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1984 Agricultural Outlook Conference  
Washington, D.C.



For Release: November 2, 1983

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Good Morning.

My remarks today focus on three aspects of the international outlook for pesticides. First, I'll discuss the economic outlook in terms of agriculture and inputs. Second, I'll review the technological outlook, with emphasis on what is happening in research and some of the problems faced in developing new technology. Third, I'll briefly discuss the political outlook, encompassing both economic and technological dimensions.

Underpinning my comments about the world outlook for pesticides are three key assumptions. They've been stated so many times that they sound trite, but that does not diminish their importance.

One assumption is that millions of people suffer from some form of malnutrition. No one, including the Food and Agriculture Organization of the United Nations, has more than a good guess at what the precise number may be. In 1979, a commission on world hunger appointed by President Carter estimated that 1 in 8 people suffers from malnutrition. Whatever the real number is, it's clear that while enough food is produced to feed all people currently living, it's equally true that only a relatively small portion of the world's people have enough food to represent an adequately balanced diet.

A second assumption is that world population growth will continue to pressure agricultural production as well as stimulate it. Norman Borlaug has pointed out that the world population will grow to between 5 and 5.5 billion people by 1990, and will reach 8 billion by 2040 at the latest, and 2020 at the earliest. That represents a doubling of the world's current population -- and the consequent demand for food -- in 40 to 60 years.

Our third assumption is that the land under cultivation cannot be significantly increased, at least in the near term. Research in biotechnology and gene-splicing may succeed in

60th ANNUAL AGRICULTURAL OUTLOOK CONFERENCE • USDA  
OCT. 31-NOV. 3 1983 • WASHINGTON, D.C.  
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expanding the kinds of land and climates in which we can grow food crops, but this research will not yield results until the turn of the century at the earliest. Thus, in the near term, the forces driving us toward more productive agriculture, that is, to increase crop yields for each acre now under cultivation, will continue unabated.

It is with these assumptions in mind that we'll discuss the world outlook for pesticides.

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First, let's look at the economic outlook for pesticides. In 1981, the world market value of agrichemicals reached \$13 billion. That's equivalent to roughly 2.5 billion pounds of insecticide, fungicide and herbicide active ingredients. Last year, this value grew in real terms by about 4 percent to \$13.5 billion. It should reach about \$14 billion this year. Alan Woodburn of Wood, MacKenzie has projected that revenues will reach about \$20 billion, in 1982 dollars, by 1990. That represents a growth rate of about 4-5 percent per annum. This is consistent with recent years' growth but below the rapid growth of the late 1960s and early 1970s. The higher growth rates, of course, were driven by the comparatively rapid assimilation of high-technology agrichemicals by the U.S. and European markets -- markets characterized by highly-educated farmers, excellent communications, sophisticated distribution systems, and the like.

This growth projection is based upon a number of factors. Real prices of the main agricultural commodities should increase at fairly slow rates, barring extremes of weather or geopolitical disruptions. More importantly, this growth is due to the fact that an increasing number of the so-called newly industrialized countries and less developed countries appear to be reordering their economic development priorities.

Agricultural development, which in the past has been given short shrift compared to industrial development, is now again being recognized as the vital driving force in these countries economies. Examples are India, Brazil, Thailand, Indonesia, Argentina and Mexico -- all with varying degrees of commitment and execution.

Virtually all of these countries have underutilized arable land, and they hold the potential to become important agricultural markets during the next decade. Whether this occurs, of course, depends on their skill and commitment in stimulating local farmers to increase agricultural investment, such as land, equipment, fertilizer, hybrid seeds, pesticides and the like.

Critical here is the pricing level of agricultural commodities, the means used to establish price, as well as the government commitment to invest in agricultural infrastructure over an extended period of time. Also significant are the technological inputs made available to the farmer -- both on the

farm and in colleges and universities -- as well as through local extension agencies.

Countries with this heightened awareness are recognizing that bringing new acres into production is no longer an option. Virtually all available arable land is now under cultivation. To increase productivity, these countries must accelerate adoption and use of the so-called high technology inputs. They are becoming convinced that pesticides put money into farmers' pockets and foreign exchange balances. Herbicides, for example, should yield farmers an average of two to five times the value spent in purchases.

This represents a very significant trend in countries which have viewed pesticides as a cost -- or who were concerned that pesticides displace agricultural labor.

Overhanging this side of the equation, of course, are persistent problems of inflation, foreign exchange, and the extremely serious debt situation in many Third World countries. According to Morgan Guaranty, Third World debt grew from about \$100 billion in 1970 to more than \$600 billion in 1981. Debt service alone reached more than \$100 billion in 1981.

Third World debt brings new dimensions to doing business in overseas markets. It certainly has contributed to growing Third World demands for increased local investment, regardless of whether or not the local market merits such investment. Negative balances of trade experienced by the industrializing countries -- not an unexpected phenomenon as they import machinery and materials needed to industrialize -- is stimulating these countries to pressure multinationals to add value locally. I'll discuss these two areas -- overseas market expansion and local investment -- in more detail shortly.

The final aspect of the economic outlook concerns harvests, and here the big story -- quite obviously -- is what happened in the United States this year. It appears that a combination of PIK and the drought has made a significant dent in U.S. crop surpluses. However, it should be stressed that good weather conditions and farmer expectations next year could quickly bring the United States right back to where it was at the end of 1982. By using high agricultural technology, U.S. farmers have enormous productive capacity -- and obviously require free access to large, ex-U.S. markets. With the world's expanding population, improving per capita income and expected long gestation for less developed countries to absorb high technology, we also expect strong markets for U.S. crop exports in the foreseeable future.

