FROM YOU...

For Fun...Vanquished in

From: Raymond M. Leuthold
University of Illinois, Urbana-Champaign
Re: Helmberger's "Vanquishing In Vancouver"

Congratulations on publishing the column by Peter Helmberger in CHOICES First Quarter 1991 issue. It was a classic! It has been a long time since I have laughed so hard. A little humor can go a long way. Thanks.

From: David Zilberman and Andrew Schmitz
University of California, Berkeley
Re: Ayer and Conklin vs. Knutson, et al “Chemical Wars”
(Fourth Quarter 1990 and First Quarter 1991 CHOICES)

Ayer and Conklin (CHOICES, Fourth Quarter 1990) identify some flaws in the Knutson, Taylor, Penson, and Smith study of the economic impacts of canceling chemical use in the crop and livestock sectors, but their main criticism is off target. The study should not be condemned because of its source of finance.

Many research efforts are induced by economic motives or objective beliefs. The fact that chemical companies financed this study demonstrates a willingness to pay for agricultural economics research by the private sector, an activity which should be encouraged. Research should be judged by the quality of its content, not its authors or financial supporters. A major role of professional associations is to provide mechanisms for screening and scrutinizing research results cast in the public arena. We believe that the findings of the Knutson et al study would be perceived as more credible were they published (in some form) in, say, the American Journal of Agricultural Economics.

In any case, the sponsors of the Knutson et al study are unlikely to be pleased with the finding that a complete ban on the use of chemicals in the crop and livestock sectors will raise consumer food expenditures, on average by about 10 percent, and will not make farmers worse off overall.

Unlike Ayer and Conklin, we find the question raised in the study—what are the costs of an overall ban of chemicals—to be very relevant to policymakers. Unfortunately, quantitative findings on the economic impacts of pesticide regulations are scarce, and this leaves both the public and policymakers in the dark. Knutson et al at least attempt to provide the dimensions of the ballpark, a necessary first step to provide perspectives on individual strategies. Furthermore, the recent pesticide proposition in California demonstrated the appeal of drastic chemical use reduction policies, precisely the type of policy addressed by Knutson et al.

While we commend Knutson et al for obtaining the resources to undertake this unique study, and while we consider the question they raise to be important and relevant, we are disturbed and confused by some of the findings.

First, we find the predicted increases in the prices of commodities, such as rice, of which the United States is a relatively small producer, to be excessive. Because the United States accounts for only about 2 percent of the world’s production of rice, it is unlikely that the price of rice will be largely affected by the cessation of rice production in the United States. The 83 percent price increase predicted by the study is probably the result of either an unrealistically low demand elasticity for rice produced in the United States or due to the restriction of imports at their present level. In any case, this prediction casts doubts on the credibility of the overall analysis.

Second, the report does not take into account the welfare gains associated with a reduction in the excessive production due to commodity programs. It is commonly argued that the one desirable effect of environmental policies designed to restrict commodity supply is the reduction of government expenditures to support agricultural commodity revenues. This study could have provided an estimate of the validity of this argument.

Finally, while the results for two cases (barley and rice) are implausible, the prediction that producers are likely to gain from regulations that restrict supply, including chemical bans, is consistent with previous studies. Given this finding, it is surprising that farm organizations strongly oppose chemical regulations. It remains a challenge for political economists to explain this paradoxical behavior. In conclusion, we offer four hypotheses:

- Farm organizations consider such analyses unbelievable and assume that in the long run reductions in U.S. supply would not have the expected price effect because of foreign competition; therefore, farmers will eventually lose.
- There is much uncertainty about the outcome of chemical bans and, even if farmers may expect to win on average, there is always the possibility that they will lose, and this motivates risk-averse farm organizations to oppose bans.
- Even though farmers as a whole may gain from chemical bans, many of them may lose, and the impact of the losers may outweigh the impact of the gainers in establishing a response to the regulation.
- Many farmers are also involved in the distribution and sale of chemicals and, while they may gain in their farming operations, the overall impact of a ban may negatively affect incomes because of the loss of revenues from chemical sales.

In summary, Knutson et al completed an important piece of work, but it raised more questions than it answered. Similar assessments of the long-run economic effects and of the environmental and health benefits of chemical bans are needed to provide the foundation for informed and rational policy choices.
We appreciate the complimentary tone of Zilberman and Schmitz’s comments on the Knutson, Taylor, Penson, and Smith study of the aggregate economic effects of banning the use of purchased chemicals in agriculture.

