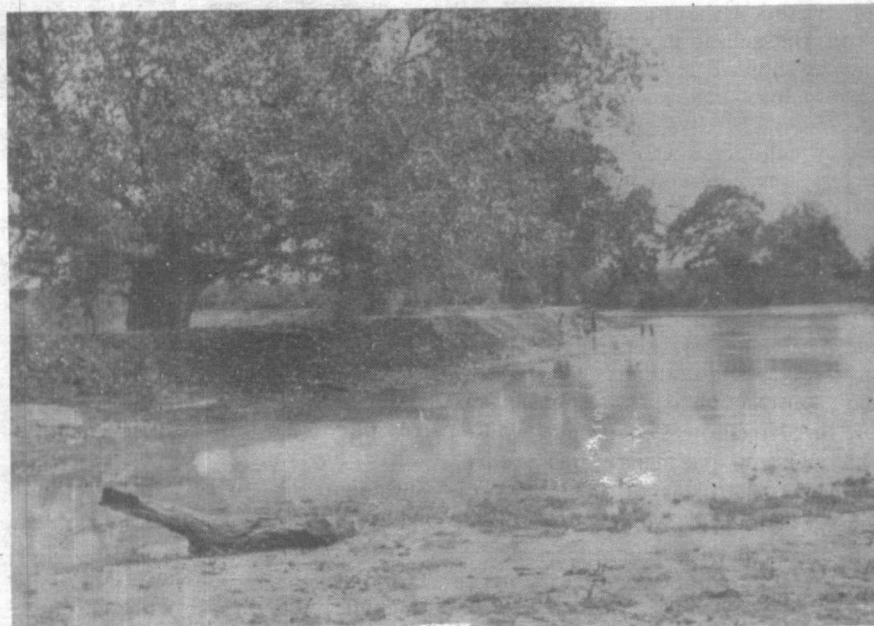


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Two of the thousands of abandoned 'small' village tanks renovated, in the Dry Zone.

two-thirds of the country, the traditional system of village irrigation is still an important source of food and employment for the rural people. But village irrigation and water management under this system remains relatively neglected. The comparatively impoverished economy within the Dry Zone, particularly in the tank villages, can be traced to factors such as this neglect of minor irrigation, together with the complexity of land tenure, inaccessibility of credit and other facilities, and related issues. A revival of the entire minor irrigation system and a greater understanding of its intricate relationship to the rural environment can benefit not merely agriculture and the communities within these specific areas but also have a major impact on the country's economy and overall living standards of the people.

Like many other developing countries in Asia, Sri Lanka experiences food shortages. One of the main targets of the Government is to achieve self-sufficiency in staple food. Sri Lanka has adopted two strategies to increase her food production;

- (a) by extending agriculture to new areas
- (b) by intensifying agriculture on existing cultivated land.

Whilst highly capital intensive long-gestation irrigation schemes have tremendous potential for boosting the country's economy they also have certain adverse effects in the short run, notably generation of inflationary tendencies and pressure on the balance of payments. Moreover, these investments create economic disparities between regions as all parts of the country do not derive equal direct benefits from the investments made in highly capital intensive irrigation schemes. One of the countervailing measures against economic disparity between regions that the Government has been attempting since 1981 is a number of short term programmes of low capital intensity for developing village irrigation schemes.

Village Irrigation systems consist of village tanks chiefly in the Dry

VILLAGE IRRIGATION

The emphasis in recent years has been on major irrigation schemes. In the 1981-1985 Programme of Public Investment a sum of Rs 29 billion was allocated as capital expenditure for the Mahaweli project while Rs 3.6 billion was allocated for all other irrigation works; while in the 1985-1989 Programme the allocation had changed to Rs 8.1 billion for Mahaweli; but Rs 2.0 billion for all other irrigation. In the minor village tanks programme the main project started in 1982, for rehabilitating 200 village tanks and

improving irrigation facilities for about 15,000 acres, is costing Rs 670 million. An important reason for the emphasis on major works is the multi-sectoral and power generating capabilities of such projects; but the fact that minor works also do have their importance is being increasingly recognised. There is no doubt that despite the increasing size of major irrigation schemes the irrigation works outside such schemes will continue to perform a vital role. For instance, in the Dry and Intermediate Zones, constituting

