

# Voice

of  
the Federal Reserve Bank of Dallas  
El Paso · Houston · San Antonio

December 1979

- 1 Since You Asked:  
“In Order to Stop Inflation, Why Don't You Just Stop the Growth of Money and Credit Instead of Raising Interest Rates? Wouldn't That Be Better for Everyone?”
- 2 Increasing Water Scarcity: Some Problems and Solutions
- 12 Board Broadens Regulation Q Interpretation
- 14 Agricultural Outlook Conference Highlights
- 16 “Fed Quotes”
- 19 Board to Revoke Regulation Z Amendment



????????????????????????????????????????????

# Since You Asked

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

*A fringe benefit of working at a Federal Reserve Bank is the frequent invitation to speak before various groups. And speeches inevitably generate questions. This is a brief response to the question asked most frequently following speeches during the past month.*

**Question:** In order to stop inflation, why don't you just stop the growth of money and credit instead of raising interest rates? Wouldn't that be better for everyone?

**Answer:** It is not possible to slow the growth of money and credit without causing interest rates to rise, for a while at least.

Interest rates, money, credit, inflation, and economic activity are all linked together. So it is not possible to influence one of them without influencing the others also.

Interest rates, of course, are the price of credit and are determined, therefore, by the supply of credit and the demand for credit. The Federal Reserve can directly influence supplies of credit, but its influence on demand is indirect. There is a direct link between credit and money. Bank credit, for example, represents the asset side of the banks' balance sheets, and money consists largely of demand and time deposits, on the liability side of their balance sheets. In any conventional accounting system, assets must equal liabilities.

People and businesses borrow money to spend it—that is, the demand for credit. But higher expenditures require larger cash balances. Thus, when credit demand strengthens and credit grows more rapidly, so does money—that is, both sides of the banks' balance sheets.

The Federal Reserve can influence the supply of credit by changing the supply of bank reserves or by changing required reserve ratios. Slowing the growth of bank reserves or raising reserve requirements constrains the supply of lendable funds at banks and limits the growth of both credit

and money. With the supply of credit restricted, interest rates rise. The higher price of credit slows borrowing, spending, the growth of money, and economic activity. So money, credit, interest rates, spending, and economic activity are all inextricably related.

The goal of reducing the growth of money and credit, however, is to slow the rate of inflation; and to the extent this can be done, interest rates will decline. Interest rates track the inflation rather closely. That is, the higher the rate of inflation and the greater are anticipations that the inflation will persist or strengthen, the higher will be interest rates.

So, in order to get interest rates down, we must reduce the rate of inflation. The Federal Reserve's role is to slow the growth of money and credit. While this results initially in an increase in interest rates, it is expected eventually to reduce both inflation and interest rates. With any given level of demand for credit, the initial slowing of the growth rates of credit and money will cause interest rates to rise until the demand for credit declines.

—Ernest T. Baughman  
President, Federal Reserve Bank of Dallas



# Increasing Water Scarcity: Some Problems and Solutions

By Larry D. Hauschen

The reappearance of gasoline lines and skyrocketing petroleum prices this past summer once again reminded Americans of the exhaustibility and increasing scarcity of petroleum. Yet, a problem that is unknown to many and at the same time is critically important to others lies in the threat of a shortage of a resource even more basic than oil. That resource is water.

The problems and the issues surrounding water have been receiving attention recently, especially in the arid and semiarid western half of the nation, where rapidly increasing demand threatens to surpass available supplies. A recent issue of *The Economist* states, "Of the shortages that face Americans, petrol may be the most alarming at present but water may be the most serious in the long run."<sup>1</sup>

The threat of a serious shortage of water is different from oil shortages in at least two respects. One, water is absolutely essential to life itself and is required at some point, in one form or another, to produce nearly everything. Unlike petroleum, water has no substitutes, and, thus, development of alternatives does not have potential. Second and somewhat ironic is that water, unlike petroleum, is not an exhaustible resource. Precipitation is the ultimate source of all freshwater supplies, and in an absolute sense, this country has as much water

now as it did a century ago. And barring any drastic changes in weather patterns, it will have as much a century from now as it has today.

The threat arises, of course, because population and economic activity have grown rapidly, and the demand for water for an increasing number of uses now threatens to surpass the naturally renewable supply. An important implication lies in this contrast. In the case of oil, no realistic level of conservation can prevent eventual depletion, but conservation and efficient use of water can ensure continued supplies of usable-quality water indefinitely. Indeed, since available supply can be augmented only to a point, conservation and efficient use will prove essential to avoiding shortages of water in the future.

The importance of water and the threat of water shortages are not unfamiliar to the Eleventh Federal Reserve District. The rapid economic growth that this region, as well as other parts of the Sun Belt, has experienced in recent years has depended to a significant extent on the development and maintenance of adequate water supplies to meet agricultural, industrial, municipal, and recreational needs. As can be seen from the accompanying precipitation map, only the eastern edge can be classified as having a humid climate, and a major part of the District is either arid or semiarid. Thus, the solution of current and potential problems surrounding water use is vital to continued growth of

1. "Water: It's Finite, Too," August 18, 1979, p. 34.



the region. Suggestions for alleviating water shortage fall, naturally enough, in two categories: ways to increase the supply of water and methods of reducing the demand for water.

### **Supply augmentation**

A number of possibilities for augmenting the supply of water have been suggested. Three important ones are interbasin transfers, precipitation enhancement, and desalinization.

**Interbasin transfers.** Interbasin transfers of water—importation from water-surplus areas by water-deficient areas—at first glance have the greatest potential, at least in the short run, and certainly have received the widest public attention. The concept of interbasin transfers is not new. Such transfers are common in the eastern half of the nation to meet municipal water needs of large cities, and a significant number take place in the West as well. Importation of water to the Texas and New Mexico High Plains is currently receiving a considerable amount of attention. An import authority has been established in Texas and is charged with determining potential sources of water and establishing guidelines for importation. Unfortunately, the opportunity costs of exporting water may be very high, and residents of potential exporting regions tend to be extremely skeptical about agreeing to give water to other regions.

