THE ERY SYSTEMS OF SOUTH INDIA

BY
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It is well known that more than one lakh villages of Indian do not have even drinking water sources. The National Technology Mission on Water is to spend Rs.2000 crores in providing drinking water to nearly one-lakh villages. The major source of water is to be ground water. However, there seems to be no clear idea as to how all this groundwater is to be continuously extracted. There is no understanding of how provision is to be made for the recharge of all groundwater.

It is not clear why the Technology Mission has not considered surface water as a viable and relevant source for the provision of drinking water. As compared to groundwater, surface water is a renewable resource. And surface water storage reservoirs play a very important role in the recharge of groundwater. Hence even if groundwater is to be used on a sustainable basis, the surface water storage reservoirs became very crucial.

It is in this context that traditional storage reservoirs or Erys become very relevant. Traditionally Erys have played a very important role in irrigation and in the local eco-system in areas with relatively low-rainfall, such as most parts of Karnataka, Andhra and Tamil Nadu. Even today about 1/3 of the irrigation needs of these areas are met by Erys (see tables 2,4 and 5)

The following article attempts to bring out the current relevance of the Ery systems of South India. Although the importance of Erys in irrigation in South India is generally granted, the notion that this technology is somehow backward , primitive and is eventually to be got rid of in our quest for advancement, is quite prevalent amongst the intelligentsia of our country. Modern agriculture after the introduction of Green Revolution has become heavily dependent on large quantities of water for irrigation in addition to large doses of fertilisers and pesticides. However, this strategy seems to have backfired in paddy production.

Paddy is a highly location-specific crop, which is the reason why there were perhaps a couple of lakh paddy varieties all over India. Data from different parts of Tamil Nadu for the late 18th and early 19th centuries reveal that under Erys the productivity of paddy was considerably high and in fact higher than the yields in the 1960 s. It is important to understand how this was possible and not merely dismiss Erys just because they have been around for more than a thousand years.

The first section of the article attempts to explain the technology of Erys, how Ery systems work and their role in the eco-system. The second section goes into the history of these Ery systems and the scientific knowledge which has gone into their design. The third section deals with the arrangements for management of Erys in the pre-British South Indian society. The next section deals with the rapid decay of these massive systems under the British rule. The fifth section deals with the attempt of the British state to shift the burden of maintenance of Erys on to the village communities without providing them the necessary resources for doing so. This myth of Kudi Maramath has been taken up by succeeding generations of officials of the Indian state so that it has become today a by-word in academic and official circles, used in order to blame the village communities for not undertaking the maintenance of Erys.

The sixth section describes how community management of Erys takes place today. This section is based on field data from several parts of Tamil Nadu. The situation is that, today, most village communities manage their own Erys through informal organisations of all cultivators. Resources are raised voluntarily from within the community. The village community is of course not in a position to take up major repairs to the Ery which involve large expenditures and often the use of heavy machinery. However, these informal irrigation organisations receive no recognition or support from the state. For all practical purposes they remain as underground organisations. Any book at the

indigenous management of Ery should serve to dispel the pervasive myth of Kudi Maramath and help in seeing how functional the village community is to this day.

Lastly, there is a brief description and evaluation of the Modernisation of Tank Irrigation scheme undertaken by the Tamil Nadu Government. This scheme which focuses on the efficient use of irrigation water from Erys and equity in the distribution of water has turned out to be a failure and has so far been treated as an irritant by the farmers. The evidence for this has been gathered from a couple of villages in the Chengalpattu District of Tamil Nadu.

Not only are Erys marvellous examples of indigenous engineering skills and ingenuity, they also illustrate an understanding of nature and an ecologically sound intervention in nature. An understanding of this technology and its relevance for today will go a long way in providing ecologically sustainable alternatives to the current mode of modernisation and development in agriculture, modelled after the West.

ERYS: AN INTRODUCTION

Tank is actually a misnomer for the reservoir known as *Ery* in Tamil.

Tank normally refers to a dugout reservoir, which has steps on all sides reaching down to the water. The best examples of such tanks are the temple tanks *(Kulam)* of South India. An *Ery*, on the other hand, is a reservoir of water contained behind earthen bunds or embankments. Here the bund surrounds the water on three sides. The fourth side is open to the catchments from which water flows down to collect in the *Ery*. Normally the middle of the bund is the deepest portion of the *Ery* and the depth decreases as we go away from the middle of the bund to the sides or flanks of the bund.

One of the main functions of an *Ery* being irrigation of fields for cultivation, each *Ery* is designed to irrigate a certain extent of agricultural land known as the *ayacut* of the *Ery*. The water reaches the fields by gravity flow, across (below) the bund through openings or valves called sluices (*madag*u in Tamil). Normally, there are fairly elaborate arrangements for opening and closing the sluice, which can be operated from the top of the bund. Once the sluice is opened, water flows down channels and is distributed all over the *ayacut*. An Ery has, depending on its size, a number of sluices. Sluices are located normally at different levels so as to be able to supply water to fields at different elevations.