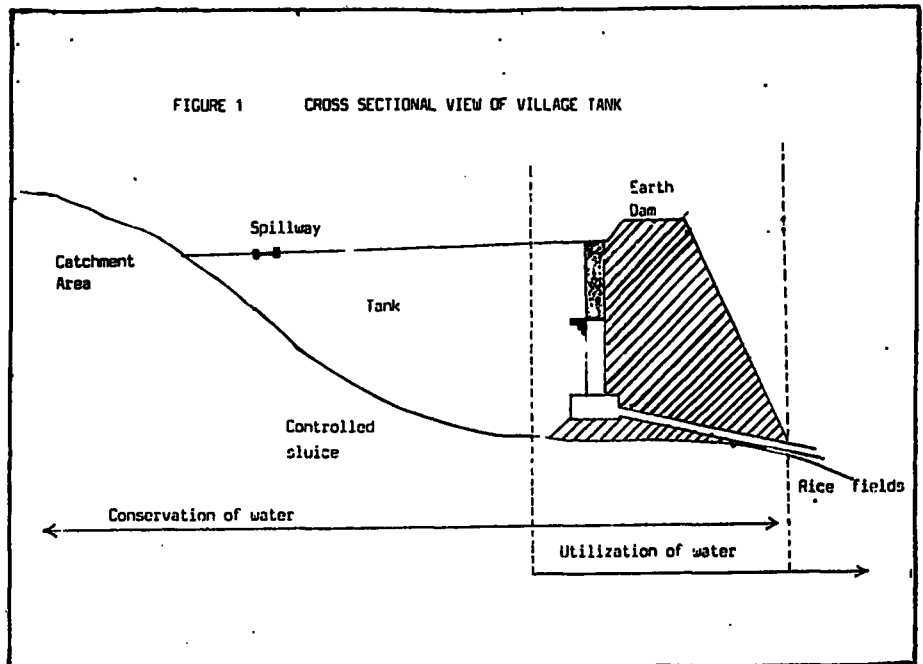
Zone, and anicuts (river diversions), chiefly in the Wet Zone. The lift irrigation systems in the Northern areas, irrigation systems formed by using small streams for terrace cultivation in the hill-country, and the rainfed irrigation systems which make use of non-perennial rivers in the Eastern Dry Zone also serve village irrigation. This Report is concerned only with Dry Zone Village Tanks which provide a major part of the requirements of village irrigation schemes.

What is Village Irrigation?

Small scale water conservation systems commonly referred to as village tanks are a distinctive feature of the Dry Zone of Sri Lanka. They are small reservoirs used for collecting runoff water during the monsoon for irrigation and domestic water supply. Tanks are created by constructing an earthen bund across the natural drainage basin (See figure 1). The significance of the village tank in Sri Lanka is that the social, economic and cultural life of the people has been very closely knit with a tank village settlement pattern.

This village irrigation system is not unique to Sri Lanka, it is also found in other Asian countries such as India, Burma, Cambodia and Thailand. Tank irrigation systems of southern India (particularly Tamil Nadu) have a similarity to those of Sri Lanka because of their close climatic resemblance in terms of seasonal variability and ineffectiveness of rainfall. Village tanks in Sri Lanka fall mainly into the non-system type which depends entirely on direct rainfall and runoff water from their own catchment areas. The irrigation capacity of tanks varies a great deal. It appears that spatial distribution as well as site and size of these tanks had been primarily dictated by social factors rather than by technical factors.

The conventional classification of irrigation schemes in Sri Lanka is largely based on the scale and type of organisation. Following these criteria all the country's irrigation projects were categorized as minor, medium, major and multi-purpose projects. As stated in the Irrigation Ordinance No. 32 of 1946 minor schemes are those that have been "constructed by the



proprietors without government aid or with the aid of masonry works and sluices supplied free of charge by the government, and maintained by the proprietors". Thus, any irrigation project which served less than 80 ha (200 acres) was considered as minor and others fell into the major category. There is now a statutory significance for this figure of 200 acres because the Agrarian Services Act No.58 of 1979 defines Minor Irrigation Works as an irrigation work serving upto 200 acres of agricultural land. The design and construction is the responsibility of the Irrigation Department whilst the operation and maintenance is that of the Department of Agrarian Services which enlists the involvement of the community for the purpose.