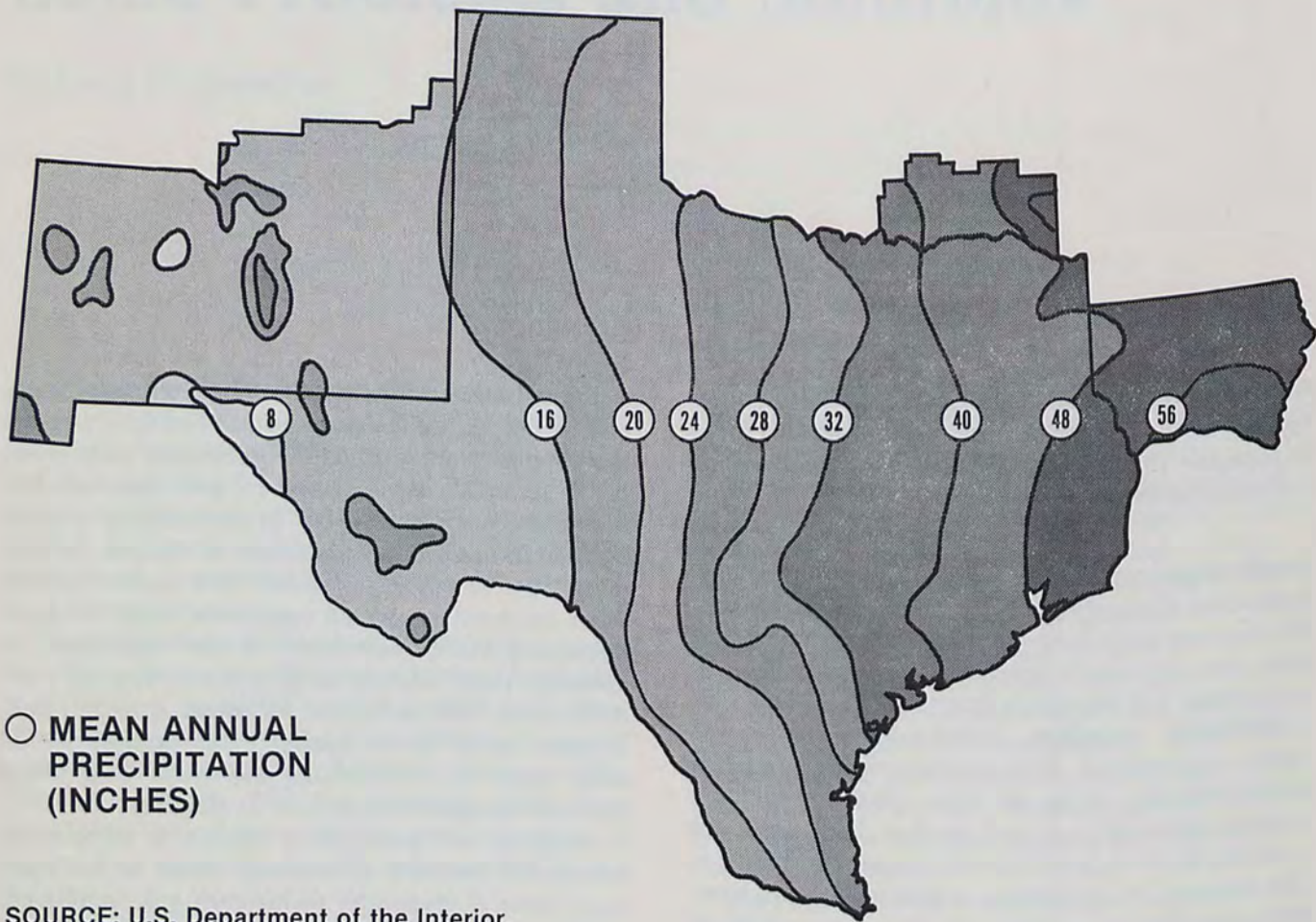
**Precipitation enhancement.** Research into methods of increasing the proportion of moisture in the atmosphere that reaches the earth has been going on at least 30 years. However, past research has not been very successful in developing a solid understanding of the processes of increasing precipitation. A paper presented at a recent symposium on western water resources noted that research is fairly advanced in the technique of seeding winter clouds as they move upward over mountains. The technique increases snowfall and, in turn, runoff in the spring.<sup>2</sup> This process would raise costs of maintaining highways and might increase dangers arising from avalanches.

Progress has been much slower in developing successful methods of seeding clouds in the summer. Even if improved techniques are developed, two significant problems will be encountered. One, the environmental impact of increasing summer rainfall could be severe; and second, there exists a tremendous potential for conflict over whether artificially induced rainfall in one area may deprive another area of precipitation that would have fallen naturally.

2. Theodore M. Schad, "Western Water Resources—Means to Augment the Supply," paper presented at Western Water Resources Symposium sponsored by Federal Reserve Bank of Kansas City, Denver, Colo., September 27, 1979.



# Precipitation in the Eleventh Federal Reserve District





In short, the potential for precipitation enhancement in the long run cannot be ascertained. But this method of augmenting water supplies clearly will not be an important solution in the near future.

**Desalinization.** Nearly 30 years of research on desalinization technology have not brought success in developing a technique that can compete, from a cost standpoint, with other methods of developing water. Most existing plants rely on distillation, a process that is extremely sensitive to changes in energy prices.

---

**Since the promise for augmenting water supply sufficiently to solve potential shortages appears limited at best, the search for solutions to the water problems of the West must turn to factors that affect the demand for water.**

---

A relatively new process, reverse osmosis, may improve the economic feasibility of desalinization projects. However, while desalinization may have immediate potential for very high value economic uses, such as manufacturing, and may indeed have potential in the long run for other uses, it also is unlikely to solve any near-term water problems.

Since the promise for augmenting water supply sufficiently to solve potential shortages appears limited at best, the search for solutions to the water problems of the West must turn to factors that affect the demand for water. Generally, these solutions involve pricing, structural changes, and conservation. Emphasis will be placed on solutions that would reduce the demand for water in agricultural irrigation, which accounts for 90 percent of the consumptive use of water in the West.

### **Pricing**

Past policy has led to pricing water far more cheaply than would be the case in a market environment where all alternative uses and costs are reflected. The Reclamation Act of 1902, which provided for the sale of public lands to construct irrigation projects for family farms, intended for the capital costs of irrigation, as well as operation and maintenance costs, to be repaid by the beneficiaries of the irrigation water. And until 1939, irrigators did pay all project costs but without

interest. That year, the Reclamation Project Act allowed a ten-year development period before repayment was to begin. The act also set the stage for "basin account" transactions by allowing other beneficiaries, such as power customers, to be required to pay part of the irrigation costs.

