The Future of Water Supply in Victoria

Objectives and Problems of the State Rivers and Water Supply Commission

By L. R. East, M.C.E., M.Inst. C.E., Chairman, State Rivers and Water Supply Commission

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The tragedy of the drought that has parched South Eastern Australia for nearly two years has given outstanding emphasis to the value of Victoria's extensive irrigation and water supply system. This State has long been "water conscious," and ever since the constitution of the State Rivers and Water Supply Commission in 1905 all governments have given practically unqualified support to the Commission's programme of water conservation and distribution.

Today the Commission controls 33 large reservoirs and a host of minor storages which, together, with a total capacity of 1,887,000 acre feet which expressed in gallons would amount to over 500,000 millions gallons, or more than 250,000 gallons for every man, woman and child in the State.

In Victoria, 238 towns and townships have reticulated water systems, and domestic and stock water supplies are provided by channel to more than 22,000 square miles of farm lands. Irrigation channels serve an area of 2,000,000 acres of which 590,000 acres were watered last year.

Through all its channels, or from bores or pipe lines, the Commission supplies water for drinking purposes to no less than 40 per cent. of the total area of agricultural lands in the State. These works have made habitable whole provinces which, without them, would today have been laid waste by drought.

FRUIT INDUSTRY ASSISTED

Record quantities of dried and canned fruits have been produced in northern districts both for home consumption and for export and record numbers of stock from drought stricken areas have been preserved by agistment on irrigated lands.

Water users last year received from the Commission the record quantity of 693,699 acre feet of water, the greatest quantity delivered since the commencement of irrigation in Victoria, and their production of milk and butter, fat lambs and cattle, pigs, vegetables, eggs and other irrigation products has increased in a very great measure, while the production from areas dependent upon natural rainfall has fallen alarmingly. So much for the practical results of water conservation — what of the financial?

RECENT CAPITAL ADJUSTMENT.

The total capital liability in respect of the State's expenditure on country water conservation works at December 31, 1937, was £26,175,195 of
which £3,770,290 represented cost of free headworks and capital written off nearly 40 years ago. On July 30, 1938 a further £17,104,026 was transferred to the State, leaving £5,300,879 to be carried by water users.

The actual capital adjustment for each of the various districts, numbering 155 in all, was based on the liabilities that could be carried by rates and charges which were considered by the government to be reasonable and within the capacity to pay of the water users.

The proportion of total capital liability now carried by the districts varies somewhat from one district to another, but on the average the adjustment transferred to the State the whole cost of all headworks and about two thirds of the cost of local distributary works.

The districts will, therefore, now be required to carry only the cost of maintenance and operation—with the exception of a few “non paying” districts, together with interest and redemption on their allotted proportion of capital liability, which, as indicated above, would average about one third of the cost of local works.

NOT VANISHED ASSETS.

It should be emphasised that the £20,874,316 liability transferred to the State does not represent the cost of vanished assets. By far the greater part of this expenditure represents the cost of reservoirs and main channels which are in full use and which could not be constructed at present day costs for any lesser expenditure. On the contrary, many of the older structures would today involve at least twice as high as those actually incurred when the works were built.

REVENUE AND EXPENDITURE

The cost of maintaining and operating the present waterworks controlled by the Commission—including provision for depreciation and of supplying national services for which no charge is made—is estimated at approximately £539,000 per annum, and the total of the present rates and charges plus interest payments from trusts at £645,000 per annum.

The total contribution towards interest by water users including locally administered waterworks trusts, will be in the vicinity of £225,000, but as already mentioned, there are certain “non paying” districts—mostly in the Mallee—where the total revenue will be insufficient to meet maintenance and operating costs and where the State will have to bear the whole of the interest charge and contribute as well some £56,000 per annum towards operating cost.

The State will also have to carry the cost of special services of a national character such as the super vision of waterworks trusts and local governing bodies, the gauging of streams, the control of private diversions and similar operations not charged against water users.

The financial position in regard to existing country water supply operations may be summarised as set out below:

**NOT VANISHED ASSETS.**

Total interest and redemption charges, including exchange, will amount to approximately £1,205,000 of which £225,000 will be debitable to water users in various districts. Operating costs and State services will amount to £539,000, of which £419,000 will be carried by water users.

**ANNUAL COST—£1,100,000**

The total annual cost of country water supply undertakings will therefore, amount to some £1,744,000 of which approximately £644,000 will be carried by water users and £1,100,000 by the State.

It will, therefore, be seen that the annual contribution
by the State towards the cost of its present extensive country water supply undertakings will be in the vicinity of £1,100,000, which contribution may be gradually reduced as the loan liability is liquidated by the statutory sinking fund payments, half of which are met by the Commonwealth under the Financial Agreement.

