dextrous than Billy Sol Estes, but bankers and other lenders operate with leverage ratios <u>above</u> 10. Thus one bad year could wipe them out. (The assumptions about consumption, etc. underlying the analysis in Table 2 would not hold for a lender, but it is clear that they <u>must</u> be cautious with their loans.)

The major financial risks are the variability in returns (more on this later) which generally lowers the leverage that a farm can tolerate; the potential loss of equity due to leverage; and the reduced liquidity that accompanies increased borrowing. Doing anything about these problems involves management actions or strategies which affect the management of the whole farming operation. We turn now to some management aids which have proven useful.

Time Management

Time is the one resource which can't be bought, borrowed or stretched. Therefore, its use should be the most carefully planned of all. Peter Drucker wrote in "The Effective Executive" that the beginning point is to know where time goes. An operational plan can help. The ranching plan in Table 3 shows what will be done, how long it takes, and when extra help will be hired. This type of plan can have a host of direct uses by managers, including the coordination of work on separate units. From its preparation and use, both the owner and the on-site manager are aware of what should be done and when. Using this type of plan can improve communication and execution, even without any further planning.

For maximum benefit, management time should be separated from the laborers' time. This is especially true when expansions are being planned. The old saying is that "Nothing fertilizes a field like the boss's tracks," and he must be there to make them. Failing to allocate enough management time has wrecked many otherwise sound expansions.

Another common planning error is to expect net income to double when farm size is doubled. Not so, usually. There is a shake-down period that must be planned for. After expanding, things don't get done on time, yields are often lower than expected and costs are frequently higher. This adjustment lag can be due to insufficient management time or perhaps a learning lag on the part of labor. But the net income decline may be caused more by a lack of liquidity which keeps management form "buying smart" when the chance comes. Cash flow planning can help provide for adequate liquidity.

Table 3. Schedule of production practices by months and time required, 1,000 acres of permanent pasture and 4,000 acres of native range, flatwoods soil in Florida.

Practice	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total hrs.	Total[e] annual amount
	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.		$
Checking cows	90	44	44	44	44	44	44	44	44	44	90	90		
Semen testing bulls	19													
Burning range	25	25										25		
Branding & vac. calves					135									
Pregnancy testing							82	162						
Selling cows									32					
Selling light calves					b									
Selling calves								d						
Selling heifers						c								
Renovating pasture									120	120				
Dipping cattle		82			b			d			82			
Weaning calves								d						
Selling bulls								d						
Putting bulls out		a												
Mowing pasture					66	67	67							
Dragging pasture	100	100										100		
Checking fences	40	40	40	40	40	40	40	40	40	40	40	40		
Worming cattle								194						
Total man-hours	274	291	84	84	285	151	233	440	236	204	212	255	2749	
Hrs. available (1 man)	170	170	170	170	170	170	170	170	170	170	85	170	1955	$6,393
Operator's labor	100	100	--	--	100	--	63	100	66	34	100	85	748	2,446
Extra labor	4	21	--	--	15	--	--	170	--	--	27		237	623

[a] Hours included in dipping cattle.

[b] Included in branding and vaccinating.

[c] Hours included in pregnancy testing heifers.

[d] Hours included in above combined practices.

[e] Calculated at $3.27/hr. for the operator and full time employee and $2.63/hr. for extra labor. Includes employer's share of Social Security.

Source: Anderson, C.L. and T.S. Hipp, "Requirements and Returns for 1000-Cow Beef Herds on Flatwood Soils in Florida." Cooperative Extension Service Circular 385. Institute of Food and Agricultural Sciences, University of Florida, April 1974.

Even when expansions aren't underway, the higher cost of capital is creating more pressure on management to get better mileage out of their money. So a growing number of agricultural managers are trying their hand at cash flow planning. It is just a short step from an operational plan to a cash flow plan which shows when money will be coming in, where it goes out and when. Making such a plan requires setting up expected yields or productivity goals and "guesstimating" what the market price will be. Prices of the production inputs must also be estimated. Such plans have won many friends among the banking fraternity, particularly if they are accompanied by forward price contracts or prices which have been hedged on the futures market. Whether his production is hedged or not, the manager who has projected his expenses and returns into the future is in position to merchandise his debt load most effectively in today's credit market.