Today, hydroelectric customers pay as much as 80 percent of project costs, and the debt farmers repay is spread over a 50-year period, with no repayment due in the 10-year development period and the debt repaid over the remaining 40 years without interest. At current interest rates, the interest subsidy alone represents a significant transfer payment from general taxpayers to irrigating farmers.

While there is a significant difference of opinion regarding the extent of the subsidy, a study that examined some 5,000 water projects and programs has indicated that agricultural water supply projects repay only 19 percent of project costs.<sup>3</sup> The subsidy from reclamation water provided to farms in the Westlands Water District of Central California has been estimated to run as high as \$1.4 million per 640-acre farm per year. The General Accounting Office estimates the subsidy in the Westlands district ranges from \$20,000 to \$100,000 per year for a 640-acre farm, compared with an average of \$500 per year for farms of the same size in the rest of the nation.<sup>4</sup>

---

**Past policy has led to pricing water far more cheaply than would be the case in a market environment where all alternative uses and costs are reflected.**

---

**Full-cost pricing.** Whatever the extent of the Federal subsidy, it has serious implications for the problem of impending water shortages. It is an accepted economic principle that a good priced below cost will not be used efficiently. Artificially low prices necessarily lead to waste, in that more

3. Ronald M. North and Walter P. Neely, "A Model for Achieving Consistency for Cost Sharing in Water Resource Programs," *Water Resources Bulletin* 13 (October 1977): 1004.

4. "Senate Water-Use Bill Pits Big Firms Against Small Farms," *Congressional Quarterly Weekly Report*, September 29, 1979, pp. 2121, 2123.



## Allocation of a Scarce Resource

The basic problem involving water is the essence of economics: how best to allocate a scarce resource among competing uses.

In a market economy, prices perform the allocation process. The scarce resource is allocated to the buyers that are willing and able to pay at least the equilibrium price—the price at which the last unit of supply will be offered. Given any supply, as the demand increases, the price is forced higher. At the higher price, only the users that, given the economic activity for which the resource is used, can still profit will obtain the resource. Those that cannot or will not pay the higher price are forced out of the market. In this manner, the resource is always allocated to its “highest and best” uses, as measured by the resource’s contribution to the total value of output.

Water has not been allocated through the market system for several reasons. First, for a market to allocate a commodity efficiently, there must exist the opportunity for property rights to be established. Only if a party can claim ownership can something be offered for sale. Water, unlike land, often is not fixed or clearly definable as to the area and location for which property rights can be established. Rather, it is a fugitive resource, and specific property rights are extremely difficult to establish in the absence of nonmarket institutions.

Second, for a market to allocate a resource efficiently, there can be no significant externalities—that is, spillover costs or benefits. If benefits accrue that are not accounted for by the measurable demand, then, given any supply, the market price will be too low and

resources underallocated to that use since, at the going price, society wants more of the good. On the other hand, if spillover costs prevail—that is, persons who neither buy nor sell the output incur some of the costs—then resources are being overallocated to that use.

In our economic system, externalities are partly responsible for government construction of highway systems, national defense, space research, and pollution controls. Water projects constructed for any given use typically benefit a large number of users that would not be evident in the marketplace. Thus, there are significant benefits from water resource development that are collective in nature and, therefore, difficult to incorporate into a market.

Third, the initial costs of projects at times can be prohibitive to even the largest of private enterprises. The benefits accruing to any one user would usually be insufficient to warrant the project, and the construction costs of many water projects tend to be prohibitive to all but governmental institutions. Even if the private sector were capable of financing the projects, the collective nature of the benefits provided would, in many instances, make collecting the financial resources difficult.

The last factor that often induces governmental involvement rather than strict reliance on the marketplace is that while the price system promotes economic efficiency, it contains no provision for equity. Thus, in the opinion of society, natural adjustments in the marketplace in the continued allocation and reallocation of resources may be unduly burdensome on particular elements of the economy. Political concerns regarding the transfer of water from agriculture to other uses reflect this phenomenon.



of the resource is used relative to the optimum amount, given the true cost of the resource.

It follows that an obvious way to reduce the demand for water and to cause water to be used efficiently is to impose full costs on users and allow high-value users to take water away from low-value users. That is what would occur if the resource were allocated by an efficient market.

There is no question that the implementation of this approach would cause serious conflicts. Pricing water at its market value would have an immediate detrimental impact on longtime recipients of subsidies. A wealth loss would be imposed on farmers who have already paid for the subsidy in the form of higher land prices. Considerable conflict could arise between efficiency and equity considerations if direct beneficiaries are forced to pay all costs, ignoring the indirect benefits generated. Additionally, the issue will be further complicated by the fact that the general taxpayer does receive some return benefits from the subsidy in the form of cheaper food prices. For example, 30 percent of the nation's fruits and vegetables are produced on land supplied with federally developed water.

**"Water bank."** Water in the West is generally allocated by a system of water law known as the prior appropriation doctrine (see the accompanying Appendix). Under this doctrine, a party acquires a right to use water by making a claim to divert a specified quantity of water from a particular source for a given purpose. The applicant has priority over later claimants but may lose the appropriation through nonuse of the water. In other words, conservation may lead to loss of rights. Clearly, then, the appropriation doctrine not only fails to encourage efficient use but encourages inefficient use. Some institutions have been developed to alleviate this problem, but one rather obvious solution has largely been ignored. That solution is the creation of a water "brokerage" or "bank."

Water administrators could significantly increase the efficiency of water use by establishing an institution to which an appropriator could sell unneeded water. This institution, the water bank, could, in turn, sell the water to other users. The price could reflect supply and demand conditions and could serve to reallocate water to high-value users by allowing low-value appropriators to sell water, on a nonrecurring basis, for more than the water could earn if applied to their enterprises.

The water bank transaction would entail no conflict, in the same manner a true marketplace entails no conflict, since all parties involved would be at least as well off as they would have been without the transactions. The incentive for conservation would be considerable, as users would be rewarded for consuming less water at any particular time without sacrificing the right to their full appropriation at any time in the future. Water banking has been successfully implemented in some instances in California and is worthy of serious consideration elsewhere.

### **Structural changes**

Even if steps are taken to increase the role of market-type forces in increasing efficiency of water use, the fact remains that water will continue to be allocated for the most part by government policy.

