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Water Makes the Difference

"The United States by itself cannot answer the international challenge of maintaining food security and providing food aid and technical assistance. Nor can Europe or any other of the great agricultural nations, if they act alone."

Quentin M. West, administrator of the Economic Research Service, U.S. Department of Agriculture, made this statement at a recent "Water for Food and Fiber Conference," sponsored by the **Texas Water Resources Institute.**

"Each country's individual concerns must be viewed in a broader world context. If all nations shared this philosophy, fears that the world may not be able to feed itself in the next millennium would melt away," he said.

West named three issues that have caused policymakers to "take a fresh look" at the U.S. position in world agricultural affairs: unstable prices, food aid, and farm productivity in developing nations.

One option suggested by West for *stabilizing prices* is establishing food and fiber reserves in this country or in cooperation with other countries on a worldwide scale. This could reduce price uncertainty and stimulate production to provide a warehouse of food for times of acute shortage.

Food aid to developing countries, West said, has been scaled down because of farm export price increase, shrinkage of exportable supplies, and brisk demand in the U.S. Although the U.S. still has a strong commitment to filling the food gap in poorer nations, he said the program support has waned. He pointed out that the U.S. petroleum imports bill continues to mount and that "U.S. agricultural exports just about offset the bill."

He said agricultural trade in the last fiscal year contributed a net positive balance of $12 billion to the international trade account, more than offsetting a $10 billion deficit in nonagricultural trade.

Farm productivity in disadvantaged nations, West said, will need American agricultural know-how. To assist in the transfer of knowledge, Title Xll of the 1975 International Development and Food Assistance Act will provide funding to encourage land grant colleges and other universities to become more involved in increasing agricultural production and research in developing countries. He said irrigation will be an important component of this effort, especially in raising yields and bringing new territory under cultivation.

SOME GOOD, SOME BAD

Key speaker was Dr. Earl O. Heady, lowa State University economics professor. Entitled "The United States' Supply Situation for Food and Fiber and the Role of Irrigated Agriculture," Heady's report fit the "some good, some bad" news mold. He reported conclusions from two model projects he has conducted –the first one in 1971 for the National Water Commission (NWC), and the more recent one, National Water Assessment for the Water Resources Council (WRC),

The first model, applied before the recent large increase in exports, indicated that U.S. food supply capacity will likely be large relative to demand up to the year 2000, and prices will be depressed except as bolstered through price supports and/or supply control. Further it was found that water over *most* of the irrigated West will be in "surplus" and that federal government investment in irrigation development or practices would be uneconomic, except as justified in terms of population dispersal and rural community welfare–but not in terms of food supply shortages.

"For national purposes, to develop more irrigation would aggravate the supply and price situation," Heady explained. It would be more feasible economically to bring new or idle lands into cultivation than to continue or expand programs of subsidized irrigation.

Heady, member of the advisory committee of the U.S. State Department on World Food Programs and USAID, and member of the White House Committee on Domestic Affairs, conducted the projects to aid the NWC and WRC in making policy decisions concerning U.S. food and fiber supplies in relation to irrigated agriculture.

The National Water Assessment model considered the basic data of the first model plus land capability, environmental restraints, and increased exports in the past few years, including the Russian wheat purchases. Results did not differ greatly from the first model. The base model of the National Water Assessment study indicates that future agriculture has a high supply capacity, and that resources are available in quantities to produce high export levels in the absence of extremely binding environmental restraints. The United States could readily meet domestic demands in the year 2000 with a high export level–for example, 450 million bushels of sorghum as compared with 160 million in 1970-72.

Reduction in irrigation water supply in the Arkansas-White-Red and the Texas-Gulf basins, Heady showed, would not be due to environmental regulations alone, but also to

depletion. Nationwide, the reduction in water supply for the environmental solution means an 18 percent reduction in irrigated acreage in 1985 and 21 percent in 2000.

Heady said supply conditions of American agriculture have fluctuated over great extremes during the past four decades. Irrigated agriculture either accentuated or dampened the effects of these extremes, depending on the case. In time of crop shortfall, irrigation helped stabilize. On the other hand, it added to oversupply in a good crop year and contributed to depressed farm prices.