Another logical extension of the operational plan is to a profit and loss statement for each enterprise. This may be the most common type of planning done in agriculture. If enterprise profit statements are projected before resources are committed, they can be a valuable planning tool.

This writer, once a confirmed skeptic about the possibility of doing an adequate job of agricultural production planning, saw these techniques being applied on a very complex agricultural operation, the Texas Department of Corrections (TDC) farm system. The TDC included a network of 11 farms totaling more than 100,000 acres scattered across six counties. The farm produced 18 different kinds of field crops and 35 kinds of edible crops as well as beef, pork, horses and milk. Their farm manager planned all their operations three years in advance, including cash flow plans. His plans had to be accurate, because any capital outlays had to be budgeted three years in advance or else the money wasn't available. Was he effective?

In 1970 the Texas taxpayers had to spend only about 13 1/2 cents per man per day to buy food items which the system couldn't produce for itself.

Labor problems? They had them, too. As one of their farm managers said, "We're just not getting the high-class convicts that we need." To help make their unskilled labor more efficient, their plans were very detailed, even including the kind of material to be used for any particular operation.

The TDC farm manager used only a pencil, hard work, and lots of common sense to plan his operations. However, plans like the one in Table 3 are readily convertible to the type of data required for such computerized planning aids as linear programming. In truth, not many farmers go to this extent, but it is possible.

Considering Yield and Price Uncertainty in Selecting Enterprises

From time to time, all of you wrestle with the question of what to produce. Whether you use linear programming, enterprise budgeting, or hunches to help make these decisions, the big problems are what to do about yield and price uncertainty. Let's work through a process for including them.

The ingredients in selecting enterprises are: (a) picking alternatives that you are willing to consider, (b) estimating your costs for those alternative actions, (c) deciding what your objectives are: This can include what your profit objectives are, or perhaps how much risk you can afford to take, (d) estimating the payoffs for the different outcomes of the decision, and (e) settling on how likely you think the different outcomes are. Specifically, we will need to know: What yields and prices are expected and how likely those different yields and prices are.

The logic of incorporating uncertainty into a decision is illustrated with a decision tree for wheat (Figure 1). Experiment station results,

Yields	Yield Prob.	Crop Sell/Price	Price Prob.	Crop Income/AC	Joint Prob.
bu.	%	%/bu.	%	$	%
		2.40	(30)	71.50	5.64
35	(18.8)	2.15	(50)	62.75	9.40
		1.90	(20)	54.00	3.76
		2.40	(30)	52.30	18.75
27	(62.5)	2.15	(50)	45.55	31.25
		1.90	(20)	38.80	12.50
		2.40	(30)	33.10	5.61
19	(18.7)	2.15	(50)	28.25	9.35
		1.90	(20)	23.60	3.74

EXPECTED VALUE/AC = $46.24

Figure 1. Expected wheat incomes, considering a range of yields, prices and their probabilities.

modified by weather information, provided the yield estimates shown on the tree. Farm records, farmer surveys, or other data sources might also be employed. Your situation would certainly be different, and it is easy to change these estimates to suit any user.

The next step is to estimate the likelihood of each yield occurring For North Central Oklahoma, 40 years of yield data suggested that 18.8 percent of the time, yields would be about 35 bushels; about 62.5 percent of the time, they would be 27 bushels; and they could go as low as 19 bushels in 18.7 years out of a hundred.

Regardless of the yields actually harvested by an indiviudal, a number of prices are possible. We settled on three as being a manageable number of price levels to analyze, even though there is certain to be a debate about any price levels and probabilities which are used. Our example estimates are now a couple of years old, but whenever the analysis is made, the best current information available is used to support them.

To be quite blunt about it, probabilities are not readily available, especially price probabilities. They can be obtained (sometimes) from econometric models or the prognostications of experts, but for the most part they are subjective estimates made by the user. That is, they represent the strength of an individual's conviction that a given event will occur. For example, we felt that there was a 30 percent chance that wheat would sell for $2.40 in the spring of 1977. To repeat an earlier point, these estimates can be changed to suit the user.