One of the major problems lies in the complexity and diversity of water rights in the different states. Courts continually make decisions, case by case, that add new elements to a state's water law. Under the present system, resolution of conflicts is possible primarily through adjudication of specific cases. For major issues pending in Texas, it is anticipated that the adjudication process will not be completed for another decade.

---

**To the extent that Federal involvement in front-end financing of water projects continues, continuation of the substantial subsidy provided in the past must be reconsidered.**

---

Several suggestions seem appropriate. To the extent that the Federal Government involves itself in water policy, it should coordinate the basic elements of that policy, rather than allow institutions responsible to different congressional committees to act individually. Careful attention must be paid to the fiscal responsibility for projects. For example, some have suggested the manner in which benefit-cost analysis has been used in the past should be evaluated. To the extent that Federal involvement in front-end financing of water projects continues, continuation of the substantial subsidy provided in the past must be reconsidered.



States can attempt to improve the allocation of water by making the laws governing water use in the state uniform across the state and by trying to eliminate the tremendous divergence of state laws. States should pay increased attention to the criteria for efficiency of use. The permit system can be used to increase the efficiency of allocation by restricting permits to a specific time span and by including a condition that reevaluation of water use take place periodically. Such a system could enable the state to reallocate water to higher-value uses as economic conditions change.

### **Conservation of water on the farm**

Whatever the changes implemented in the water allocation process in the West, it is certain that the largest consumer of water, the irrigating farmer, will be affected. Any reallocation of water will almost certainly involve a transfer out of agriculture. Water has been priced below its market cost in the past, and farmers have had inadequate incentive to use it efficiently.

The ability of the irrigating farmer to adapt to changes will depend largely on the ability to reduce water use and increase water use efficiency. It is interesting to note that particular attention has been, and continues to be, given to many of these methods in the High Plains of West Texas, where farmers irrigate by pumping from the continually declining Ogallala aquifer. Energy costs to pump water in this area are five times the total cost of water in some federally subsidized projects. The following are a few methods of reducing water use that are available to the irrigator.

**Changing the irrigation method.** For years the primary method of irrigation was furrow, or gravity, flow, in which water is released from an impoundment and allowed to flow down the furrows of the field. This irrigation method is extremely wasteful of water and is gradually being replaced by far more water-efficient sprinkler systems. Today, attention is being directed toward the adoption of low-pressure sprinkler systems, which have significantly lower energy requirements and evaporation loss than the high-pressure systems. Trickle, or drip, systems, which apply small amounts of water near plant roots at frequent intervals, use 50 percent less water than other sprinkler systems. Currently, these systems require substantial initial investment and have been limited primarily to high-value crops, such as fruits. However, increas-

ing water costs and energy prices, coupled with additional research, may make the low-pressure systems more attractive in the future.

**Pumping plant efficiency.** Farmers can significantly reduce energy and water consumption by carefully monitoring the efficiency of their pumping plant, both the pump and power station. In the past, when both energy and water were abundant and relatively cheap, farmers typically did not pay particular attention to the efficiency of the plant. As prices for water rise, farmers will increasingly find it profitable to keep the pumping plant in efficient working condition.

**Irrigation scheduling.** Research has shown that timing of irrigation is extremely important to crop yields. In the past, farmers generally have applied a larger than optimum quantity of water. Excessive irrigation not only costs the farmer more for water and energy but also increases soil erosion and nutrient loss in the plant root zone. Irrigation scheduling entails the farmer utilizing detailed information on such factors as soil moisture capacity and levels, infiltration and evaporation rates, and the timing of individual-crop water requirements in order to determine the optimal amount and timing of irrigation. Computer programs that have been developed in Nebraska are able to analyze vast amounts of relevant information and predict water needs. There is a tremendous potential for saving water through adoption of this management technique. Some studies have estimated water use can be reduced 25 percent by using irrigation scheduling.

**Tailwater recovery.** Anytime water is applied at a faster rate than a soil's infiltration rate or the amount of water applied exceeds a soil's capacity, runoff results. A study of High Plains Underground Water Conservation District No. 1, which encompasses nearly half the irrigated acres in the Texas High Plains, has estimated that 20 percent of irrigation water leaves the farm as tailwater.<sup>5</sup> Tailwater recovery systems that have been developed can capture, store, and return the lost water cheaper than the original water can be pumped.

**Tillage practices.** Limited-till or no-till production techniques are usually recognized as energy-saving devices. However, water loss from the seedbed is reduced significantly in some soil types.

5. High Plains Underground Water Conservation District No. 1, *Guide to Irrigation Tailwater Recovery*, Report 77-01 (Lubbock, Tex., 1977), p. 4.



By one report, preplant irrigation for grain sorghum following a wheat crop can be eliminated, thereby saving about 20 percent of total irrigation water.<sup>6</sup>

**Basin tillage.** Basin tillage amounts to nothing more than shaping mounds of soil in the furrows to form water-impounding basins. The basins reduce runoff from precipitation by holding the water in place longer for infiltration into the soil. Basin tillage can also be utilized to increase the infiltration of sprinkler irrigation. The practice can be adopted with minimal investment, requiring only a modification of planting or cultivating equipment, and has been shown to increase dryland yields of cotton 25 percent in the Lubbock, Texas, area.<sup>7</sup>

---

**Water scarcity promises to be a major source of conflict in upcoming decades; and traditional methods of augmenting the water supply, primarily the construction of dams, are becoming increasingly unproductive and expensive.**

---

**Water conveyance.** Significant water loss occurs through infiltration and evaporation as water is transported through irrigation ditches. The use of underground pipeline to convey water can greatly reduce this loss. Again pointing to the Texas High Plains, some 10,500 miles of underground pipeline in High Plains Underground Water Conservation District No. 1 are estimated to save 700,000 acre-feet of water per season, or 21.8 million gallons

of water each year per irrigated farm in that district.<sup>8</sup> One experiment showed the amount of water pumped could be reduced about 16 percent by using underground pipe.

These are only a few of the actions farmers can take to reduce water consumption. The extent to which any particular method reduces water use in any particular area will depend on the characteristics of that area, such as soil types, topography, and weather.

Technological developments reflect relative prices of inputs. In the past, water has been relatively cheap, and, hence, motivation to save it was not strong. That will change in the future, and as the cost of water rises, farmers and others will develop ways to use the resource more efficiently.