In presentations we have made and in many of our reports, we have made the point that there is uncertainty associated with the cost and yield changes for the various chemical ban scenarios studied as well as with the thousands of econometrically estimated parameters in the AGSIM and AG+GEM models used in the KTPS study. Thus, there is more uncertainty about estimated effects of chemical bans than can be conveyed in point estimates. Since the art of large-scale modeling has not progressed to the point where we can numerically establish confidence limits around point estimates, we are prepared to “take our lumps” over differences of opinion concerning our point estimates.

The criticism of the rice and barley estimates falls into the category of “taking our lumps.” Their assertion that we did not consider farm program cost changes, however, does not. Both models used in the KTPS study do indeed consider farm programs and associated costs. In fact, participation rates, set-aside rates, and acreage slippage are endogenous to both models. Declining real target prices relative to real market prices over the period of study resulted in low annual real farm program costs under the baseline scenario. As a result, the declines in annual real program costs under the various chemical scenarios were also low. We can be criticized for not highlighting the decline in real farm program cost changes no matter how small when we discussed the impacts on farm income and consumer surplus, but we cannot be criticized for ignoring them since these estimates are presented in appendices to our full report.

From: Dean T. Chen
Texas A&M University
Re: Ayer and Conklin vs. Knutson, et al “Chemical Wars”

It was disheartening for me to see CHOICES’ debates on the “reduced chemical” study moving into a direction of “reduced confidence” on econometric models. The credibility of econometric models should not be judged by one study or one model. There is little basis, theoretical and empirical, to support the superiority claims of Computable General Equilibrium (CGE) for farm commodity sector analysis. There are logical concerns, however, regarding the professional and ethical issues involved with many econometric models. In this aspect, as we know, the peer review process is grossly inadequate and unjust. We need to urge the agricultural economics profession to take a critical look into these “black-boxes” of all policy models.

From: C. Robert Taylor and John B. Penson, Jr.
Auburn University and Texas A&M University
Re: The Authors Respond

We appreciate the complimentary tone of Zilberman and Schmitz’s comments on the Knutson, Taylor, Penson, and Smith study of the aggregate economic effects of banning the use of purchased chemicals in agriculture.

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From: Thomas E. Elam
Elanco Products Company
Re: McGuirk and Kaiser’s “bST and Milk”

In the 1991 First Quarter CHOICES, there appeared an article by Anya McGuirk and Harry Kaiser entitled “bST and Milk, Benefit or Bane?” As an economist employed by one of the companies developing bovine somatotropin (BST) for use with dairy cattle, I would like to share our perspectives on the issues raised in this article.

Elanco shares the authors’ concern that the public is not very well-informed on the emerging science of biotechnology. A lack of factual information in the area of biotechnology may create an opportunity for some groups to influence public perceptions, at least in the short term. Because the Food and Drug Administration (FDA) has determined that milk and meat from BST-supplemented cows is safe for human consumption, we do respond with factual information to all inquiries for information on the human health dimensions of meat and milk from BST-supplemented cows. However, due to federal regulations, we are unable to supply the general public with information on the cow safety and efficacy dimensions of BST that are still under review by FDA.

There are also several points in the article with which we disagree.

The authors propose that we need to wait for consumers to become fully informed on scientific advances in agriculture before they are used by producers. We find that consumers are poorly informed on many modern agricultural production practices. If we are to fully inform the public on BST, then we are also obligated to offer education on the emerging practices of embryo cloning and surrogate mother cows.

In the particular case of BST, the debate has reached a level that should cause alarm among all agricultural scientists. As of late April the FDA, the National Institutes of Health (NIH), the Journal of the American Medical Association (JAMA, 6/24/90), Science (6/24/90), and the Committee for Veterinary Medicinal Products (CVMP) in the EC had all issued to the public findings and/or peer-reviewed articles to the effect that BST represents no risk to human health. In addition, the licensing authorities in a number of countries have approved BST for commercial sale to milk producers. If this broad-based body of science is not sufficient to assure consumers of the safety of a product, then the very basis for science-based agricultural research is at serious risk.