Crop incomes are yield times price minus costs. For a decision about whether or not to graze this wheat out, only a harvest cost of $12.50 was deducted. To receive $71.50 per acre above harvest costs, 35 bushel yields and a $2.40 price would have to be received. How likely is it that both events will occur? By multiplying the probabilities of these events, we determine that there is only a 5.6 percent chance of receiving the highest income level. Completing these same calculations for the various yields, prices, and probabilities, provides an estimate of the different outcomes and the likelihood, or odds of occurrence, of all payoffs.

If wheat were produced many times under the indicated conditions, the average income for wheat would be $46.24 per acre. This "expected value" is in gamblers' terms, the fair value of the bet, and is the sum of the probabilities times the various outcomes.

The decision maker who plays the long-run odds will choose the alternative with the highest expected value. Others may be more interested in the income ranges, or in the probability of receiving some target income level.

For example, there is a 37.6 percent chance of making $50 or more per acre (adding the joint probabilities of the incomes greater than $50 equals 37.6 percent).

Similar comparisons could be made for most crops. This analysis would be especially helpful in considering late-planted corn vs. soybeans. A similar computerized technique is available for considering whether or not to graze out crops with livestock.

Estimating How Much Can Be Paid for Land[1]

The most widely used approach is to discount future agricultural income by the desired rate of return on the capital invested in land. In its simplest form, this approach is represented by the equation $V = \frac{i}{r}$, where:

V is the present value, or what could be paid for land;

i is the expected net return to land; and

r is the capitalization rate, or desired rate of return.

Investment thumb-rules, such as the idea that an investment is worth 10 times annual earnings, probably stem from this approach. If land netted $50 per acre per year, and the desired rate or return was 10 percent, then the land would be worth $500 per acre.

Computers can solve an expanded equation that includes more of the factors affecting a land purchase. The impact of financing terms, land appreciation, trends in net returns to land, and income and capital gains taxes can be estimated with an approach developed by Lee and Rask [8].

The expanded equation would include this list of variables:

P = asking price per acre of the parcel being considered ($3,000).

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[1]This section taken from [1].

CC = buyer's opportunity cost of capital after taxes, i.e., discount rate or desired rate of return on investment (10%).

n = buyer's planning horizon--number of years income is expected from the land (20 years).

ANI = buyer's expected annual net returns/acre before taxes ($296).

GNI = buyer's expected rate of growth on expected annual net returns/acre (5%).

MTR = buyer's marginal income tax rate--based on estimated taxable income after land is purchased (30%).

DP = proportion of the purchase price paid down on the mortgage (25%).

IR = nominal interest rate charged on the mortgage (9%).

t = amortization period of the loan (20 years).

INF = expected annual rate of inflation in land values (5%).

T* = tax rate that will apply to capital gains income in year "n" when land is sold (20%).

The base values (in parentheses) were selected as being somewhat representative of an orange grove on the central Florida ridge. Returns ($296 per acre) were taken from an earlier study [9]. Asking price ($3,000), financing terms, and the levels of the other variables were obtained from appraisers and others active in the land market.

While computers can do wonders with arithmetic, they cannot correct errors in forecasting the future. Such items as a 5 percent rate of increase in citrus returns per acre, and a 5 percent rate of land appreciation are used here only as an example. Our crystal ball is as cloudy as anyone else's when it comes to reading the future. This approach does permit an assessment of the impact of assumptions about the future; it is presented for that purpose.

The expanded equation is solved to get an estimate of the maximum bid price that can be paid for the land. If, for example, the maximum bid price is $3,500 and the asking price for the land is $3,000, the investment would be profitable with the values stated for the 11 variables. Land appreciation is compounded from the asking price over the term of the analysis and the land is assumed to be sold at the end of the planning period.

This approach estimates the long-run profitability of the investment, but not the short-run financial feasibility. It does not consider repayment capacity. It also does not indicate whether the buyer can meet the mortgage payment with the citrus income; the solution tells how much could be paid for land if the buyer had sufficient income to make the payments.

Sensitivity Analysis

Changing one of the 11 dependent variables changes the maximum bid price. Changing each of these variables over a range (while holding the remaining 10 variables fixed at the base values), gave the maximum bid price ranges shown in Table 4. In general, the three variables related to expected returns--annual rate of inflation in land value, expected annual net income before taxes, and expected annual rate of growth in net return--have the greatest effect on the maximum bid price. For example, as INF is increased from 0 to 15 percent per annum, the maximum bid price increases from $3,819 to $10,818 per acre.