Having assessed the annual cost of water supply and flood protection, let us now consider for a moment what is the return from this investment.

**BENEFITS TO STATE**

Some 420,000 residents in 238 country towns have been enabled to enjoy the convenience and safety of reticulation water supplies. 25,000 farms on which reside some 75,000 persons over an area of 12 million acres have been made habitable by the provision of assured supplies of drinking water for themselves and their stock, which number at least 120,000 horses and 4,000,000 sheep.

Irrigation channels have been constructed throughout an area of 2,000,000 acres and in which have been developed 10,750 farms where last year—1937/38—a year of drought—no less than 590,112 acres of land received ample supplies of water for pastures, for vineyards, for orchards and for other forms of intensive culture. The actual figures were:

- Pastures, lucerne and other fodder crops, 440,570 acres.
- Cereals and miscellaneous 83,125 acres.
- Vineyards 34,314 acres.
- Orchards and gardens 32,103 acres.
- Total 590,112 acres.

This represented the largest area ever irrigated in this State and required the delivery of 693,699 acre feet of water.

Statistics are not readily available for the actual production of dairy products, fat lambs, and other commodities which come both from irrigated and non-irrigated portions of the State. The State’s production of dried and canned fruits and of citrus fruits come almost entirely from irrigated northern Victoria and for 1936—37 had a value of no less than £3,500,000.

The wheat harvest from lands served with domestic and stock channels was approximately 21 millions bushels, valued at £4,000,000. Sugar produced from sugar beet at Maffra was worth £150,000 and the production of milk alone dispatched from one district—Werribee of only 8000 acres—was worth about £80,000. This district supplied also very large proportion of the vegetables required for the metropolitan market.

**INCREASED LAND VALUES**

It must be remembered that the profits to be made from irrigation development lie not in the sale of the water but in the increased value of the lands which are served.

When a substantial portion of the capital cost of works is borne by the State this increase in land values is greater than would be the case if the whole cost of water supply were charged against the water user; and, where the lands are privately owned, as in Victoria, this gain in the value of the land goes not to the State, but to the landowners.

The net annual valuation of all properties supplied with water by the State Rivers and Water Supply Commission is approximately £3,500,000 for rating purposes, representing, on a very conservative basis, a capital valuation of some £70,000,000 which figure of course would include build-
ings and other improvements effected by the owners as well as the unearned increment in respect of water supply, railways, roads and other public facilities.

**INDIRECT BENEFITS**

The development of primary production that has been made possible by the works of the State Rivers and Water Supply Commission has been, and is, of vital interest not only to those who have made their homes on the land, but to practically every section of the community.

The construction of the works themselves has involved the purchase of millions of pounds worth of materials, tools and machinery and the distribution of many more millions of pounds in direct labor to the men employed.

Where works are completed and farms in full production, the distribution of benefits is even more marked. Of the total farm income, it is estimated that only about one quarter is used for farming operations, labor, taxes and local supplies, while three-quarters goes into the general industrial and trade stream.

The irrigation of northern Victoria has provided for a marked spread of population in an area which without water would have carried a mere sprinkling of people, and it is now well recognised that only through irrigation can the agricultural population of this part of the State be appreciably further expanded.

There is, however, a decided limit to irrigation development for, although there are millions of acres of land suitable, the total water resources available will enable only a comparatively small portion of this land to be watered.

**OUTSTANDING PROBLEMS**

It is here that the first great problem must be met — the problem of how to use to best advantage all of the water that can be conserved and distributed.

The problem can readily be subdivided under three headings—the problem of conservation in storages, the problem of distribution to water-users and the problem of utilisation of the land.

**WATER CONSERVATION**

Much has already been done to conserve the flows of the main streams of Northern Victoria. The Murray and Mitta Rivers have been harnessed by the construction of the Hume Reservoir to a capacity of 1,250,000 acre feet, which is about the maximum required to regulate the flows of those streams. The enlargement of the storage to 2,000,000 acre feet would not make possible any additional irrigation development in either Victoria or New South Wales, but would merely lessen the restrictions that would be required in the occasional very severe drought.

The Kiewa River is being developed for hydro-electric purposes by the State Electricity Commission, and although the works will not be operated to supply water for irrigation, they will actually increase the quantities of water available during the irrigation season.

The Eildon and Waranga reservoirs together with the Goulburn Weir, provide for the storage of 660,000 acre feet on the Goulburn River System and the provision of further storage on this stream would present a particularly difficult problem.

The Loddon River is one where additional storage would be of special value. The Laanecoorie reservoir, originally providing 14,000 acre feet of storage when constructed in 1891, has been silted to such an extent that it holds only 6,650 acre feet. The flow of this stream varies from 19,000 acre
feet in a drought year to as much as 595,000 in a flood year like 1893 and has averaged 183,000 acre feet per annum over the past 48 years. Many sites for additional storages on this stream have been investigated and discarded owing to difficult foundation conditions.