Water scarcity promises to be a major source of conflict in upcoming decades, especially in the western half of the nation. Increased demand resulting from rapid economic growth and the need for alternative energy sources threatens to surpass the available supply; and traditional methods of augmenting that supply, primarily the construction of dams, are becoming increasingly unproductive and expensive.

While alternative methods of developing water supply have potential, any solution to water shortages for several years must involve demand reduction. Economic incentives to conserve this resource have been inadequate, and, hence, significant potential for more efficient use of water exists. It is particularly important that irrigating agriculture, the largest user of water in the West, adopt more efficient techniques of water use. Cooperation and coordination of all involved in promoting efficient management and use of water resources are essential to the prevention of serious water shortages in the future.

6. High Plains Underground Water Conservation District No. 1 and Texas Department of Water Resources, A *Summary of Techniques and Management Practices for Profitable Water Conservation on the Texas High Plains*, Report 79-01 (Lubbock: High Plains Underground Water Conservation District No. 1, 1979), p. I-1.

7. *Ibid.*

8. Jack W. Richards, "High Plains Irrigators Conserve Water," *The Cross Section*, High Plains Underground Water Conservation District No. 1, August 1978, p. 4.



## Appendix

### Laws Governing Water Use

Water resources are typically classified as either surface water or groundwater. Precipitation is considered diffused surface water until it reaches a lake, river, or other watercourse. Once the water reaches a defined watercourse, it becomes surface water. Thus, surface water consists of all natural streams, lakes, and ponds as well as man-made reservoirs and impoundments. Groundwater can take the form of an underground stream flowing along some defined channel, an underground reservoir of water formed through hundreds of years of percolation and contained within layers of sand and gravel or between layers of rock, or percolating waters not confined to any channel whatsoever.

#### Surface water law

The laws and regulations governing the use of surface water in the United States vary considerably from state to state. However, all fall under two general doctrines of water rights: riparian doctrine and prior appropriation doctrine.

**Riparian doctrine.** Under the riparian, or common law, doctrine, the owner of land bounded or crossed by a river, stream, spring, or other natural body of water has certain riparian rights regarding use of the water. Riparian owners have the right to use the water for a number of purposes deemed “natural” uses, including domestic and household needs, livestock watering, fishing and recreation, even the generation of power.

In the strictest sense, riparian law gives the landowner a right to have the water undiminished in quantity and quality and uninterrupted in the duration of flow. This right is qualified only by the right of upstream riparian owners to use the water for domestic needs and livestock watering. The riparian owner does not have a property right in the water, in that except for domestic uses and livestock watering, no more water can be taken or diverted from the watercourse than will be returned to it.

Most states adhering to the riparian doctrine have modified it. A common variation

is the “reasonable use” doctrine, which permits riparian owners to take water for “extraordinary and artificial” uses so long as those uses do not interfere with the natural rights of riparian owners downstream. Under this modification, municipalities, industry, and irrigating farmers, for instance, can divert water as long as enough water is available to downstream riparian owners for “natural” uses. Riparian rights are not restricted in time; they cannot be lost through misuse or nonuse.

Some states permit riparian owners to obtain “prescriptive” rights, which grant them the authority to use water for some extraordinary use even if the rights of lower riparian owners are infringed upon. For example, a city might obtain a prescriptive right for municipal water needs. It should be emphasized, however, that the prescriptive right applies only to downstream riparian owners. For example, while a city may deprive a downstream riparian owner of some water, a riparian owner upstream could deprive the city of any water required for natural uses, such as livestock watering.

**Prior appropriation doctrine.** While the water laws in the eastern states adhere to the riparian concept, the usefulness of the doctrine in allocating the limited supply of water among a growing number of competing uses was exhausted early in the settlement of the arid West. The Mormons appropriated surface waters 130 years ago without regard for riparian rights when they began irrigating the Salt Lake valley in Utah. Gold miners in California began practicing the doctrine, and by 1900 nearly all the western states had adopted the prior appropriation doctrine of water law.

Under the prior appropriation doctrine, a party acquires a right to use water by making a claim to divert and use a specified quantity of water from a particular source for a given purpose. When the claim is made and water is diverted, a priority is established, with first claimants receiving priority over later claimants. This is appropriately referred to as a “first in time, first in right” doctrine.

The claimant must apply the water to a beneficial use, and riparian and nonriparian owners have an equal right to make a claim.



## SELECTED ASPECTS OF WESTERN WATER LAW

State	Water law doctrines		Preference of use (Order) <sup>1</sup>
	Surface water	Groundwater	
Arizona . . . . .	Prior appropriation	Reasonable use <sup>2</sup>	1-2-3-4-5
California . . . . .	Prior appropriation, riparian	Correlative rights	1-2—
Colorado . . . . .	Prior appropriation	Prior appropriation	1-2 over 5
Idaho . . . . .	Prior appropriation	Prior appropriation	1-2 <sup>1</sup>
Kansas . . . . .	Prior appropriation, riparian <sup>4</sup>	Prior appropriation	1-2-5-6-3
Montana . . . . .	Prior appropriation	Prior appropriation	None
Nebraska . . . . .	Prior appropriation, riparian <sup>4</sup>	Reasonable use <sup>2</sup>	1-2 over 5
Nevada . . . . .	Prior appropriation	Prior appropriation	None
New Mexico . . . . .	Prior appropriation	Prior appropriation	None
North Dakota . . . . .	Prior appropriation	Prior appropriation	1-2, 5-6
Oklahoma . . . . .	Prior appropriation, riparian <sup>4</sup>	Prior appropriation	None
Oregon . . . . .	Prior appropriation, riparian <sup>4</sup>	Prior appropriation	1-2-4—
South Dakota . . . . .	Prior appropriation, riparian <sup>4</sup>	Prior appropriation	1—
Texas . . . . .	Prior appropriation, riparian <sup>4</sup>	Absolute ownership	1-5-2-4-3-7-6
Utah . . . . .	Prior appropriation	Prior appropriation	1-2
Washington . . . . .	Prior appropriation, riparian <sup>4</sup>	Prior appropriation	None
Wyoming . . . . .	Prior appropriation	Prior appropriation	1-5

1. 1 represents domestic and municipal; 2, agricultural (irrigation); 3, power; 4, mining; 5, manufacturing and industrial; 6, recreation; 7, navigation.