The buyer's opportunity cost of capital is also an important determinant of the bid price. A buyer who is content with a 5 percent after-tax rate of return on his investment can bid up to $6,499 per acre. However, the maximum bid price that corresponds to a 20 percent rate of return is only $2,712 per acre.

Table 4. Sensitivity of maximum bid price (P*) to changes in the dependent variables.

Input Variable	Range of Values of Input Variable	Corresponding Range in Maximum Bid Price
Items of mortgage financing		
Interest rate (IR)	5-15% per annum	$5,416 - $ 3,591
Down payment (DP)	0-50%	4,968 - 4,235
Opportunity cost of capital (CC)	5-20% per annum	6,499 - 2,712
Land prices and inflation		
Average price of land ($\overline{P}$)	$2000-5000 per acre	4,170 - 5,378
Expected rate of inflation in land values (INF)	0-15% annum	3,819 - 10,818
Income tax variables		
Income per acre (ANI)	$200-400 per acre	3,481 - 5,754
Growth in net income per acre (GNI)	0-10% per acre	3,460 - 6,499
Marginal tax rate (MTR)	10-50%	4,086 - 4,958
Capital gains tax (T*)	0-30%	4,507 - 4,696
Planning horizon (n) and loan amortization period (t)	5-40 years	3,981 - 5,006

The base values were: $\overline{P}$ = $3,000 DP = 25%
CC = 10% IR = 9%
n = 20 years t = 20 years
GNI = 5% INF = 5%
MTR = 30% T* = 20%
ANI = $296

Although not shown in Table 4, a 17 percent after-tax rate of return makes the maximum bid price equal to the asking price of $3,000 per acre.

High down payments or interest rates cause decreases in the maximum bid price. As the interest rate is increased from 5 to 15 percent per annum, the maximum bid price drops from $5,416 to $3,591 per acre.

The tax variables, MTR and T*, have minor effects on the maximum bid price. Lengthening the planning horizon and the loan amortization period results in higher maximum bid prices that buyers can pay and still realize their desired rate or return.

Citrus returns are presently higher than the $400 we used as a maximum in the analysis summarized in Table 4. With $400 per acre, and the other variables kept at their base, $5,754 could be paid for a grove and a 10 percent return on capital realized. With results like these, grove prices might be expected to jump, and perhaps they will, but there is more to the question of how much can be paid for a grove than this treatment reflects. First there is the question of the variability of citrus returns.

Returns Variability

History is hindsight, and we need foresight for a land purchase decision, but history does show that what goes up can also come down (Figure 2). Over the last 20 seasons, annual net incomes to Florida citrus growers have been subject to wide swings above and below an average of $220 per acre [3, 4, 11].

The roller-coaster nature of citrus returns should be remembered when estimating how much to pay for a grove. This aspect was not considered above. Another serious limitation of the approach summarized in Table 4 is that there is no consideration of how mortgage payments would be made. Now to that question.