The work of the water supply engineer naturally becomes increasingly difficult. The easiest, simplest and cheapest proposals have, of course, been first constructed, and most of the opportunities for further water conservation today present special technical or financial problems.

Water will, however, become increasingly valuable; and these problems will in time have to be overcome. In this regard, full advantage should be taken of the very rapid development overseas in the art of reservoir design and construction. Dams are now being safely constructed today in other countries under conditions which, a few years ago, would have been considered impossible.

**WATER LOSSES IN DISTRIBUTION**

The second problem is that of water distribution from the storage to the water user. The losses of water in distribution are staggering. In the Goulburn system, for example, last year 625,300 acre feet were released from Waranga reservoir but excluding 25,000 acre feet sent to Maliee for domestic and stock supply during the winter and spring months, only 266,70 acre feet reached the irrigator. In the Torrumbarry system 712,000 acre feet were diverted from the Murray River to supply only 205,838 to water users.

This tremendous waste of water—previously stored at great cost—must be reduced, for only by attaining greater efficiency in delivery can additional water be made available to irrigators in these or other districts.

**ADEQUATE MAINTENANCE ESSENTIAL**

The first essential to this end is adequate maintenance of both channels and structures. As pointed out to the recent Royal Commission, the Commission took over inefficient channels and structures from the abolished trusts more than 30 years ago and, tithough provided with loan funds to some extent to reconstruct and extend the works, had at no time since been provided with sufficient funds to maintain either the original or the new works in a satisfactory condition.

At the present time, scores of miles of channels are overgrown with cumbungi or other water growths and many hundreds of structures are falling to pieces. Under these circumstances, excessive losses of water through evaporation, seepage and leakage are unavoidable. During the past four years, some £10,000,000 has been made available by the Employment Council from Unemployment Relief funds for the reconstruction of works of this nature and, where this has been expended, a marked improvement has resulted. A great deal, however, still remains to be done before the works can be said to be satisfactory.

The appointment of regular maintenance men in each district would go far to solve the problem. Up to the present, this has been financially impracticable.

**STANDARD OF IRRIGATION**

The third problem is that of more efficient utilisation of water on the land, and this problem is one that is
largely, although not entirely, in the hands of the water user himself.

Water is one of the most valuable of the State’s natural resources, and its wise use imposes a great responsibility on both the Commission and the irrigator.

STATE'S RESPONSIBILITY

It is the responsibility of the State to conserve water wherever economically practicable and to deliver to water users as great a proportion of the water stored as possible. It is the responsibility of each irrigator to use the water delivered to him to best advantage, that is, so that it will return to him and to the community the greatest return in actual production.

As already pointed out, the State is carrying approximately two-thirds of the cost of supplying water to the water user, and it is becoming increasingly evident that the State cannot afford to permit the water so supplied to be wasted upon ungraded lands and natural grasses.

The Water Acts already provide that in times of water shortage, preference should be given to the more permanent types of irrigated culture, and it is only a short step to the stage when at all times water will be given only to landowners who are prepared to prepare their lands to take full advantage of it.

At the present time, the most intensive culture is seen where the cost of water is relatively high. It is the objective of the Commission to see the same high standard of culture throughout the districts where the price of water is low. That this objective is attainable has already been demonstrated by outstanding irrigators who, in practically every district, have achieved individual production figures at least 50 per cent. above the district average. These remarks do not apply so much to irrigators in the fruitgrowing districts where the standard of irrigation is already uniformly high over quite large areas.

In many districts development has been retarded by lack of adequate drainage facilities. Within the last few years, however, grants totalling £4,003,355 have been made available from Unemployment Relief Funds and comprehensive drainage systems have been constructed which already serve an area of 400,000 acres. This work is being continued.

The capital cost of construction has, as already indicated, been provided as free grants, and the water users are required to meet the cost of maintenance only. The beneficial results of drainage are already apparent in most cases of the areas served.

The Commission proposes, as soon as possible, to extend the advisory work of its District Officers by building up an Irrigation Branch with officers whose responsibility would be the raising of the standard of irrigation throughout the State, and who would advise irrigators in existing and new districts on all matters concerning the layout and development of their holdings.

The experts of the Irrigation Branch would work in close cooperation with the Agricultural Scientists of the Department of Agriculture, and would, by public addresses and discussions, by published articles in local press and elsewhere, and by personal contact with water users, endeavour to ensure that full advantage is taken of every advance in the science of irrigated agriculture, and that all of the water made available for irrigation is used to the best advantage of the irrigators, the Commission, and the State.