2. Lacks comprehensive groundwater laws.

3. In mining districts, 4 over 2 and 5.

4. All new water by prior appropriation.

SOURCE: George E. Radosevich ("Better Use of Water Management Tools," paper presented at Western Water Resources Symposium sponsored by Federal Reserve Bank of Kansas City, Denver, Colo., September 28, 1979).

Thus, a nonriparian landowner with a prior claim to water from a given source has the right to use the quantity of water established in the claim to the exclusion of a riparian landowner with a later claim or no claim at all. The right to use water is subject to the needs of prior appropriators and, thus, is not a guaranteed right per se. A claimant may divert the specified amount of water only if its intended use will not infringe upon the supply of water to prior claimants. However, once that condition is met, a claimant can divert the specified quantity of water even if doing so exhausts the water supply.

Unlike the riparian right, the appropriation right can be lost through misuse or nonuse. Also, unlike the riparian right, the appropriation right is a property right and, as such, has value and can be exchanged.

The prior appropriation doctrine implicitly requires a system of administration to effect its rule. In the absence of any Federal water laws, the individual states have established a wide variety of rules, modifications, and

guidelines that are administered by various agencies and organizations. Such a collection forms a state's water law. In the administration of the prior appropriation doctrine, most western states have adopted a permit system, in which a claimant must request permission from a state agency to divert and use a certain quantity of water under a certain set of conditions. The agency has the authority to grant the permit as requested, grant it in a modified form (such as for a restricted time period), or reject it altogether.

The permit system allows some states to allocate water among the competing uses not only by priority in time of filing but also by priority as to proposed uses of the water. The priorities assigned to various uses differ among states, however, and several states assign no priorities at all.

Some states have modified the appropriation doctrine as it applies to agriculture by imposing a "statutory duty" on water. This criterion restricts the amount of water that can be applied to an acre of farmland. The



purpose, of course, is to prevent waste through excessive use.

#### **Groundwater law**

Most western states have adopted the prior appropriation doctrine for groundwater as well as surface water. However, three other groundwater doctrines exist: absolute ownership, reasonable use, and correlative rights. Under the doctrine of absolute ownership, a landowner has a right to use any amount desired of the water lying below his land. Texas is the only western state that abides by this doctrine.

Under the reasonable use doctrine, each landowner must use the underlying water in a reasonable manner, showing regard for the rights of the other landowners using the water. Under the correlative rights doctrine, landowners are required to put the water to a reasonable use so long as the supply is adequate but to use only a quantity of water proportionate to the percentage of an owner's land overlying the particular underground water source when supply becomes inadequate. California has adopted the correlative rights doctrine.

---

## **Board Broadens Regulation Q Interpretation**

The Board of Governors of the Federal Reserve System has determined that credit unions should be included within the category of institutions from which member banks may borrow Federal funds. As a result, the existing interpretation of Section 217.137 of Regulation Q was modified, effective October 6.

With this new category expansion, a member bank may now borrow Federal funds from another member bank, a nonmember commercial bank, a savings bank (mutual or stock), a building or savings and loan association or cooperative bank, the Export-Import Bank of the United States, Minbanc Capital Corporation, a foreign bank, or a credit union. Member bank borrowings from credit unions in the form of Federal funds are managed liabilities that may be subject to marginal reserve requirements.



# Amendments Proposed for Regulation Z Enforcement Guidelines

The five regulatory agencies represented on the Federal Financial Institutions Examination Council are proposing three amendments to the Truth in Lending enforcement guidelines. The proposed amendments to the guidelines for enforcement of the Truth in Lending Act and its implementing Regulation Z are:

1. Increase the tolerance for minor errors in disclosure of the annual percentage rate to a borrower, from the present one-eighth of a percentage point to one-quarter of a point.

2. Amend the prescribed period of retroactive application of the guidelines—including reimbursement—from October 28, 1974, or two years prior to the date of the examination to:

- a. The date of the previous examination, if violations are found in a current examination.

- b. And where an agency determines that a creditor has persisted in a violation cited in a previous examination, corrective action would be required for all affected loans consummated after the date when the creditor was first notified of the violation.

3. Add a section to the guidelines permitting

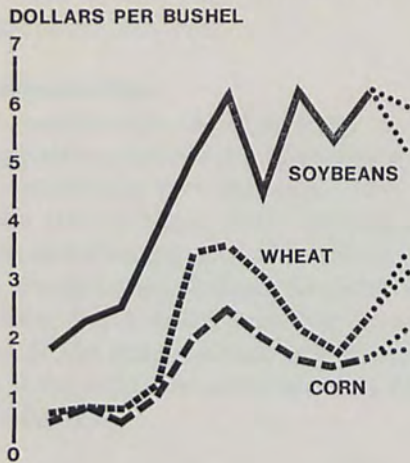
the agencies to use discretion in applying enforcement policy where a violation presents a unique or significant problem.

These amendments are being considered because they would promote equitable enforcement of the Truth in Lending Act and allow greater flexibility in implementing effective corrective action for the different types of institutions to which the act applies.

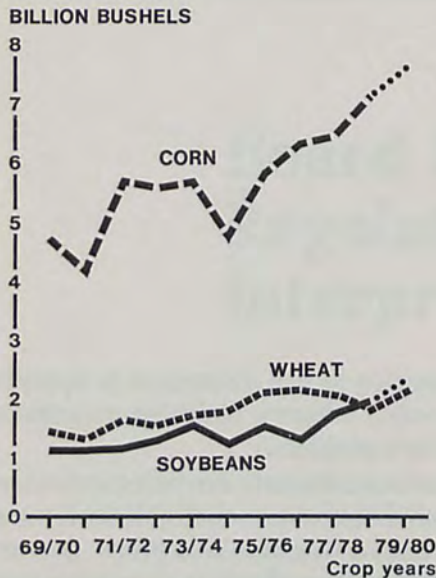
In August the Board of Governors of the Federal Reserve System authorized a temporary suspension of the requirement of the guidelines for reimbursement of overcharged customers, pending resolution of certain policy issues. In proposing the amendments to the guidelines, the Board said in October that the recommendations were based on experiences of the agencies (the Federal Reserve Board, Comptroller of the Currency, Federal Deposit Insurance Corporation, Federal Home Loan Bank Board, and National Credit Union Administration) in implementing the guidelines over the previous nine months. The proposed amendments should alleviate the major problems raised by the original guidelines.