As is pointed out by the authors, we also observe that there are frequent differences between consumer attitudes, as measured by surveys, and actual consumer behavior in the marketplace. It may be that the consumer’s answer to a mail questionnaire or a phone survey on an issue as abstract as a new technology just cannot be expected to indicate what people will really do in the grocery store. For example, in the case of organic produce, numerous surveys have shown strong support for the concept, but in the grocery store, a mass market has not appeared despite tests in most of the United States. Why? Organic produce in a questionnaire is abstract in concept to the average consumer, while the reality of paying a price premium for a usually visually inferior product is something yet entirely different.

Finally, we also find fault with the fact that statistics used in this article, all based on response rates of about 33 percent, were projected to the universes of New York and Virginia consumers. In Elanco’s market research area we conduct numerous studies based on samples, and we are well aware of the potential for non-respondent bias. We would regard the results of a survey based on this response rate as non-projectionable unless there was an effort, not mentioned in the article, to measure the attitudes of those 67 percent of the households who chose not to reply. Contrary to the authors’ statements, the statistics in the article are likely not representative of all consumers in the two states surveyed.

In conclusion, Elanco supports the science-based regulatory review process by which we must prove that our products are safe and effective. We also believe that consumers need to understand how this process works, and that it is the basis for what is arguably the safest food supply in the world. Should anyone
have any concerns regarding the safety of milk or meat from BST-supplemented cows, we will supply information to address their questions.

From: Anya M. McGuirk and Harry M. Kaiser
Virginia Polytechnic Institute and State University
and Cornell University
Re: The Authors Respond

Thomas Elam raises several points about our article entitled, “bST and Milk: Benefit or Bane?” Here is our response.

We agree with Elam’s first point that consumers are poorly informed about many agricultural practices, and we see a real need for more consumer education about agriculture. bST is the innovation that is currently in the limelight for many of the reasons we indicated and we stand by our statement that “consumers should be accurately and fully informed about the issues.” This does not imply that those introducing new technologies should have to wait until all individual consumers know all about the technology and have decided for themselves what they think about it. Rather, we believe that there should be more of an educational effort than is currently being conducted on the part of policymakers, universities, and the industry to provide consumers with the whole (current) “truth” about bST. Given the potential backlash in milk consumption predicted by our study, the importance of a proactive, rather than a reactive education strategy is clear.

In response to Elam’s question regarding an educational program on embryo cloning and surrogate mother cows, we do not see an urgent need for a campaign regarding these specific issues at this point in time. However, if there is a chance that some special interest groups could or are planning to take issue and devote resources and publicity in an attempt to stop these practices, then we would recommend that an educational campaign be launched explaining these practices, why they are used, and what their benefits and risks are.

We are sympathetic to Elam’s argument that if the scientific community’s consensus on the safety of bST is not sufficient for consumers, “then the very basis for science-based agricultural research is at serious risk.” As scientists and educators, we should be alarmed at our inability and lack of success in educating consumers about the scientific process in general and about the concept of risk and benefits specifically. As a first step in improving the current situation, we recommend teaching the general public that science does not know all the answers, that science evolves over time, and that hypotheses such as “This product is safe” can only be disproved, not proved. While we see a definite need for more research in the area of risk communication, particularly as it pertains to new biotechnologies, we should also be cautious about judging our success in this area on the basis of whether or not consumers agree with our assessment of the risks and benefits. As is noted in the article, consumers often consider a different set of factors than scientists when making decisions.

We also agree that there probably is a difference between consumers’ response to a hypothetical question and their ultimate actions. In fact, we state this clearly in the article. Given a relatively low media exposure and consumer awareness of bST, our estimates of the decrease in milk consumption due to bST are likely to be on the high side. On the other hand, our estimates could actually be on the low side if bST receives highly visible and negative publicity similar to the media attention that was given to Alar recently. The point is that while there is a margin of error associated with our results, it is still useful to attempt to determine what the possible outcomes may be for the dairy industry. It is always a prudent strategy to try to assess and prepare for several possible outcomes following the introduction of a new technology.

As Dr. Elam suggests, it is possible that our results suffer from non-response bias. However, it is difficult to judge exactly how the results would be affected. Unfortunately, neither project had enough funds to allow for a follow-up survey of the non-respondents. However, to get an idea of how the results could be affected, consider the following best case (or worst case depending upon your viewpoint) scenario. In Virginia the average decline in milk consumption following the introduction of bST for the 32 percent of the households responding was 17.8 percent. Suppose that all those not responding do not expect to change their milk consumption patterns following the introduction of bST (a heroic supposition). Then the average decline in household milk consumption due to bST would be 5.7 percent, which is still a very sizable decline. Using the same procedures, the average decline in milk consumption due to bST in New York State would be 7.9 percent—again a very sizable decline. In conclusion, even though our results may suffer from non-response bias there are still plenty of reasons to worry about the potential milk consumption backlash against bST.

