

# Water Pricing by Small Groups

pricing policies of small watershed and irrigation district organizations in California affect use of water they provide

Michael F. Brewer

**Enabling legislation** stresses the flood prevention purposes of small watershed organizations but also permits them to provide irrigation water supplies. However, such water may not be used to bring new areas into agricultural production.

The irrigation district has been a widely adopted form of organization, for both providing existing irrigated areas with a more adequate water supply and bringing new land into intensive irrigated production. In addition, irrigation districts may engage in other activities, including the generation, transmission, and sale of electricity.

Being public entities, these organizations do not hold the usual price policy objectives of private firms—firm profit maximization. Yet these development and distributive agencies have certain definite financial obligations that they must meet and which constitute income requirements.

The income requirements of the small watershed organization stem from funds needed to operate and maintain the basic functions of the watershed and from loan repayment contracts with the federal government authorized by Public Law—PL—566.

A recent California law stipulates that the State may form a Maintenance Area—covering a small watershed project that has failed to operate or maintain itself in accordance with federal standards—and assess the property within the Area boundaries for such funds as are required to meet federal standards.

Income requirements of the irrigation districts exist in the form of the current operational, maintenance and administrative expenses in addition to amortization of and interest on outstanding bond issues.

The pricing policies these organizations pursue in meeting these requirements materially affect the uses of the water they provide. Both these types of organization have a variety of instruments that may be used in determining a price for water. The inherent problem revolves about the income requirements, the public nature of the agencies, and the variety of pricing instrumentalities at their disposal.

Two principal types of charge—among several frequently employed by small watersheds and irrigation districts in

California for the products they produce—are property assessments and more specific charges associated with a definite unit of product. There is not a single price but rather a payment complex, made up of different components which may bear little or no resemblance to a simple unit price.

Experience with the operations of projects under PL 566 has been too brief to furnish extensive data on the payment complex employed, but an insight may be had by examining certain state statutes which define the types of organizations able to submit project proposals under the law. A synopsis of 18 such laws for 13 different states reveals that only one included provisions for the establishment of specific tolls to cover the products produced on such watersheds, whereas all 18 have provisions for levying taxes or general assessments on property. The taxation and assessment component of the payment complex is stressed by the legal conditions pertaining to small watershed organizations.

Such a method of pricing has been characteristic of small water development projects in California and the west in general, as opposed to the pricing policies of larger development organizations, which employ direct tolls to a considerably greater extent. This relationship is evident among irrigation districts. In California, 23 of 109 active irrigation districts filed no water sales receipts in their annual report to the California Districts Securities Commission for the year 1956. The remaining 86 districts recorded income received from water sales. All districts employed assessments for income purposes during the year. The mean size of the 23 districts with no water sales receipts was 28,700 acres; the mean size of the 86 was 43,300 acres.

A substantial institutional difference between the two components of the payment complex lies in the enforcement measures available to each. In the instance of the assessment component, non-compliance may be met almost immediately with tax delinquency proceedings whereas in the event of water toll delinquency, service can be discontinued until the full payment and—in some instances—additional fine and penalties have been paid. In situations characterized by owner-operator farms, this would

not seem to be as strong a deterrent to delinquency as the threat of property seizure.

The cost of administering a toll frequently favors tax or assessment because county tax facilities may be used. Thus, the ease of application and degree of security offered by assessments, as opposed to direct water tolls, may render it the most desirable component of the payment complex for a small watershed or small irrigation districts.

The payment complex derives economic importance from the various functions that price performs. The important function of the price of water to an individual user is the conditions it establishes for his obtaining that water. On the other hand, a principal interest in the price of water—with respect to the economy at large—lies in its functioning as an allocator of water supplies among different lines of use, and the resulting effect that allocation has upon aggregate income.

Possible explanations of existing pricing patterns center upon the effects of the payment complex on individual users. The assessment component of the payment complex is a fixed cost to the user but the per unit toll component is a variable cost. An assessment on an acre must be paid regardless of use, whereas the toll or unit charge is usually related to the

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## CUTWORMS

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effectiveness is based on contact action in addition to actual feeding.

In making the bait the apple pomace and bran were thoroughly mixed, the endrin added and mixed, then the oil and amyl acetate were sprayed into the dry ingredients as the entire mixture revolved in the mixer. When the oil was warmed a better coverage resulted.

Endrin Oil-base Bait Used in Control Experiments

Ingredients	Amounts/100 pounds bait
Endrin 75% W.P. (1% actual) .....	lbs. 1.33
Apple pomace .....	48.335
Bran .....	48.335
Oil (heavy grade spray oil) .....	2.00
Amyl acetate .....	50 ml

Asparagus culls dipped into a 2% endrin suspension also were effective in killing cutworms when scattered on the beds at the rate of 300 pounds per acre.