### PRICES RECEIVED BY FARMERS

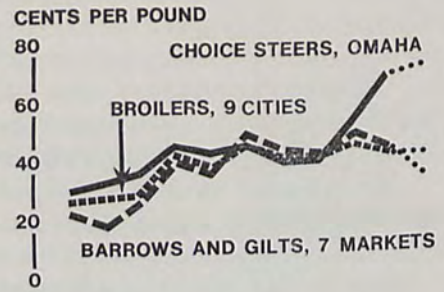


### PRODUCTION

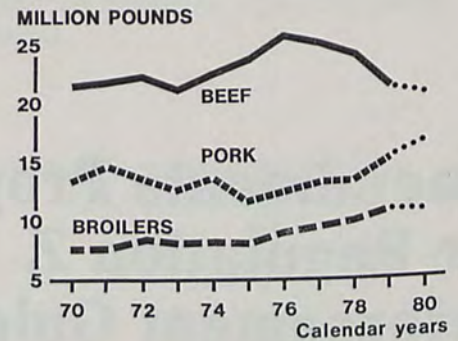


Domestic production of major crops will be up sharply in 1979-80, but foreign demand is strong and is helping to maintain favorable farm prices. For corn and soybeans, production is at record-high levels. Cotton production, projected to be about 14.5 million bales, will likely be about 34 percent greater than in 1978-79.

### PRICES

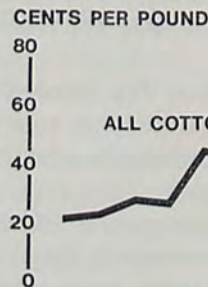


### PRODUCTION

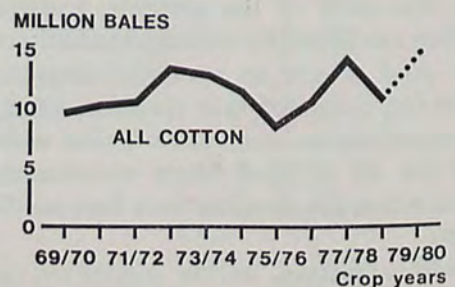


With beef supplies low and retail prices high, demand for pork and poultry has been particularly strong. Hog and broiler producers have apparently overexpanded and will face a difficult year as the prices they receive drop below rising production costs. Beef production will not likely increase until 1981.

### PRICES RECEIVED BY FARMERS



### PRODUCTION





# Agricultural Outlook Conference Highlights

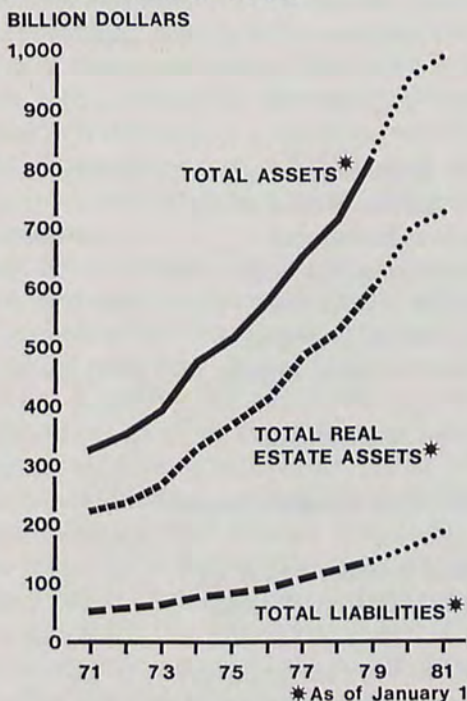
The U.S. Department of Agriculture's 56th annual outlook conference was held recently in Washington, D.C. Participants from government, private industry, universities, and foreign countries gave their assessments of the outlook for agriculture in 1980.

## U.S. AGRICULTURAL TRADE



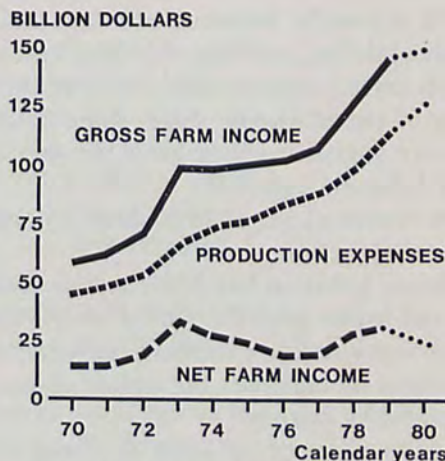
Exports are a bright spot in the agricultural outlook. Agricultural exports are expected to reach a record \$38 billion in fiscal year 1980 and to increase more than agricultural imports.

## BALANCE SHEET OF THE FARM SECTOR



Total assets of the farm sector are expected to reach \$820 billion by the end of 1979. The largest component of total assets, real estate, is expected to register a 16-percent increase for the year. However, the value of real estate is projected to increase only 5 percent in 1980, primarily because of reduced net farm income.

## FARM INCOME



Net farm income for 1979 is expected to be the second highest on record at close to \$31 billion. And although total cash receipts may reach a record high in 1980, fuel, fertilizer, and interest costs will cause production expenditures to rise even more rapidly. The result will probably be a decline in 1980 net farm income of about 20 percent.



# “Fed Quotes”

Brief Excerpts from Recent Federal Reserve Speeches, Statements, Publications, Etc.

“I would point out that productivity growth in this country is actually negative in a recent period, and we have had higher oil prices. And, of course, we import 50 percent of our oil, so that the higher revenues going abroad do not go to American citizens. Under those conditions, the standard of living of the average American has declined. I don't think we can escape that when we're producing less with the same amount of effort, according to statistics, and we're paying high prices abroad.

“Now, if we fail to recognize that and people try to catch up with the existing standard of living or try to increase their standard of living, you get a process going that only feeds the inflationary process, because wages move ahead of prices and then push up costs further, and up go the price levels some more.”

Paul A. Volcker, Chairman, Board of  
Governors of the Federal Reserve System  
(Before the Joint Economic Committee of  
the U.S. Congress, October 17, 1979)

“There was a day when our problems seemed to fall into . . . convenient analytic compartments. Most economists of my generation have made a career of analyzing so-called ‘tradeoffs’ between inflation and employment, between external and domestic stability, between the long and short run. But that theorizing has been rooted in certain assumptions—assumptions that are now suspect—about the stability of expectations. When expectations of future inflation are so strong and potentially volatile as they have become, the ‘tradeoffs’ disappear, or they appear in a much different light.