Finally, we remind Dr. Elam that our science-based regulatory review process cannot prove that a product is safe, they can only approve the product.

From: Kenneth W. Bailey
The Food and Agricultural Policy Research Institute (FAPRI)
Re: Spitze’s “First Glimpse”
(Fourth Quarter 1990 CHOICES)

In the Fourth Quarter 1990 issue of CHOICES, Professor Spitze commented, “It (the 1990 Farm Act) was not shaped by economic analysis...It is a public policy...about which the education of economists offers precious little understanding.” As a former USDA employee and currently with FAPRI, my experience with the new Farm Act provides me with a much different opinion.

The policy process that led to the 1990 Farm Act generally involved three major players: the Congress, the Executive Branch, and interest groups. Within the Congress, the House and Senate Agriculture committees are the Congressional Budget Office (CBO) which maintains econometric and other models of U.S. agriculture and specific sectors. CBO's mission is to respond to Congressional requests for policy analysis and estimate the likely impact of policy changes on the agricultural portion of the federal budget.

The U.S. Department of Agriculture (USDA) and the Office of Management and Budget (OMB), both within the Executive Branch, are also major participants in the policy process. USDA organized interagency subgroups early in the farm bill debate to analyze issues such as flexibility, the Farmer Owned Reserve, and the Conservation Reserve. These subgroups were instrumental in developing the Administration's proposal as outlined in the “Green Book.”
Another participant in a supporting role in the policy process is the Food and Agricultural Policy Research Institute (FAPRI). FAPRI consists of two centers, one at the University of Missouri-Columbia, and the other at Iowa State University. FAPRI's mission is to provide independent credible economics based analysis for use in the agricultural policy process. FAPRI maintains large-scale econometric models of U.S. and world agriculture for grains, oilseeds, cotton, livestock, and livestock products.

A major use of economics in the 1990 Farm Bill debate as related to the commodity titles was in evaluating how alternative policy proposals affected commodity supply, demand, prices, net farm income, and government outlays. Changes in all of these variables reflected on the welfare of consumers, agricultural processors, producers, and the U.S. Government. Most proposals under major consideration were evaluated in some form and simultaneously by CBO, USDA, and FAPRI.

The terms of debate were primarily budgetary and economic, and were also substantially economic if you conceptually lump the budgetary considerations into the economic framework. Thus, while the final bill was, of course, shaped by politics, social factors, and previous law, economics and the agricultural economics profession played a significant role in its development.

From: R. G. F. Spitze
University of Illinois, Urbana-Champaign
Re: The Author Responds

Kenneth Bailey’s perceptive comment on my “first glimpse” of the 1990 Act (Fourth Quarter 1990 CHOICES) might appear to be a carefully staged appeal by us for more attention to this noteworthy policy event. But it was not. Perhaps we simply share that felt need.

From my observations and study while on leave in Washington, D.C. during the 1990 policy development, I believe that he accurately sketched some, but not all, of the script and actors in that drama. However, he had only six paragraphs for the task, and I only had one page. The imperatives of the 30 seconds sound byte that seems so pervasive in this Information Age have not bypassed the printed media either. The importance of both the content and process of this Act deserves space in all of our professional publications.

Bailey concluded that the “...final bill was, of course, shaped by politics, social factors, and previous law...” in which economics and agricultural economics played significant roles. I could not agree more, and maybe his words were better than mine: “It was not shaped by economic analysis, but was indeed affected by economics as well as political economy.” Also, I still fear that most contemporary education of professional economists offers little understanding of how both our “imperfect participatory political and economic systems” function.

There is need for the kind of insight about the process as summarized in Bailey’s comment, no doubt enriched by his experience as a professional in the Executive as well as in a well respected Institute of our Land Grant System. He correctly identified some of the private and public players, including legislative and executive. There were many more. The objective understandings flowing from some of the models and other types of scholarship were invaluable, certainly more so than pronouncements, opinions, and implicit value positions that sometimes accompany our economic products. In the end, the “shaping of public policy” occurs through the endless compromises of policymakers, building on the logical and significant role performed by economic analysis.