Tests on McDonald Island during 1956 indicated that baits and sprays of endrin, toxaphene, DDT, dieldrin and heptachlor were not too effective when used under cool conditions when the cutworms were not active. In other tests there were also indications that baits were not readily selected if the soil was too warm and the cutworms remained at a greater depth in the soil.

Commercial applications during 1957 demonstrated the value of a 0.75% endrin bait of the type used in the experiments. A bait was applied on May 10 at the rate of 40 pounds per acre by air to a field where 100% damage occurred. On May 16, a bed area 100' long produced 67 dead worms, and only 1.2% damage to spears. In a second field 20 pounds per acre of the same bait was applied on May 15 in an area where 30%-40% damage occurred. On May 16 a total of 11 dead worms were found per 100' of bed and damage dropped to 28%. Some of the damage occurred prior to use of the bait.

Apparently 20-40 pounds per acre of endrin oil-base bait will give good control and 4-5 days are necessary for complete kill.

Endrin baits are effective in controlling small darkling ground beetles—*Blapstinus* spp.—in asparagus. In addition, they have been used effectively in the control of cutworms and darkling ground beetles affecting seedling corn, sorghum, tomatoes, and other vegetable and field crops.

Endrin baits should not be used around leafy vegetables and should be used in all cases in such a way as to avoid contamination of plant parts. If used

properly no residues should occur on edible portions of vegetables.

*W. Harry Lange, Jr., is Professor of Entomology, University of California, Davis.*

*Stanley F. Bailey is Professor of Entomology, University of California, Davis.*

*John P. Underhill is Farm Advisor, San Joaquin County, University of California.*

## WATER

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quantity of water used. This fundamental distinction between the price components gives rise to numerous possible lines of economic influence. The specific nature of that influence will be governed to a large extent by the relative magnitude of the components of the payment complex. Such a case may be exemplified by an instance of development activities that provide a water supply suitable for agricultural use but where there are individuals within the service area who—although they do not use directly the water provided by the developing agent—are subject to assessment. Any shift of the incidence of the total payment complex from individuals using water to those who do not use it, would represent an economic advantage to the users.

The nonprofit nature of watershed organizations and irrigation districts means that in any one season the total revenue target can be fixed on the basis of estimated expenses for the following year, capital allowance, and other pertinent financial obligations. If that part of the total revenue represented by tolls and assessments is considered as a fixed amount for a given season, increase in the total receipts from sales will reduce the total receipts from assessments.

More particular types of economic effects may be defined. For example, economic advantage for a water using group which has alternative supplies available would result from a large assessment component so long as the total payment complex was less than the variable cost of an equivalent supply. If the total complex were greater than the cost of alternative supply, however, a high fixed cost component would constitute an economic detriment in that the decision on the part of the water user will be made on the basis of the size of the relative variable costs entailed in obtaining water from both sources.

The payment complex is appropriately constituted to be used as an allocating device. Individual decisions about water use will be based on the variable costs. The relevant variable costs will depend upon the nature of the decision, the planning horizon of the individual involved, the physical relationships entailed in the water use contemplated, and their changes over time.

On the other hand, the fixed cost component of the payment complex is suited to provide a source of revenue. Assessments are designated on a property value basis and, in general, do not affect water use.

In a sense, the total payment complex has components that enable it to be purposefully used in allocating water as well as an instrument of revenue.

*Michael F. Brewer is Assistant Specialist in Agricultural Economics, University of California, Berkeley.*

## LILIES

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forcing trials. The following season it was tested in the field. Two years after the first successful trials a schedule of hot water treatment and dipping in PCNB-ferbam was widespread among field growers of lilies. Approximately 90% of Easter lily bulbs planted on the northwest Pacific Coast for the 1956-1957 season were dipped, the majority in PCNB-ferbam. Where treated bulbs were planted in clean soil, the plants were more vigorous, retained their green color after flowering, basal roots survived, and the harvested bulbs were white rather than yellow.

At the end of 1956 a few bulbs derived from the treated bulb scales were large enough for a preliminary forcing trial. In a commercial greenhouse 7" bulbs averaged more than four flowers, 8" bulbs more than five, and 9" bulbs more than six. The color and form of the foliage and the freedom from leaf scorch were outstanding. Commercial bulbs of equivalent sizes gave at least one flower less.

A comprehensive forcing trial is continuing to check the preliminary results. The continuing trial includes comparisons between relatively pathogen-free Croft and Ace stocks and commercial stocks, including the healthiest available and others carrying such an amount of disease as was common two or three years ago.

The improvement in field-grown Easter lilies already attained has been such that it was easier to find the better stocks for the test than it was to find stocks considered average or typical a few years ago.

*J. G. Bald is Professor of Plant Pathology, University of California, Los Angeles.*

*Philip A. Chandler is Principal Laboratory Technician, University of California, Los Angeles.*

*John V. Lenz is Farm Advisor, Humboldt County, University of California.*

*R. H. Sciaroni is Farm Advisor, San Mateo County, University of California.*

*A. O. Paulus is Extension Plant Pathologist, University of California, Riverside.*