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Accounting for Irrigation Companies

BY CHARLES D. TURNER

The irrigation of arid and semi-arid lands has been the means of reclaiming for the benefit of humanity many acres of otherwise more or less worthless land.

The question of the average increased value of irrigated lands over lands not irrigated, from the viewpoint of their productivity, is a subject upon which there are differences of opinion. Statistics furnish us with the information that where lands are irrigated, that is to say moisture is thus regulated, they will produce one third more on an average than lands which depend upon the uncertain rainfall. There is no reason to doubt that over a given number of years, the more the better, statistics on this subject are approximately correct. Thus we might say to the farmer that if he will keep his profit-and-loss statements on twenty- or thirty-year bases the statistics we have will apply, but for any given year we have very little to offer in the way of advance information.

It is to be assumed naturally that irrigation facilities are not placed on lands where the average rainfall is sufficient. This being the case there is in irrigated sections less likelihood of an amount of rainfall at any time that would be damaging to crops, although this very thing may occur and sometimes does. It is not an uncommon thing for a farmer to irrigate his land in expectation of a dry spell and then receive in a few days a heavy rain, which is generally more damaging to crops than is a drought. Such factors work a hardship in evolving dependable statistics.

Most of the water used in the United States for irrigation purposes is derived from streams, and as streams rise and fall a dependable supply of water is not always available in the stream itself. For this reason waters from the streams are impounded and stored in reservoirs for future use.

The contour of the land and the number of acres to be watered will govern the nature and extent of the construction of the plant and facilities. As a rule there will be at least two levels or benches for which pumping plants will be constructed to raise the water to a height where it will flow downhill, as it were. The main canals and laterals which are constructed by earth fill or dredge may flow through tunnels in hills or around them, if more economical, or

over low areas such as lake beds, when aqueducts will be constructed. It might be mentioned here that the irrigation company is concerned with the maintenance and operation of all avenues through which the water travels except the so-called field ditches which are constructed and maintained by the farmers on their lands.

The first lift-pumping plant site is generally selected at a point where there is the least danger of the bank of the stream sloughing off at high stages. It is generally necessary to do some dredging at this point each year in order to provide a more or less constant source of water supply, and in some years this forms an item of expense of considerable proportions, especially in years when the stream reaches the flood stage. The matter of setting up a reserve in the accounts for this contingency is good policy but not often observed.

In sections where streams overflow periodically and where there are no flood control drains or levees the necessity arises for consideration of a reserve for damage from this source. An amount should be accumulated through an annual charge to a profit-and-loss account based in amount upon past experiences as to the extent and frequency of this loss. When the reserve has reached reasonable proportions no further credits should be made to it. It may be submitted that there are companies who observe in the accounts the charging off of damage from overflows in subsequent years on the theory that the uncertainty of the extent of the loss does not offer sufficient information for the setting up of an amount that might be indicative of the requirements. This, however, is not a good argument against setting up some sort of an estimate which would at least be an acknowledgment of the danger of overflow damage.

There are three common forms of organization of irrigation companies, viz, the private corporation, the mutual corporation and the irrigation district.

The private corporation is generally operated by land companies owning large tracts of land and the irrigation facilities are for the purpose of making the land salable. These companies rarely operate with profits as an object and as a general rule when the land is sold the irrigation facilities are conveyed to the owners of the land.

The so-called mutual corporation is organized with an amount of capital stock equal to the cost of constructing the plant and

facilities, the par value based upon the pro rata cost of the construction per acre, so that the number of shares will equal the number of acres in the system. Under this form of organization deeds to land include title to the stock and for this reason the stock in itself has no value.

The irrigation district or water-improvement district which is created by statute is a political subdivision of the state in which it exists. Under this form of organization bonds are issued upon vote of property owners in the district to provide funds for the purchase of the plant and facilities. Ad valorem taxes are assessed and collected to cover the interest and sinking-fund requirements of the bonds. The balance-sheet of the irrigation district should be divided so as to show separately the capital section and the operating section.