Historical Perspective

Sri Lanka is covered with a network of thousands of man-made tanks. The map showing the distribution of ancient village tanks indicates a greater preponderance of these reservoirs in the region of the ancient kingdoms. (See Inside Cover). A closer inspection of the topographical maps reveals that in some localities the density of tanks exceeds 1.4 tanks for an area of a mere one square mile. Although a large number of these tanks are in use at present, a considerable proportion lie in an abandoned state under forest cover. It is generally believed that most of these tanks have fallen into

disuse after the collapse of the Rajarata Civilization around the 12th century.

According to Wittfogel, who analysed the despotic power in hydraulic societies, the tanks are generally assumed to be the work of a centralized state bureaucracy, and it is argued that their setting up and subsequent abandonment can be explained by the breakdown of the state apparatus in these specific areas. E.R. Leach (1959) argued in a paper entitled "Hydraulic Society of Ceylon," that "although the large tanks may have been the work of a bureaucracy, the village tanks most decidedly were not." This leads us to the conclusion of the inapplicability of the Wittfogel hypothesis of Oriental Despotism for Sri Lanka.

As stated by Madduma Bandara (1984) in his paper on "Catchment Eco-systems and traditional village tank cascades," the gravity irrigation developed in these areas since ancient times was obviously based on small natural drainage basins. Thus a system of cascades has developed over the centuries. These village tank cascades which will still form a common phenomenon in most parts of the dry zone, appear to be time-tested land and water management systems with a remarkable

degree of harmony with their natural environment.

Even though at present the presence of a cascade pattern seems apparent, when considering only the topographical evidence which can be analysed under different criteria, as explained above, the validity of the assumptions that this system of tanks has been built at the same time or that these have functioned as a unitary system are rather questionable. Though there are local words in most of the other concepts of irrigation and water use, it is hard to find a local equivalent for the concept of 'cascade'. Therefore conduct of comprehensive research based on more historical evidence is imperative before one could arrive at specific conclusions about this 'cascade' concept.

Numerous smaller tanks still survive and continue to provide the basis for irrigated agriculture in the Dry Zone. Indeed, the tank was judged to be so vital to village life that the term 'wewa' was frequently used synonymously with the term 'gama' (village). Each village possessed its own village irrigation system which was maintained by the villagers themselves. The running of the village irrigation system was thus firmly in the hands of the local community. It is only since about 1900 that a centralized Irrigation Department has had the right to interfere in matters relating to the maintenance and use of village tanks.

By the mid 19th century the plight of the settlements which were remaining, was so pitiful that they could no longer be ignored. The greatest need was to restore the numerous irrigation works that lay abandoned. This required the filling of breaches in the tank bund; desilting the tank bed; re-opening the canal network; and replacing the sluice gates and structures, which works were clearly beyond the means of an already impoverished peasantry. The government had to step in.

In 1856 the government enacted the Irrigation Ordinance to facilitate the revival and enforcement of

ancient customs regarding the irrigation and cultivation of paddy lands; and later (1867) extended the legislation to include the repair of village tanks and minor irrigation works (See Box on Irrigation Laws and Peasant). Whilst State interest in the early days was centred on the village irrigation works, by the early 20th century, with the national leaders gaining a greater say in the affairs of the country, the emphasis shifted to large irrigation works, the restoration of which enabled the re-settlement of substantial numbers of families from the over crowded Wet Zone areas.

The responsibility for village irrigation works has changed hands among different state agencies during the last two decades. To start with, the Government Agents (GAs) of the respective districts managed these systems until 1958. Since then, those works have been the responsibility of Agrarian Services Department (1958-1970), Territorial Civil Engineering Organizations - TCEO (1970-1977), Department of Irrigation (1977-1979), and again the Agrarian Services Department (1979- to date).

Present Status

Village irrigation works are those that benefit less than 80 ha. and have a traditional pattern of cultivation. It is very difficult to get an accurate estimate of the number of village irrigation works in Sri Lanka. The reason is that the schemes which are in use and those which are not in use are included in official census. The Lands Ministry estimates that there might be about 23,000 village schemes in the country of which 13,000 are village tanks and 10,000 anicut or stream diversions. About 50 percent of these schemes are in working condition, although their efficiency is of varying degrees.