Heady said a repeat of fluctuations in the next 20 years is possible, even if somewhat milder. At the minimum, he predicted, great price instability is likely to face U.S. food producers and consumers over this period. He described cycles of frenzy that accompany the fluctuation between crop shortfalls and normal production.

"Because of these cycles, we need to concentrate on the future outlook of food supplies and demands," he said. "We need to examine the recent events, to determine which are transitory and which are enduring.

"The U.S. itself does not have a food supply problem," the economist pointed out. "Supply capacity in this nation is so large that we could either double our population or exports over the next 50 years and still spend a minor portion of our disposable income for food.

"Generally the question is not only food and fiber and the role of irrigated agriculture. It is one of interregional, agricultural, and rural community income distribution. Incomes of many rural communities are far greater than they would be without irrigation."

RESEARCH POINTS THE WAY

Dr. H. O. Kunkel, dean of agriculture at Texas A&M **University,** cited research developments which will provide higher productivity and efficiency of resource management. He mentioned techniques of water stretching "on the horizon."

Reduced tillage and monitoring application of water could reduce water requirements; new systems of managing range land could reduce the effects of periodic droughts in West Texas ranges. Learning to use the unique soil-plant-water relationships in Texas "blacklands" might insure crop production even in low rainfall seasons.

Other aspects of irrigation were discussed by Texas A&M agricultural economist, Dr. **Ronald Lacewell, and W. D. Parish,** general manager, Hidalgo-Cameron Counties Water Conservation Improvement District #9. Lacewell addressed the sensitivity of irrigated crop production to the price of natural gas. Focusing on the Trans-Pecos region, Lacewell reported findings in a TWRI-sponsored study that indicate natural gas price increases will cause agricultural output to decline and regional economies to contract. He said the regional economic and employment implications indicate serious adjustments "sooner and more rapidly than generally assumed."

The study shows 1) a likely shift from intensive irrigated crop production to extensive livestock production; 2) possible default in land payments; 3) severe stress on financial institutions and a land value decline; and 4) serious economic impact throughout the region.

"The Trans-Pecos situation is immediate and most serious," Lacewell said. "However, the High Plains and other irrigated regions are approaching a similar situation. "

Parish reported that environmental concerns and regulations have finally "hit" irrigated agriculture hard–probably right in the pocket book. Sections 402, 404, and 208 of the Federal Water Pollution Control Act Amendments of 1972 will impact irrigation the greatest. Section 402 established the National Pollutant Discharge Elimination System (NPDES) to control irrigation return flow by requiring a permit. Parish described three levels of control–low, medium, and high–whose costs range from $7 per acre to about $300. Even the low level would increase operation and maintenance costs by 70 to 80 percent.

High Plains farmer, **Don Anderson,** also pointed to the spiralling cost of energy as one of the critical water issues facing his region.

"The agricultural producer's energy cost problems stem not so much from increasing costs themselves, but from the fact that the producer has no effective way to pass-through these higher costs. He is at the mercy of the marketplace with virtually no control over it."

Securing a permanent supply of supplemental water to augment diminishing ground water on the High Plains is the most critical water issue facing crop producers, he said.

ISSUES FACING TEXANS

The need for importation of water into Texas from outside sources was stressed by Texas House Speaker **Bill Clayton** in his banquet address. He gave an overview of the state water picture, emphasizing planned water development, and cited two issues facing voters: the increase in amount of Texas Water Development bonds from $400 million to $800 million, and the increase in Texas Water Quality bonds from $100 million to $200 million.

Effects of climate on production were discussed by **Ray E. Jensen,** director of the National Weather Service Environmental Studies Service Center, Texas A&M, who reported that world food reserves have shrunk to about 35 days.

"The 35-day reserve is now near or within the range of yearly variability in food supply that can be induced by weather conditions," he said.

He discussed the concept that a climatic change is occurring, manifested by global cooling and greater weather variability, which will significantly reduce global

agricultural production. Two studies, he reported, indicated that a moderate cooling may even increase yields of cool season crops such as small grains and corn.