“The lesson of the 1970's—here and abroad—simply does not bear out the ‘either/or’ approach.

“—More inflation has been accompanied not by less, but by more unemployment and lower growth. We have not ‘traded off’ one for the other.

“—A weak dollar externally aggravates inflation at home, and a weak dollar at home undermines the dollar abroad. Fundamentally, what disturbs Peoria disturbs Zurich.

“—After years of inflation, the long run has caught up with us. We can no longer blithely assume we can ‘buy’ prosperity with a little more inflation, because the inflation itself is the greater threat to economic stability.”

Paul A. Volcker, Chairman, Board of  
Governors of the Federal Reserve System  
(In New Orleans, Louisiana, October 9, 1979)



"I have been in favor of greater restraint for more than a year and so I clearly favored the Board's action on October 6. However, I am still skeptical about targeting our policy actions on the monetary aggregates even through a surrogate. Over the past nine years we have moved steadily toward greater use of monetary aggregates as a guideline to policy. I submit that the problems of measurement, interpretation, forecasting, revisions, and tracking these guides on weekly, monthly, and quarterly bases have cast a significant cloud on their usefulness. Personally I would pay attention to such data only on a semi-annual time period and use our traditional measures of reserves, bank credit, and interest rates to provide the guidance as to the need for Federal Reserve action. I am particularly disturbed by the attention given to weekly money supply data recognizing all of its frailties of composition and estimation."

Philip E. Coldwell, Member, Board of  
Governors of the Federal Reserve System  
(At Washington, D.C., October 25, 1979)

"Monetary policy has never been easy. There was a time, nevertheless, when it was relatively simple. The standard prescription was to smooth out the business cycle. When the economy began to turn down, monetary policy was eased. The criterion usually applied to a central bank's performance was how well it 'caught' the top and how quickly it shifted from restraint to ease. Once the low point of the cycle had been passed, a lessening of ease was in order. The general principle was that of leaning against the wind.

"Even with this simple prescription, mistakes occurred. The most serious mistake, incurred repeatedly, was to start restraint too late. Waiting to tighten until you saw 'the whites of their eyes' meant that some inflation was allowed to occur that was not wrung out in the subsequent downturn. Excessive stimulative fiscal policies contributed to building in a mounting rate of inflation. In successively leaning against the winds of unemployment, inflation, and again unemployment, we kept switching targets until we had ratcheted ourselves up to very high levels of both inflation and unemployment.

"Today the problems of monetary policy are more complex. I can enumerate only a few. We now must contemplate the possibility of rising unemployment and high inflation occurring simultaneously. We may find ourselves moving into that situation from a cyclical peak now. Fiscal policy has remained stimulative, with an effective deficit—when in reality we are at full employment—of the order of \$40 billion, even though the Administration and Congress have made commendable efforts to bring that deficit down from much higher earlier levels. More near-term but nevertheless important considerations are that the monetary aggregates have been very strong for some months and that interest rates have been at best barely positive in real terms. These are some of the factors that must be taken into account in assessing the thrust of monetary policy. I shall revert to this aspect presently.

"More generally, the traditional policy of leaning against whatever wind blows is no longer appropriate to problems of our day. The wind now seems to be blowing from all sides. Greater steadiness is needed. In particular, we need steadiness in reducing the growth of the monetary aggregates in order to wind down the inflation."

Henry C. Wallich, Member, Board of  
Governors of the Federal Reserve System  
(In New York, New York, October 11, 1979)



## District Banks Elect Two New Fed Directors

Robert D. Rogers and John P. Gilliam are the new members of the Board of Directors of the Federal Reserve Bank of Dallas that member banks have elected to succeed Stewart Orton and Gene D. Adams, whose terms expire December 31.

Elected as a Class B director by banks in Group 1, Robert D. Rogers is president and Chief Executive officer of Texas Industries, Inc., Dallas. In addition to being a director of the parent company, he is Chairman of the Board of Texas Industries' real estate subsidiary, Brookhollow Corporation, and Chairman of the Board of Texas Industries' affiliate, Chaparral Steel Company.

Born in Hartford, Connecticut, Rogers attended public schools in New York and Massachusetts. He attended St. Mark's School of Texas and then graduated from St. Mark's of Southborough, Massachusetts. He received a B.A. degree from Yale

University and an M.B.A. degree from Harvard.

Elected as a Class A director by banks in Group 3, John P. Gilliam is President and Chief Executive Officer of the First National Bank, Valley Mills, Texas. His banking career began in 1956 when, following graduation from public schools in Clifton, Texas, he was selected as recipient of a scholarship from the Citizens National Bank of Waco to study banking at Baylor University. His postgraduate work was done at the Wharton School of Finance at the University of Pennsylvania, and he received an M.B.A. degree from Baylor.

Gilliam joined the Citizens National Bank of Waco in 1961 and became an officer in 1963. In 1968, he became President of the First National Bank in Valley Mills.

Both Mr. Rogers and Mr. Gilliam were elected for three-year terms to begin January 1, 1980.



# Board to Revoke Regulation Z Amendment

The Board of Governors of the Federal Reserve System, after careful consideration, has decided to revoke an amendment to Regulation Z, Truth in Lending. The amendment to be revoked provided for an exemption from the rescission notice requirement for certain advances under open-end credit plans secured by customers' residences. Under the amendment the right-of-rescission notice has been required only when the plan is initially opened, when the credit limit is increased or the terms of the account are changed, when a new security interest in a home is added to an existing open-end credit plan, and once annually.

After the withdrawal of the amendment, the rescission notice must be given every time there is a credit advance under an open-end credit plan that is secured by the customer's principal residence. The revocation will be effective March 31, 1980, and leeway has been provided for the orderly modification or termination of the few open-end credit plans now making use of the amendment.

---

## **New nonmember banks**

The Colony Bank, The Colony, Texas, a newly organized insured nonmember bank located in the territory served by the Head Office of the Federal Reserve Bank of Dallas, opened for business November 19, 1979.

Bank of Johnston County, Tishomingo, Oklahoma, a newly organized insured nonmember bank located in the territory served by the Head Office of the Federal Reserve Bank of Dallas, opened for business December 3, 1979.

Community Bank and Trust, Rockdale, Texas, a newly organized insured nonmember bank located in the territory served by the Head Office of the Federal Reserve Bank of Dallas, opened for business December 3, 1979.

---