However, I do want to re-emphasize that the 60 year evolution of this kind of U.S. policy, symbolized especially by the 1990 Act, reaches far beyond both the content and process surrounding only commodity and conservation issues, focused on by Bailey. Again, this is where “more than economics” is so vivid in public policy, and why we also need to perceive it as “more than the farm bill.”

From: Jerry Skees
University of Kentucky
Re: Mayer’s “Putting Balance in Programs”

Leo Mayer makes a good case for modified commodity programs. Two problems need to be pointed out: (1) the proposal only deals with program crops, and (2) it would be politically difficult to lower target prices. The first problem points to a need for crop insurance. For the second problem, I believe a change in terminology may be needed. The concept of “target revenue” may prove more palatable.
Leo Mayer argues that commodity "programs do little to protect farmers who are caught up in adverse weather situations." I would like to make a stronger argument that they can be risk augmenting in adverse weather years.

For program crops that have target prices and loan rates, the deficiency payments are made based upon a fixed ASCS yield. Thus, when deficiency payments are made, this portion of gross receipts is not influenced by the actual farm yield. In recent years, there were times when feed grain producers could expect a third of their gross receipts from deficiency payments. As this proportion increased, many farmers began to count on the income as a fixed income that was not subject to risk—it became a substitute for crop insurance for some farmers. In short, I am arguing that farmers became too dependent on the "fixed income" associated with deficiency payments.

Without question, the deficiency payment program does reduce the variability in income since, for the most part, yield risk does not influence these payments. However, during the 1988 drought farmers in the Midwest were reminded that widespread yield shortfalls also impact national prices.

In 1989, Kansas wheat farmers received the same reminder. Since deficiency payments are made based on the difference between the national price and the target price, increases in the national price result in reductions in deficiency payments. As a result of the 1988 and 1989 droughts, many farmers had both crop losses and significantly lower deficiency payments than they expected.

Congress has used these relationships to find funds for disaster assistance. For example, as the deficiency payments disappeared in 1988 and 1989, members of Congress argued that these payments would be lower than the budget forecasts and that those "savings" should be used for disaster assistance. It is highly unlikely that the Congress would have found nearly $4 billion for disaster assistance in 1988 without these arguments.

Given the importance of the budget process and the great frustration that budget analysts have in forecasting budget exposure from commodity programs, the concept of using both a target price and a target yield has even more merit. In a forthcoming article for the American Journal of Agricultural Economics, Mario Miranda and Joseph Glauber demonstrate this principle. The empirical analysis presented in this paper "indicates that for the same cost as the current target price program, a county target revenue program for corn would substantially reduce county-level revenue variability and would also stabilize total Government deficiency payments."

It is extremely important that this concept not be implemented at a national level. This would only increase the risk environment for farmers in regions where yields are not related to national prices. The work by Miranda and Glauber demonstrates the merit of a county level program.

When the combined yield and price drop below a target revenue, adjustments are made in the income transfers to farmers in a fashion that will bring the county to the target revenue level. However, there is a potential serious problem with a county program. Since it is free insurance, it may influence production patterns and resource allocation even more than the current programs. Farmers in high risk areas could be expected to increase their plantings, if given the opportunity. The concept that Barnaby and I presented in our CHOICES article (Second Quarter 1990) could be applied to a county target revenue program in order to protect against this possibility.

In this case, a farmer could purchase a revenue insurance policy based on the county revenue. Any time that the county revenue dropped below a specified level, the farmer would receive a payment equal to the liability he purchased times the percent the revenue was below the target. Unlike other revenue insurance plans, this concept does not suffer from adverse selection and moral hazard as the farmer would have no incentive to influence the outcome. Further, as farmers would pay for this protection, it would not create the same problems as direct income transfers.

The introduction of flexible base in the 1990 Farm Bill increased the risk environment for farmers. To the extent that the U.S. continues to reduce subsidies to farmers without similar responses around the world, this also increases the risk environment. Concepts like target revenue are increasingly important for U.S. agriculture. With the proper amount of leadership and forward thinking, current commodity programs could be modified in this manner to facilitate a move toward a revenue insurance program that is in fact workable for the vast majority of U.S. farmers. The opportunities are challenging.