Joe C. Moseley II, executive director of the Texas Coastal and Marine Council, discussed the impact of bays and estuaries on food demand. His conclusions follow: 1) Estuaries make a contribution directly to the state's (nation's) food supply although there is considerable debate over the extent and value of this contribution. 2) Quantification of an estuary's value is difficult because of technical reasons and strong emotional views. 3) Decisions relating to water resource development are made so that estuarine resources will be protected.

WRAP UP

Four generalizations were made by **Emery N. Castle,** vice-president of Resources for the Future, who summed up talks relating food and fiber to climate, energy, technology and other critical areas.

- There will be a more substantial investment in water resources development for agriculture internationally than domestically. Worldwide attention will be given problems associated with irrigation development–salinity, siltation, and fertilizer losses.
- There probably will be much greater instability of agricultural commodity prices for those commodities entering international trade.
- We are going to become more aware of motivation and incentives of people, and we will be studying these issues in a more systematic way than we have in the past.
- There is a real need for agriculturists to devote greater attention to the environmental consequences of large scale agricultural production. Some of the best environmentalists are agriculture producers, but they have not communicated this concern and have not been able to take leadership in this area. Consequently, environmental leadership has tended to impose constraints on agriculture without knowledge of the consequences.

Eenie, Meenie, mine

Possibly the biggest problem involving water is, and always will be, competition among users. Agriculture vies with oil and gas industry, power industry, municipalities, and bays and estuaries for its share of water. Representatives of those competitive areas presented their "side" of the supply issue in a conference panel, headed by **Joe D. Carter,** chairman of Texas Water Rights Commission. Below are excerpts from the panel discussion.

POWER INDUSTRY--**Robert J. Huston,** consulting engineer: "Where future population pressures are projected to be great and the water supply-demand picture is uncertain, water requirements of steam-electric power generation represent an ever growing challenge to effective plant siting. Where projected deficits already exist, water resources planning must attempt to balance supply and demand. Where possible, additional

development of storage capacity (reservoirs) will be required. When the existing water resource system becomes fully developed, other alternatives, such as importation or priority allocation of fresh water, must be implemented. All these options have significant financial and social impact on the consumer of freshwater supplies."

OIL AND GAS INDUSTRY--**Mack Wallace,** Texas Railroad Commissioner: "While water is important in the drilling for new fields, it is in the secondary recovery phase that water usage is of major concern. Commission records from the beginning of secondary recovery projects through 1973 show over 44 billion barrels of water have been used: more than 10 billion barrels of fresh water; 6 billion brackish water, and almost 28 billion salt water. Let me challenge you not to run out of water, so we don't run out of oil."

BAY AND ESTUARIES--**Joe C. Moseley II,** executive director, Texas Coastal and Marine Council: "The marine fish catch in Texas is approximately 75 mill ion pounds valued at $175-200 million. Of this about 10 percent is actually caught in the estuaries, but virtually all are estuarine dependent at some time in their life cycle. Some experts contend that "an acre of estuarine-related marsh is five, ten, or 15 times as productive as good farmland." Of course, such statements lead to further questions, such as: Productive in terms of "what," total biomass produced, or that portion that is recoverable and usable by man? Just which acre of each is being considered?"

MUNICIPALITIES--**Henry Graeser,** former director of Water Utilities, Dallas: "We might well recognize now that where value of water is concerned, there are wide disparities among alternative uses. Many studies indicate that water use for urban or industrial purposes will presently create as much as 10 or more times the value in new products over water for agr iculture. The question is, of course, what kind of product– essential or luxury?

"We in the municipalities cannot look at it as our God-given right to grow and be as big and as wasteful as we wish to be simply because we are wealthy and are producing wealth. We need food and fiber and the agricultural industry and its input to the economic well-being of the municipalities. There is a balance to he reached, however, in the use of water in both the cities and on the farm. Certainly in Texas food and fiber is a vital part of our economic well-being. At the same time, there must be developed new and more efficient means of using agricultural water because the day is coming when the supply of water to some of our most fruitful areas will be exhausted, or its replacement will be extremely expensive. In the urban picture, water is becoming more and more expensive, too, as trans-basin diversion is now a necessity for nearly all the metropolitan areas in Texas."