In No. 5 of the Western Resource Issues Education Series, we considered a natural resource issue area that is of high interest to the public. We discussed water scarcity in an effort to identify and explore a public issue that may evolve from this issue area. In an effort to identify a specific public issue, we asked the question: With the pressure on rural Nevadans to convert vital water supplies to quench rapid urbanization, can agriculture remain a viable economic activity in western Nevada and Mono County, California?

No. 6 of the series addressed this question by considering water banking as one water management tool. It explained how a market for water works, how a water bank might be designed and operate, and possible benefits water banking may offer agricultural water users who, historically, hold most of the water rights.

To balance this discussion, No. 7 in the series considers common concerns about water banking. Examining both the benefits and costs of water banking aids in understanding more fully the potential consequences of choosing water banking as a tool for water resource management.

In arid western states, water banking offers an alternative tool for water management. Pressure for water rights holders to consider alternative means of water allocation has come about by increasing urban growth, concern about drought, and environmental awareness. Water banking is a subject of increasing interest as well as concern and controversy. Water rights holders and other issue stakeholders are concerned about possible undesirable economic, social, and ecological effects that might result if water banks are established. They are concerned also about the threat that water markets might pose to their property rights as water rights holders.
The possible undesirable effects of water banking are described often in legal terms as third party injuries. Since we are applying economic principles to the distribution of a scarce resource--water, in economic terms these injuries are considered negative externalities.

A negative externality refers to undesirable repercussions from shared use of a scarce resource. Repercussions may be described in economic, social, or ecological terms, or some combination of all three. The basic idea though is that when one individual demands more of the scarce resource it results in an increase in cost for another demander. Economic theory maintains that in order for all demanders to be satisfied, the added costs from increased demands must be shared. In this way, the externality is internalized. When we refer to this added cost as a third party injury, we typically look to courts to decide the outcome. If we consider the situation in terms of increased costs, we might be inclined to negotiate an agreement that satisfies new demanders--for a price.

An externality is more complex when property rights or ownership of the resource is not clearly defined. Lakes and rivers, for example, are often perceived as open access resources or public goods--that is, with only limited restrictions, everyone feels free to use and enjoy these waters. But in fact, western water is a quasi-private resource. That is, historically, western water is adjudicated to native residents of the American west and non-native settlers.

What complicates the situation further is that new demands for this scarce resource are constantly growing. These more recent demanders increasingly are urban, sub-urban, exurban, and industrial users, rather than agricultural. This creates a conflict among traditional, pioneer, and contemporary envisioned uses for a scarce resource.

Although western water decrees appropriate water for specific usage and in a sense privatize it, water resources remain relatively free-flowing over large geographic areas, varying belief systems, politics, affluence, and power. Users up-stream have always had the power to influence users downstream. In short, water is subject to forces of both natural and man-made change.

One possible negative externality associated with leasing a water entitlement is that a change in water users could bring about an increase in the consumptive use of the leased water. An increase in consumptive use means a possible reduction in return flow. In order to understand this effect it is important to distinguish between diversionary entitlement and consumptive use of water.
Diversion entitlements are the maximum amount of water which may be diverted or withdrawn from a water source for a particular purpose over a given time period. Consumptive use is that portion of the diverted right which can be permanently removed from the hydrologic system by irrigation, industrial use, evaporation, transpiration or other manner. The return flow is the difference between the amount of water diverted and consumptive use. The return flow is water which reenters the system and becomes available for use by others.

Historical appropriation of diversionary water entitlements is based on priority or seniority—that is, those who made use of the water first have historical priority to use it first. The system as it is now is concerned mainly with making sure that water entitlements are received in the order of seniority. Making sure that senior water rights holders do not exceed their diversionary entitlement serves to protect junior entitlements as well as downstream users.

For a water bank to be considered an acceptable water distribution tool, water rights holders need assurance that when others choose to lease water entitlements, that it be to only the portion of water available for consumptive use. This restriction addresses a common concern of downstream users and junior appropriators. They are no longer as vulnerable to water lease transfers that, without their knowledge, increase consumptive use.

To ensure that a transaction is complete, the amount of water the bank leases must approximate as accurately as possible the amount that actually arrives for consumptive use. As a long-time farmer recently lamented, if he pays to lease 100 acre feet of water and by the time the water actually arrives, due to evaporation, transpiration, distances, topography of the stream bed, runoff, etc., he only receives 50 acre feet of the water he has paid for, then he has been shortchanged.

Concerns are prevalent also about the possibility of negative externalities if water that is leased changes in terms of where it is used and the purpose of its use. If leased water leaves an agricultural community to be used for commercial uses in an urban area, for example, the agricultural community may suffer from the redistribution effects of the water transfer.

Leasing water entitlements is perceived by many agricultural users to be the same as fallowing their fields. Fallow fields are considered undesirable to many farmers and nonfarm businesses and residents in agricultural communities for a number of reasons including:

- potential negative impact on local economy,
- potential decrease in food and animal feed supply and thus an increase in food and animal feed prices,
- negative impact on wildlife habitats hosted by crops and other cultivated plant life,
- the loss of aesthetics that cultivated open space contributes to a community
- potential decline in local property values, and
- the potential for legally-driven takings of water entitlements that might evolve out of routine non-use of water for agricultural purposes.
Additionally, if leased water leaves a community to be used for nonagricultural purposes, the long term economic impacts on food and feed supplies may extend past the boundaries of agricultural communities to reach the wallets of users in urbanized areas as well. Thus, negative externalities that appear localized to farming communities eventually could be felt where leased water is delivered and used. Water marketing experts have suggested ways that water banks might be structured to lessen the chance of economic, social, and environmental externalities associated with fallow fields. A common suggestion is to limit water purchases/leases to surface reservoir storage and groundwater substitution (where wells are used to extract groundwater to substitute for surface water transfers).

Idaho's water bank program, for example, limits banking of natural flow rights. Only water available under storage rights may be transferred through local rental pools and its tribal bank. Idaho water law and the state water banking program also places limitations on water bank transfers. State law requires legislative approval for any changes of temporary or permanent use of more than 5,000 acre-feet of water for out-of-state use. These limitations are designed to minimize externalities to water rights holders and public interests.

Options for agricultural users who plan to lease water entitlements are not limited to fallowing fields. In No.6 of the series we listed other options to include: dry crop substitution, drip irrigation technology, strategic riparian management, grazing, spot irrigating, and strategic timing of irrigation. Such alternatives to traditional irrigation practices may serve to lessen or avoid the impacts of taking agricultural land out of production. One or more of these options may turn out to be quite lucrative and even enhance farm profit.

Whenever farm strategies necessitate change, however, there are initial costs associated with that change. Agricultural users will have to explore these options carefully and work with water banks to assure that these options are economically viable.

Economic incentives to participate in the bank must balance out the potential costs of participation. Obviously, water banks could reduce transactions costs for farmers who currently negotiate lease prices and timing of delivery amongst themselves. This savings should factor into additional costs farmers bear when implementing a new management strategy. In short, farmers need to determine if the marginal return from leasing their water equals the marginal cost of implementing an alternative to fallowing fields.

In economic theory, applying marketing principles to the distribution of a scarce resource improves efficiency in distributing that resource. More efficient distribution usually implies better conservation of the scarce resource. In considering the potential benefits that water banks may offer, however, stakeholders must consider potential costs as well. Even though water banks are based on voluntary participation, stakeholders are more likely to enjoy possible benefits if they are involved early on in the structuring of the banks and maintain local ownership of these activities.

References