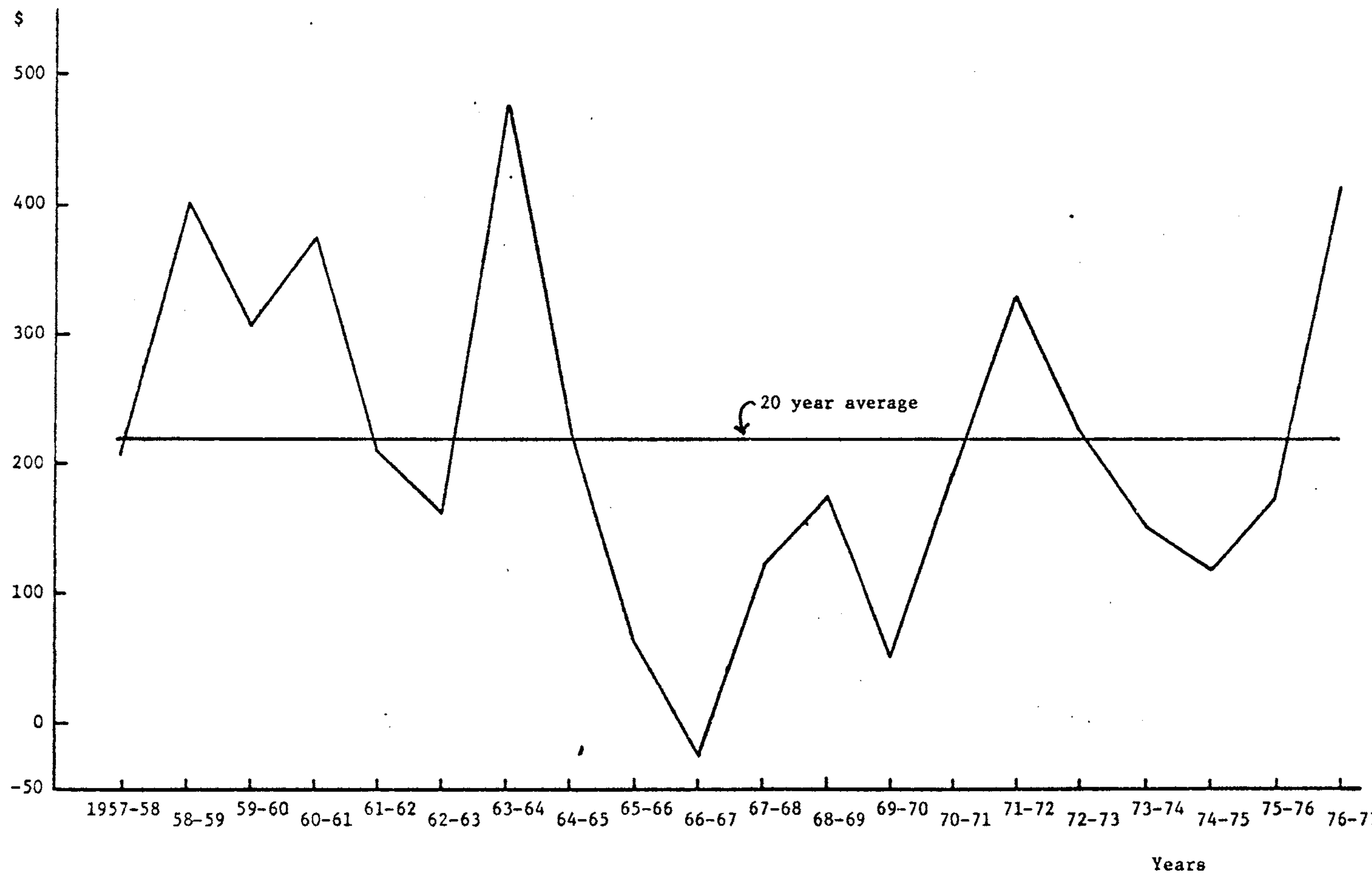

Figure 2. Average annual net return[a] per acre for groves averaging over ten years of age.

[a]Includes costs for labor, power and equipment, fertilizer, spray materials, state and county taxes, miscellaneous and interest on grove reduction at 6%. Does not include cost for management. Sources: [3, 4, 11].

Estimating Debt Servicing Ability

Determining the ability to meet land mortgage payments requires an estimate of the buyer's income flows, operating expenses, other debt commitments, and family living allowances. An estimate of these is in Table 5.

Assume a buyer is considering purchasing a 50-acre Valencia orange grove for $3,000 per acre, and he expects to custom hire those cultural practices shown in Table 5. Terms of the sale are a $37,500 down payment (25 percent of asking price), with the balance ($112,500) due at 9 percent over 20 years ($12,323 annually). The buyer can probably obtain financing, if he can raise the down payment and present a healthy net worth statement. If incomes and expenses go as planned in Table 5, $15,403 would be available for debt service. The $12,323 projected land payment would leave $3,080 above the land payment ($15,403 - $12,323).

Both the buyer and his lender will want to analyze the possibility of repayment setbacks. Both parties should be aware that more than a $3,000 cushion might be necessary in the future. The projected income statement (Table 5) shows that a 15.6 percent increase in operating costs ($3,080 ÷ $19,697), or a 4.2 percent drop in revenue could wipe out the projected cushion.

The cost side seems safe enough, since costs in the last five years have increased less than 2 percent per year [2]. However, history shows that returns can easily fluctuate more than 5 percent per year. Of course, anyone wanting to buy land should go beyond the condensed treatment given here. It would be helpful to calculate the debt servicing ability of the grove during low income periods.