According to the Register of Irrigation Projects of the Irrigation Department, in 1975 there were 3,119 village irrigation tanks scattered in the Dry Zone. According to F.A.O. estimates (1980) the number was 7758. The Freedom From Hunger Campaign

(1979) has counted about 18,000 village tanks in Sri Lanka (although they estimated the number to be as high as 30,000) and most of them are in the Dry Zone and are of ancient origin. According to the 'Wewas and Reservoirs Album' prepared by the FFHC (1979) about 52 percent of them were working currently with different degrees of efficiency, and there were about 8000 abandoned tanks that are amenable to restoration that could benefit about half a million people. However, the actual number of village tanks in operation now in the Dry Zone is estimated to exceed 8000. The Kurunegala and the Anuradhapura districts together account for nearly 63 percent of all village tanks. A district wise breakdown of the distribution of village tanks is given in Table 1.

Table II shows the total irrigable area under major irrigation which remained at 269 ha. in 1984. The land area under major schemes kept growing, and at present it accounts for nearly 60 percent of total irrigable area. This trend is likely to continue much faster with the progress of the Mahaweli project and other new major irrigation works. On the other hand the area under village irrigation has been showing a declining trend since 1978 due mainly to the absorption of many village irrigation works under major Schemes.

In spite of the growing size of the major schemes the irrigation system outside major irrigation zones will continue to perform an important role for many more years to come. The total extent of paddy land fed by village irrigation amounts approximately to one-third of the asweddu-mised area in Sri Lanka. It can be estimated that production of paddy on land irrigated by village schemes accounted for 23 percent of total paddy production in 1983/84. The Dry Zone village irrigation schemes accounted for nearly 63 percent of all harvested acreage under minor schemes.

The cost of village tank rehabilitation is estimated at Rs 10,000/- per hectare. This can be compared with the cost of settlement in the first stage

in the Mahaweli Scheme which is calculated at Rs 65,000/- per ha. of irrigated land.

From a social or equity view point the lower yields and the smaller average holding sizes in Dry Zone village tanks, indicate that the percen-

tage of paddy growing households dependent on paddy production from these village tanks is much larger than is reflected by their percentage share in total production. This suggests that in social terms, the improvement of village irrigation is a more pressing need than major scheme improvement.

Table I DISTRIBUTION OF VILLAGE TANKS

Dry Zone		Wet Zone	
District	Number	District	Number
Ampara	90	Badulla	289
Anuradhapura	1406	Colombo	228
Hambantota	311	Kalutara	45
Jaffna (including Kilinochchi)	442	Galle	636
Kurunegala	4203	Kandy	382
Mannar	461	Matara	493
Monaragala	137	Nuwara Eliya	223
Polonnaruwa	63	Ratnapura	410
Puttalam	772		-----
Trincomalee	192		2970
Vavuniya	610		
(including Mullativu)	-----		
	8927		
Grand Total-	11,897		
	=====		

Source: Survey by Ministry of Lands and Land Development, 1971-1975; and Survey by Department of Agrarian Services, 1980.

Table II PADDY LANDS UNDER VILLAGE IRRIGATION (IN '000 HECTARES)

Year	Total irrigable area	Irrigable area under major irrigation	Irrigable area under village irrigation	Irrigable area under village irrigation as a % of total
1970	341	179	162	47.5
1971	344	181	163	47.4
1972	350	184	166	47.4
1973	352	188	164	46.6
1974	364	196	168	46.2
1975	376	203	173	46.0
1976	384	206	178	46.4
1977	389	208	181	46.5
1978	402	217	185	46.0
1979	399	228	171	42.9
1980	406	239	167	41.1
1981	415	244	171	41.2
1982	433	260	172	39.7
1983	441	266	175	39.7
1984	445	269	176	39.6

Source: Department of Census and Statistics, Colombo.

blocks, and crop diversification in the second season are the most important methods being promoted to improve the efficiency of water use.

The 'Walagambahuwa Project' is frequently referred to as the model

on which the principle of dry sowing has been elaborated. It has been described as introducing a new concept of technology to improve cropping intensity which is low in village irrigation schemes 'because of inefficient

water use practices'. Timely cultivation (dry sowing) is 'the crux of the new technology'. This model is essentially a return to the traditional crop calendar which began with much optimism. It is doubtful whether it has

provided the breakthrough that was expected. However, water management under village irrigation still remained relatively neglected.

Other projects have had a similar experience. In the tank Irri-

gation Modernization Project of five major schemes, an attempt has been made over several years to introduce dry sowing of paddy but so far this has not achieved any success.