From: Leo Mayer
U.S. Department of Agriculture
Re: The Author Responds

Jerry Skees pinpoints the issue in his critique of my article on "balancing commodity programs." Target price payments have become so important to the farm sector that when drought decreases them, farmers in drought areas suffer large economic losses. This was not the intent of the target price programs, it just worked out that way. My point was that it is not clear what to do about this perversity at this point and it should, therefore, receive more attention.

Jerry Skees appears to agree, and I find it satisfying that others, notably Miranda and Glauber, are coming forth with further analysis of this issue. Hopefully, the fact that the article will have to meet the standards of the AJAE for publication will not make its implications inaccessible to the policymaker. As Herbert Stein noted in the March/April 1991 issue of The Washington Economist published by The American Enterprise Institute, "It may seem a shocking thing to say, but most of the economics that is usable for advising on public policy is at about the level of the introductory undergraduate courses." I share this view.

I do have one difference with Skees on another suggestion he made, notably calling this proposal a "target revenue" plan. This hints at the beginning of an income guarantee program for farmers. I would find such a move quite objectionable. As an offset to weather cycles, balance in our farm programs is consistent with movement toward more market orientation. As an income guarantee program, it hints of turning agriculture into a public utility. I doubt that most farmers are ready to live with the degree of regulation implied by this suggestion.

What we both seem to agree on is that making farmers depend on an Act of Congress each time that drought strikes is not a very reliable form of crop insurance. If a large portion of farm income is going to continue coming from federal programs, farmers have an inherent right, it seems to me, to expect some amount of balance in those programs so that they protect both in good and bad weather years. The question remains open on exactly how this should be accomplished.
From: John T. Scott, Jr.
University of Illinois, Urbana-Champaign
Re: Hanson, Breimyer, and Harl's "Beyond the Farm Debt Crisis" (Fourth Quarter 1990 and First Quarter 1991 CHOICES)

"Beyond the Farm Debt Crisis" by Hanson, et al, is a good reminder that there are many lessons to be learned from the Debt Crisis of the 1980s. However, some sections written "looking out from the concrete and glass of DC" do gloss over details that would otherwise mitigate the public's and the authors' negative view toward farmers, especially their ability to assess risk.

A very important point not mentioned was the change from fixed to variable interest rate mortgages which were instituted in 1971 first by the Federal Land Bank—the "farmer's mortgage company." Farmers are well experienced and educated to assess the risks of weather, commodity prices, and government programs, and many farmers did a good job of assessing these risks before buying land in the 1970s. However, lenders who were best equipped from experience and education to assess interest rate risk and assume that part of lending risk transferred this risk via the variable interest rate mortgage to borrowers (in this case, farmers) who were least qualified by experience and education to analyze and accept this risk. So farmers who were otherwise good farmers, who had assessed their own risks and made logical decisions based on their assessment, ended up with large loans tied to the high interest rates of the early 1980s.

I am an extension economist who also early on (1978) warned people in print of the coming disaster and in 1981 I predicted in print that land prices would decline "at least 20 percent" in the near future. As a harbinger of doom, my head would have been on a silver platter had the president of a large lending institution had his way, so there were some people listening. He later apologized. The error was that my prediction turned out to be an underestimate of the decline.

I dare say I was probably the only agricultural economist who put his money where his mouth was—I sold all my farmland in 1981. A landowner who did pay attention to me sold 1,800 acres for $4,200 per acre. That land at the bottom would have sold for about $1,600 to $1,800 per acre. Today it has rebounded and would bring in the range of $2,500 to $3,000 per acre, still far below the 1981 price. The buyer paid cash, still owns the farm, and still gets only a 2-1/2 percent return on his investment. I bought back some land about two years ago just off the bottom—so my back-patting involves real money and is only a few more lines than Breimyer's and a lot fewer than Harl's. It may now be a little late to buy into the land market, but there may still be a few good opportunities on the buy side.

Test Supplement NEW Desk Reference

GLOBAL FOOD PROGRESS 1991 by Dennis T. Avery

At last a readable, timely and ACCURATE global overview of food and resource trends and the related food safety and environmental challenges. And it has no limits-to-growth bias. The book focuses especially on worldwide changes in technology, investment and national policies. These are the key factors which are triggering rapid changes in world agriculture and forestalling the famines so widely predicted in the headlines.

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Course review copies available.