The irrigation district furnishes a means of obtaining a plant from money borrowed through bond issues which as a rule can be sold with a lower rate of interest than bonds which do not have the same security. On the other hand it is a matter of going into debt at the outset for the entire cost of the plant, and the expense of renting money adds indirectly to the cost of the plant. In the interests of good business there should be a considerable amount of argument in favor of the plan of organizing a mutual corporation in place of the irrigation district. It is shown by statistics on the subject that the mutual corporation prevails in more than one half of the irrigation projects in the United States, exclusive of the projects sponsored by the United States reclamation service.

REVENUES

Irrigation companies are required to anticipate their revenue requirements and to fix assessments at the beginning of the year. Each acre is assessed with a flat charge and in addition a fixed amount is determined as a charge for a unit of water used by the farmer. The method used by the company for measuring the water is immaterial. A company may use meters when the charge is to be made on the basis of gallons consumed, but the most prevalent method is that of turning the water on the farms and allowing the farmer to take the amount he deems necessary for an irrigation of his land, and in this event the unit of measurement would be the number of acres thus watered.

It is necessary to assess each acre with a flat charge annually inasmuch as there is no way of estimating at the beginning of the

year how much revenue will come from the sale of water. The rate is fixed with the intent of being equitable in so far as the owners of the land are concerned and sufficient in so far as the company is concerned. It is, however, a difficult matter to determine a flat rate and a rate for a unit of water consumed so that they will work out to the satisfaction of all customers. It happens that large tracts of land may be idle for one or more years and during this time no revenue comes to the company from the sale of water, so it must depend upon the revenue from the flat charge only in such cases.

It is a good plan for companies to request consumers to advise them of the crops they expect to plant during the season. This furnishes an indication of future demands for water although, of course, it lacks information as to rainfall and therefore can not be relied on completely. While there is a certain amount of regularity in seasonal rainfall, in certain sections Jupiter Pluvius still has full control of the faucet and provides what the "native" is apt to term "an unusual condition for this time of the year" quite often, in fact often enough to upset the majority of estimates. As a matter of fact the success of irrigation companies and farmers in irrigated sections depends each year upon the opportune arrival of rain.

The revenue from charges against each acre of land together with the revenue from sales of water furnishes the bulk of the operating revenue of the company. As previously said, it is intended that these rates will bring a total revenue equal to the total expense and also will be divided as to equity among all concerned, but the difficulty of estimating the revenues to be collected and the expenses to be incurred results in providing each year a surplus or a deficit of some proportions which must be taken into consideration in fixing the rates for the succeeding year. When a company has been in existence a number of years, however, and the land under irrigation is being more or less completely farmed the difficulty of fixing the water rates is greatly minimized.

Often an irrigation company will sell water rights to lands lying adjacent to it and take them into the system. In cases where this is done there may be a different viewpoint as to the accounting elements entering into the sale. The water right may be sold on a basis of the par value of the stock plus an amount based upon the accrued flat rates that would have been paid had the land been

in the system since the organization of the company. This is provided that the company has been in existence for only a few years and that the figure is within reason for the purchaser according to the value of the water right. In this instance there is a specific application of the excess over par paid for the stock indicated and the profit may be considered as an operating profit. If the company is an old one an amount may be paid equal to the enhanced value of the land, which would include an amount, say, of thirty-five dollars an acre as representing the cost of the plant, the residue being credited to profits in the year in which the sale is made. However, profits obtained from the sale of water rights in such a case are in the nature of profits from the sale of capital assets and are not operating profits except possibly in so far as they represent flat rates of the current year.

It is necessary, where all the stock of a mutual corporation has been sold previously, to amend the charter of the company when taking in new territory by selling water rights to it.

Where lands are taken in and water rights sold by the irrigation district the procedure is very much the same as with a city or town which annexes additional territory, except that in the case of new territory coming into an irrigation district the owners thereof are required to pay a premium for the privilege in addition to being subjected to an ad valorem tax and assessments for the operation and maintenance of the company. Any excess received by the irrigation district in the sale of a water right over cost of providing the additional facilities is considered as profit from the sale of capital assets.