The peasants who lived (and

are living) under village tanks would have had, and continue to have some basic knowledge of the activities that are taking place around their tank which is their sole means of livelihood. Therefore, it has become very impor-

tant to get their views and participation not only in the process of operation and maintenance but also in planning and constructing. In a study of Rehabilitation Programmes. J. Meda-

gama (1982) has shown the lack of avenues of farmer participation in these programmes. The research needed now is to identify the socio-economic constraints on what has been shown

to be technically feasible.

The problem of paddy production in the Dry Zone village tanks is further aggravated by fragmentation of holdings mainly due to inheritance and

economic distress of peasants from repeated crop failures. As shown by Karunanayake (1977) in a study on 'the attitude of peasants to land consolidation', there were two individuals

in the population of 87 owning more than 17 parcels of land in the study village. The complexity of tenure in the management of village irrigation becomes a crucial issue. In recent

times, the disintegration of institutional arrangements that were available for managing irrigation at the village level is readily seen.

Paddy cultivation in tank villages is to an extent modernized. Land preparation and threshing are mechanised and two and four wheel tractors are used for these operations. The vast majority of peasants have adopted locally improved varieties of paddy. Use of modern inputs; pesticides; weedicides and chemical fertilizers is also prevalent.

Data from several case studies suggest that most peasants cannot utilize the limited institutional credit facilities available mainly because many of them are defaulters and, because of problems with the timeliness of institutional credit. The problem of non-repayment restricting farmers access to credit is a serious one not admitting of easy solution. A successful credit scheme does require discipline in observing repayment schedules and failure to repay, whether due to a poor harvest, interfering politicians or any other factor is a threat to any institutional credit scheme. Since non-formal credit is usually more expensive, restrictions on formal credit are also a threat to peasant income.

A possible alternative solution to this situation would be for new programmes to settle defaulting peasants debts, although this is expensive for the programme and administratively a complex issue. Effective credit is a necessary component of village irrigation agricultural development. Therefore it is necessary that the credit problem be given much higher priority than it has so far received.

Inaccessibility of credit, complexity of land tenure, government neglect and other related issues have resulted in a comparatively impoverished economy within the Dry Zone and particularly in the tank villages.

Conclusion

The predominantly agricultural economy of Dry Zone tank villages is poorly endowed and a majority of the

households maintain themselves at a subsistence level. The poor economy of the Dry Zone in general and tank villages in particular is due to a combination of problems.

Drought is the main cause

affecting paddy production in tank villages. Scarcity of water in combination with other factors results in very low paddy yields under the village irrigation. Unstable paddy production coupled with substantial cash invest-

ment needs seem to have resulted in an increase in the percentage of paddy land cultivated under the share-cropping and leasing systems.

Under the British Colonial rule, all land whose ownership could not

Village Irrigation and Special Projects

Many of the village irrigation schemes have deteriorated or been abandoned and as a result authorities have taken action to rehabilitate these mainly under the Village Irrigation Rehabilitation Programme (VIRP) and Integrated Rural Development Programme (IRDP). Others include the Anuradhapura Dry Zone Agriculture Project (ADZP), the Tank Modernization Programme of the Department of Agrarian Services, and substantial components of the National Freedom from Hunger Campaign.

At present 14 districts (11 Dry Zone districts and 3 Integrated zone districts) are covered by the VIRP and IRDP. Rehabilitation of about 1200 village irrigation schemes under VIRP and another 940 village irrigation schemes under IRDP will be a major feature of these projects (See Table 1).

(a) Village Irrigation Rehabilitation Project

This is the largest programme concerned with rehabilitation of village schemes and has financial support from the World Bank. It aims at rehabilitating 1200 village irrigation schemes of which about 90% are village tanks.

It is expected that the rehabilitation work will minimise uncertainty related to availability of irrigation water for 77,805 acres of land benefitting 20-25,000 farm families. The project area is spread over almost the whole of the Dry and Intermediate Zones and a small part of the Wet Zone.

The project has two main objectives; rehabilitation of deteriorated village irrigation schemes to increase agricultural production and farm incomes and; to ensure efficient utilisation of stored water.