In summary, the economic outlook calls for continued slow, steady growth that could be stimulated by improvements in the Third World agricultural structural framework.

In the near term, the technological outlook for pesticides should be similar to our experience in the past several years.

Total industry spending on research and development is about 7.5 percent of sales, according to Wood, MacKenzie. Much of this investment, particularly since the late 1960s, is being focused increasingly on ongoing R&D programs as opposed to more "innovative" types of research. This trend can be explained by declining profit margins over the past decade -- in part due to the increasing costs to introduce a new product. Introduction of a single product, on average, will have close to \$70 million in development costs. When the costs of manufacturing facilities are included, this reaches a total of \$100 million. And these are outlays made before any sales are generated.

Concerning the acceptability and use of pesticides, as one would expect -- they are much more prevalent in the developed countries. For example, the United States, Europe and Japan, last year, accounted for roughly 70 percent of the total worldwide pesticide market. While we expect the higher growth rates will continue in other parts of the world, the United States, Western Europe and Japan by 1990 will still account for about 66 percent of the total market.

Part of the reason for this can be attributed to the economic and structural problems endemic in many Third World countries. For, until they are able to solve at least part of their debt problems and expand their local economies, they can be expected to encounter problems in securing and paying for modern agricultural technology. Another problem of considerable magnitude concerns the difficulties encountered in many nations in introducing and achieving widespread adoption of new agricultural cultural practices -- and the need to undertake extensive training and educational programs to show local farmers what agricultural technology can provide. Also, one must recognize the wide disparities in the efficiency of marketing, distribution, harvesting, shipment and storage systems in the United States and those in less developed countries -- inefficiencies which quite obviously severely penalize local farmers.

In summarizing the technological outlook, Third World countries may hold the key to their own economic improvement by stimulating agricultural education and technology. Changes in crop pricing mechanisms, for example, should spur production.

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A third problem that is economic, technological and ultimately political concerns property rights -- and this brings us to the political outlook for pesticides. There is a growing concern in the agricultural industry, and other industries as well, that there is a widespread misunderstanding of the nature of such basic property rights as patents and research and product test data. We are concerned this misunderstanding could

lead to a considerable restriction in the thus far reasonably smooth flow of technology into Third World nations.

It is axiomatic that nations having the greatest industrial property rights protection also happen to be those nations which are the most highly developed. Those of us who reside in the United States, or in Western Europe and Japan, can understand the connection between a strong system that protects property rights and a high level of technological innovation.

In many Third World nations, however, property rights such as patents are often viewed as relics of colonialism -- in effect, barriers to Third World economic development -- rather than a stimulant of development. Any agrichemical company that wants to do business in the Third World has to grapple with this fact of life, dealing with it at the national level there, and at international levels in such groups as the Food and Agriculture Organization and in meetings such as those held last year and early this year on the Paris Convention.

One common problem in many developing nations is their desire to define the "working of a patent" as local manufacture. In other words, economic progress is equated with smokestacks. Yet, in the case of agrichemicals, the value to a particular nation is not in a manufacturing plant -- rather, it is the value to the nation's agriculture in boosting productivity and agricultural exports. In fact, one could argue quite persuasively that economic interests of local farmers are not served by policies which stimulate construction of small, less efficient agrichemical manufacturing facilities. If duties were lowered and patent working requirements removed, local farmers could then gain access to world-scale manufacturing economies.

Confronted with such "beggar-thy-neighbor" policies, Monsanto, for example, has been forced to adopt a policy of locating manufacturing and formulating facilities outside the United States. In 1975, we had five such ex-U.S. manufacturing facilities. Today we have manufacturing investments in some 14 countries outside the United States.

Most of these facilities are first constructed as formulation units -- the final step in the product manufacturing chain. Local market conditions can most often support these types of facilities.

But even with larger, more fully integrated manufacturing plants, the presumed benefits of employment are simply not there, in the context of a developing nation's economy. Agrichemical manufacturing plants are capital-intensive, not labor-intensive, and thus make a negligible contribution at best to a country's employment problems. The real value of pesticides by far, is the value to the country's local agricultural productivity.

Local manufacturing is only one aspect of the problem of property rights. Perhaps even more serious is the likelihood that the lack of an adequate system of patents and other rights will preclude the best and most recent technology from being employed in a particular country. No company is willing to risk a product that involves up-front costs of \$100 million in a country where property rights protection is weak or non-existent. What's more, prudent, hard-nosed management of research and product development resources in a highly unpredictable environment requires a "rifle-shot" approach in selecting your ultimate markets. Virtually every major agrichemical company has had serious problems with product pirates. These problems will continue to hamper use of agricultural technology until stronger protection of property rights is forthcoming.

International property rights protection is only one aspect of the political outlook for pesticides. Another is the pressing need for the United States to develop a long-term agricultural policy that is global in scope and encompasses both the need to further improve the quality of productivity and to assure our maintaining a strong share of the overseas agricultural market expansion.

PIK has been expensive, but it has had several benefits, not the least of which is the growing recognition of and sharpened focus on the importance of agriculture to the American economy. It is quite clear that past gains in agricultural productivity and technology have, in effect, globalized U. S. agriculture.

It appears that this need for a comprehensive national agricultural policy in an increasingly interdependent world is becoming well recognized. For example, this was a major topic of concern at a meeting last month of the Midwest Governors Conference. Let me conclude by saying that all of us in agriculture have the responsibility to see that this awareness continues, and that we work toward a consensus on what such a long-term policy should encompass. I believe that the creation of such a policy will do much to further brighten the prospects of the international outlook for pesticides.

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