Obviously there is a limit to the extent to which an irrigation company, and more especially an irrigation district, may go in selling water rights, and it can be assumed that only in territories which have been recently reclaimed by irrigation is much of this done.

Methods of handling the construction of canals and appurtenances on lands taken into systems differ. There is a tendency to allow the purchaser to build the works under the supervision of the irrigation company's engineers and to require that a certain standard as to size and quality be maintained in all construction. Where this is done it is necessary to place a value on the construction to set up on the books of the irrigation company, as the actual cost to the purchaser might not represent the fair value and it is not always obtainable from the purchaser.

Other sources of revenue of the irrigation company are water sold to cities or towns, usually on a basis of gallons pumped into reservoirs; fees received by the company for running contours of farms, and interest which is assessed against delinquent flat rates.

EXPENSES

The following operating and maintenance accounts with amplifications are typical of irrigation companies operating two lifts:

		Cost per acre irrigated	
Operating expenses:			
Canals	\$.....	\$.....	
First lift-pumping plant:			
Labor	\$.....		
Fuel			
Lubricants			
Supplies			
	\$.....	\$.....	
Second lift-pumping plant:			
Labor	\$.....		
Fuel			
Lubricants			
Supplies			
	\$.....	\$.....	
	\$.....	\$.....	
			\$.....
 Maintenance expenses:			
Canals:			
Repairs—ordinary wear and tear	\$.....		
Repairs—due to breaks			
Cutting weeds and dredging			
	\$.....	\$.....	
Canal structures:			
Bridges and culverts	\$.....		
Siphons and flumes			
Miscellaneous			
	\$.....	\$.....	
Reservoirs	\$.....	\$.....	
First lift-pumping plant:			
Repairs—ordinary wear and tear	\$.....		
Bank protection and channel			
	\$.....	\$.....	
Second lift-pumping plant:			
Buildings			
Equipment			
General			
	\$.....	\$.....	
	\$.....	\$.....	
			\$.....

Water enters the canals through the pumps at the first lift-pumping plant and is conveyed through a main canal direct to the

second lift plant where it is raised to another and higher lift whence it enters the second lift main canal. Laterals lead out from the main canals and sub-laterals from them, and finally the so-called field ditches carry the water over the land to be irrigated.

Gates and checks are used for diverting and holding the water. These are generally of concrete and metal construction. The water is delivered to the land to be irrigated under the personal supervision of a representative of the company.

Farmers desiring water for irrigation purposes are required to make application and to pay for it in advance. It is delivered when enough applications are in the hands of the company to justify it in the interests of economy and efficiency. While there may be a considerable diversity of crops planted and while certain crops will need more water than others, coöperation on the part of the farmers generally brings about a request on the part of enough farmers in one section to justify the company in diverting water there at times when it will be beneficial to all.

During periods when pumping plants are not in operation, which are at times when because of rainfall there are no demands upon the company, the employees make necessary repairs and a certain amount of their time is non-productive. The payroll should show a distribution as between maintenance, operations and non-productive activity. Salaries of employees who supervise the delivery of the water to the farms should be charged to operating expenses of canals. The cutting of weeds which grow up in the canals and the work of removing silt which in time forms an obstruction are charged to maintenance.

Over periods of time some fairly dependable information may be obtained as to the cost to irrigate an acre of land one time by dividing the costs of operating for the year by the number of acres watered during the year. The cost of maintenance likewise may be obtained by dividing the total cost of maintenance by the number of acres maintained during the year.

The operating cost of delivering water to an acre of land, found in this manner, is a basis for making the rate for the sale of water per acre, and the cost per acre of maintenance and overhead is a basis for making the fixed annual flat rate. However, in making a division between the two rates consideration must be given to the fact that the annual flat rate will produce a certain and de-

terminable amount of revenue while the revenue to be received from the sale of water will depend upon occurrences over which the company has no control. For this reason a certain sum is usually added to the flat rate and taken from the charge for delivering water, as determined upon the basis mentioned above, in an attempt to make the rates equitable.