The VIRP is a 5 year (1981-85) project and has a budget of US\$ 25.9 million. The project life has been estimated to be 25 years with the project reaching its full production levels in 1991. It is estimated that with full maturity of the project

cropping intensity in the project areas would increase from 32.5% to 116.25% leading to an increase in rice production of 37,800 tons per year and a 43% increase in per capita income.

Rehabilitated tanks will be operated and maintained by the farmers with support from the Dept. of Agrarian Services (DAS). The Irrigation Department will be responsible for ensuring satisfactory functioning of the headworks and structures rehabilitated under the project. The Dept. of Agrarian Services is responsible for planning and implementation of the water management programme in the rehabilitated tanks to ensure optimum utilization of the available water.

Specific water management programmes will be prepared for individual tanks in consultation with the farmers and will be operated by the farmers under the guidance of the DAS staff. A new set of agricultural and irrigation practices is being introduced under the water management programme.

REHABILITATION PROGRAMME FOR VILLAGE IRRIGATION

District	No. of Schemes	
	VIRP	IRDP
Amapara	60	-
Badulla	160	200
Batticaloa	40	-
Hambantota	40	-
Jaffna	40	-
Kurunegala	350	500
Mannar	60	-
Matale	10	40
Monaragala	100	-
Mullativu	50	-
Puttalam	50	200
Ratnapura	30	-
Trincomalee	110	-
Vavuniya	110	-
Total	1200	940

Source: Medagama, J. *Water Management Programme in Village Irrigation Schemes in Sri Lanka, (mimeo).*

(b) Dept. of Agrarian Services Programme

The Dept. has undertaken a modernization programme for 500 village tanks with financial support from the World Bank. This is a two year programme (1983-85) and modernization work mainly involves on farm development work and minor repairs or improvements to the head works.

The main objectives of this programme is to introduce a systematic water management programme for the non-rehabilitated working village tanks by providing them with appropriate downstream facilities.

A small number of village tanks are also modernized every year by the Dept. of Agrarian Services with funding from its own departmental budget and from the decentralized budget. Tanks thus modernized are also brought under the water management programme.

(c) Anuradhapura Dry Zone Agricultural Project

This project aims at rehabilitating 600 village tanks in the district in order to provide irrigation facilities to about 20,000 acres of new farming land along with a water management system and to stabilise about 65,000 acres of chena land with improved agricultural facilities.

This is a 5 year (1981-85) project with financial support from the Asian Development Bank and the International Fund for Agricultural Development (IFAD). The project has an estimated cost of US\$ 39.6 million. Of the total budget about 50% is allocated to village tank rehabilitation work. The project life has been estimated to be 30 years.

(d) Freedom from Hunger Campaign Programme

Since 1980 the FFHC has been involved with restoration of abandoned small tanks in the dry zone under its 'Small Reservoir Village Community Rehabilitation Programme'. Although the project is mainly concerned with restoration of abandoned tanks it also does some rehabilitation work. FFHC is a voluntary agency.

be firmly established was confiscated, designated 'Crown Land' and then sold off in plots of five acres. Land thus became a marketable commodity. Land was no longer a matter of prestige. Monetary transactions became more important. With the changes of traditional attitudes and values, the existing social patterns and land/water use practices also changed. These transitional features were more in evidence in relation to paddy cultivation, although they had some influence on chena cultivation too.

On the basis of recent studies, several alternative possibilities in village irrigation could be envisaged such as improving management of irrigation water use under existing village schemes; and developing irrigation in existing paddy lands under village irrigation through supplementary irrigation (e.g. well irrigation).

Considering the official estimates there are around 12,000 village irrigation works and on the basis of 100 families per village and 5 persons per family almost 6 million people would be dependent on these works. The question arises whether sufficient has been done for a sector of irrigation that benefits so large a segment of the population. If due emphasis is to be shifted to this sector it must be appreciated that the village tanks are ready-made structures closely integrated and inter-dependent with the rural environment and the economic and social life of these people over many generations. No doubt investment on larger works has been necessary, particularly due to requirements of power but the benefits can certainly be more widespread if the due emphasis was given to this sector as well; as an increase in village irrigation facilities can be regarded a basic step in helping to stabilize the agricultural base and also helping to reduce the impact of regular droughts and expenditure on drought relief measures in many of the areas where village tanks have been located. There are many problems needing attention if village irrigation is to be improved, and as the Director of the Water Resources Development Division of the Ministry of Lands referring to these problems emphasises "this is a matter which cannot be any longer postponed".