Table 5. Projected annual income, expenses and debt service from 50 acres of 'Valencia' oranges.

Item	Annually
	$
I. Cash Receipts:	
Fruit sales (420 boxes/acre at $3.50/box)	73,500
II. Operating Expenses:	
Spraying	3,907
Fertilizing	2,428
Dolomite	240
Controlling weeds	1,652
Pruning	1,097
Irrigating	5,053
Replacing trees and caring for resets	2,041
Management	3,279
Total Operating Expenses	19,697
III. Other Expenses:	
Family and income tax	25,000
Other debt commitments	12,000
Land taxes	1,400
Total Other Expenses	38,400
IV. Total Expenses (II and III)	58,097
V. Available for Debt Servicing (I - IV)	15,403

Increasing Regulations

Senator Charles Percy has written that "Some regulatory agencies are highly effective. But others are living, breathing anachronisms--unwieldly dinosaurs which, through Congressional laxity and enlivened self-defense, have avoided extinction. Altogether, they cover an astonishing array of activities which range from the necessary to the reasonable to the ridiculous" [10].

These regulations have an increasingly serious effect on agricultural operations. Complying with these increasing tangles of bureaucratic red tape take time. Management time. Somebody within an organization must pay attention to the regulations and to the regulators, and it turns out to be management. The most valuable men in an organization spend an increasing amount of time at this onerous chore. We haven't any good estimates of just how much this amounts to in agriculture, but it is large and increasing. Clifford Hardin, Vice-Chairman of the Board of Ralston Purina Company, wrote that in the last five years,"the paper work in our Company prepared in response to federal regulatory agencies has just about quadrupled and so, likewise, has the amount of prime staff time involved in the preparation" [6]. According to Hardin, the increasing regulations are:

1. Adding to the cost of consumer goods;
2. Reducing productivity;
3. Hampering innovation and invention;
4. Feeding inflation;
5. Delaying or preventing completely the introduction of new products;
6. Strangling some small businesses which cannot afford the professional help necessary to cope with the growing maze of red tape [6].

Recognizing this, most of us will resist the growth of new regulations and regulatory bodies as best we can. But even the meanest defensive lineman in football has to slow his rush occasionally to avoid trap blocks. It works the same way when dealing with regulatory agencies. The following points are worth keeping in mind:

1. Planning and regulatory boards will be with us from now on. Therefore, it makes sense to join them. A well-informed, hardworking, persuasive individual can exercise an inordinate amount of influence on a board. Urge some of your "smooth" farmer friends to serve on some of these boards.

2. Despite how hard you and yours may be fighting the existence of a regulation or a regulatory agency, remember that people will be implementing those rules.

   When dealing with people, you are never ahead to start out by calling them a s.o.b.--or even intimating that they are one.

3. Be prepared. First find out what a regulation entails. If you must fight it, do so only after you can make a clear case for the impact that regulation will have on your operation.

4. Deferral seems to be the ultimate strategy in dealing with bureaucracy. File some tentative report at the required deadline, indicating progress and good faith.

5. Comply in a minimal manner. The history of most agricultural relations is that they have changed several times. Full compliance with the first regulations has caused many producers to spend a lot of money needlessly.

   The exception is when some needed modification is one that makes sound management sense.

6. Get to know the regulatory people and coach them when you can. They don't understand agriculture. There may be some variations on the farm-city week theme that can go a long way to acquaint some of them with the real requirements of agriculture. If you know them, at least you can talk to them.

   County Extension people can occasionally do more than any other set of professionals to help get some realism into the way regulations are implemented.

Conclusion

In dealing with the risk and uncertainty in farming, intellectually speaking, one can do no better than remember the words of Peter Drucker, the "inventor" of management science:

> "There are no solutions with respect to the future. There are only choices between courses of action, each imperfect, each risky, each uncertain, and each requiring different efforts and involving different costs. But nothing could help the manager more than to realize what alternatives are available to him and what they imply [5, p. 515]."

Knowing the implications of the uncertainties, there still is action to be taken. In a nationally televised Bowl game, Coach Lou Holtz advised his tired young running back to: "Suck it up and hang onto the ball." The young man did that, and set a rushing record for that Bowl. I wish for you the same results.

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