The irrigation district assesses the ad valorem tax against gross acreages, that is to say the entire acreage owned by the taxpayer, while the annual flat rate is assessed against the net acreages which exclude lands occupied by field ditches, roads or lands too high or too low or for other reasons not subject to irrigation. For these reasons records must be kept of both the gross and net acreages in each tract.

It is found where changes are often being made in net acreages and where sales and transfers of land occur frequently that the ordinary loose-leaf ledger containing an account with each piece of land in lot and block order and supported by a cross index as to ownership in alphabetical order is best suited to the work of accounting for this form of accounts receivable. The map of the district should be checked against this ledger to ascertain that all lands in the district are being properly assessed.

The statutes of states where irrigation districts exist usually prescribe that the familiar tax roll must be kept with ad valorem taxes. From this roll, at the close of the year, the delinquent taxes are written upon the delinquent tax roll, errors are corrected, etc., and the roll of persons from whom the tax collector has collected taxes for the current year is set aside in the files. This procedure requires the writing of a great deal of information each year, while if the data were carried in a loose-leaf ledger they would need to be written only once, except in the few instances where changes might be necessitated by the division of tracts of land. Where the accounts are kept with the land in place of the owner a change in ownership would require only that the cross index be adjusted accordingly.

The writer knows of one irrigation district which has found it advantageous to keep the tax roll as prescribed by statute as a matter of legal requirement and at the same time keep the same information in a loose-leaf ledger.

There are some companies which have found the system of selling coupons good for one acre of irrigation to be more satisfactory than the system of requiring a deposit covering the number of

acres to be watered. The latter method calls for a little more accounting work than the former, but in my experience has been more popular with water users.

All receipts from the sale of water are credited in the cashbook to deferred revenue from water sales. Reports of water delivered made daily by the canal supervisors furnish the information for the compilation of a monthly journal entry debiting this account and crediting revenue from water sales.

One twelfth of the annual flat rate assessed in advance is transferred monthly from deferred revenue from flat rates to revenue from flat rates.

Some companies include in the annual fixed flat charge one irrigation of the land and where this is done it should be stipulated that the water must be taken within the year, which would provide that the unearned-revenue account with these water sales would be wiped out within the year and the company would not be required to carry the obligation over into future years.

As the charge for water to be delivered is paid in advance and as it often happens that water users do not take all water they have paid for in advance, the auditor should verify the unearned revenue from water sales by the file of unfilled water orders.

There is no necessity for keeping an accounts-receivable account with a customer for water sales, as each sale is a cash transaction.

It is the writer's opinion that in furnishing to a client the information set forth in the balance-sheet and the profit-and-loss statement there should be sufficient explanation to make each account clear to the uninformed reader. In the instance of what has been set up in the books as deferred or unearned revenue from water sales it should be added that this amount is also refundable and, therefore, at the date of the balance-sheet, is a demand upon the working capital of the company. Without this information there would be reason to suspect that the company had a margin of profit in the unearned revenue.

With irrigation companies the statement of resources acquired and their application is a very acceptable addition to the usual forms furnished by the auditor. It is the writer's opinion that this statement should do more than show the fluctuations of the working capital during the year in condensed form. It should show, in the case of notes payable, for instance, important items paid and important new loans made and other information that may be buried in the accounts.

I have found also that irrigation companies like to obtain in the auditor's report an analysis of the cash transactions of the year as compared with the accruals, and the records should be kept in such a way that this information will not be difficult to obtain.

In conclusion, I might add that accounting for irrigation companies offers nothing new to the accountant. The procedure would be basically the same with a company selling some commodity other than water. As a rule the directors of the irrigation company are farmers not very familiar with accounting terms, and therefore technical terminology must be set aside to some degree and language used that will be clear to those who are not by any means accountants. I do not mean by this that our terminology is not exact as far as it goes, but in our effort to be brief, which we sometimes regard as being efficient, we occasionally fail after a fashion to carry out our mission as reporters of the whole truth.