Another important feature of an *Ery* in the arrangement for overflow of water, for which one or more overflow weirs (*Kalangals*) are provided, normally on one of the flanks of the bund. It is important that this weir is fairly precisely placed and designed to allow overflow of excess water beyond a level, which is the maximum level of water the bund may safely hold without breaching. Accumulation of water beyond maximum level will result in the waters overflowing the bund and eroding and breaching it. Hence the overflow arrangements are very important from the point of view of safety.

Although isolated *Erys* which are fed by the run off waters from their own catchment do exist, it is more common to find even today, *Erys* as part of an inter-connected chain of *Erys,* wherein the surplus waters of one flow down to the next Ery down the line and so on. *Erys,*
Which are fed by channels diverted from rivers, are known as *System Erys*.

Ery irrigation accounts for about 4 million hectares in India (See Table.1). This is perhaps the total area irrigated by officially recognised irrigation tanks. Hence, other estimates which also take into account *Erys* in areas such as Bihar and Rajasthan which do not come into official estimates suggest that the area under *Ery* irrigation may be 5 million hectares or even more. On the whole, nearly 2 lakh *Erys*, mostly in parts of India, which receive annual rainfalls of 1,000 mm or less, provide irrigation to these 5 million hectares.[1]

ERYS IN TRADITIONAL AGRICULTURAL PRACTICES

In India agriculture depends upon and closely follows the monsoons (South-West and North East), which are regular occurrences. In normal years, monsoons are predictable and sufficient for all the irrigation needs when supplemented by artificial irrigation. Traditional water conservation and irrigation technologies such as *Erys,* took on precisely the supplementary role of adding to the sufficiency, certainly and predictability of water availability for agriculture.

Traditional cultivation practices were so chosen as to adjust themselves to the supply of water available. Preparation of the soil, selection of seeds and implements used, mixture of crops cultivated and the crop calendar all these reflected a minute and comprehensive understanding of the relationships between terrain, soil, rainfall, water, crops, human labour and livestock. Such an approach resulted in an optimal utilisation of resources such as water. For example, depending on the rainfall and the availability of water in the *Ery*, different crops (millets instead of paddy, for instance) and cropping practices such as mixed sowing are adopted. Similarly, the area irrigated is altered from crop to crop, depending on the water available, to ensure it is adequate.

Since *Erys* are local resources, the village communities constantly make estimates of water available in the *Ery* and such estimates are used to make sure that the most efficient use of available water is made. In addition, folk-knowledge is able to predict rainfall quantities reasonably in advance depending on the observation of other natural phenomena, so that cultivators are prepared in advance for shortage in rainfalls.

Modern agriculture, especially with the advent of Green Revolution cultivation, has one great obsession, namely water. Massive irrigation schemes and enormous quantities of water are said to be necessary in order to produce large yields. However, the traditional Indian approach to the question of water, like the approach to every other natural input into agriculture, has been one of making very minute observations of what nature provides and to make optimal adjustments with nature. There seems to have been no obsession to use water in large quantities or to consider areas, which do not receive, through rains or irrigation, large quantities of water, as *dry* and somehow inferior. Where rainfall was relatively low, every effort was made to retain all the water that fell on the ground through appropriate water-retention and conservation strategies such as *Erys*.

Traditionally, Erys seemed to have played several roles:

1.AS APPROPRIATE IRRIGATION DEVICES IN THE CULTIVATION OF PADDY:

In areas, such as the Chengalpattu District of Tamil Nadu, which are completely dependent on rains and water stored in *Erys,* during the first crop season called *samba* which begins in the Tamil month of *Adi* (July-August), the paddy crop was traditionally a rain-dependent one and was cultivated practically as a dry crop. This was a long-term crop, the traditional samba varieties being of six-month duration. Towards the end of this crop, *Erys* were usually full or at least contained enough water to provide irrigation to bring the paddy crop to maturity. In this instance, *Erys* served as supplementary sources of irrigation to aid the rain dependent crop. Normally, if rains were sufficient to fill the *Erys,* there was a second crop of paddy. This crop was completely irrigated by *Ery* water and cultivated in standing water and puddle.

(2) AS A SYSTEM WHICH ACTED AS A FLOOD CONTROL DEVICE, THUS PREVENTING SOIL EROSION AND WASTAGAE OF RUN OFF WATERS DURING PERIODS OF HEAVY RAINFALL:

Erys, (particularly connected chains of *Erys)* play a very important role as flood control devices. But for the presence of a very large number of chains of *Erys* in Northern Tamil Nadu, very large quantities

of water, particularly during the North-East monsoon season, would run down from the Eastern Ghats to the sea, causing a great deal of soil erosion and other damage. Hence the rivers are not perennial streams (like for instance the Palar) and carry a heavy supply of water in a flash flood during the sudden bursts of heavy rain during the North-East monsoons. *Erys* are ideal foils for such streams since the water can be diverted away through *anaicuts* (diversion structures) into *system Erys*.

However, the effectiveness of *Erys* as flood control systems is determined by the existence of a well-maintained system of *Erys* linked together as chains; the overflow from one leading to the next lower *Ery*, trapping the maximum possible amount of water and allowing excess water finally to flow down smoothly into the sea. This would mean that if *Erys* are not properly maintained and are allowed to silt up, chaotic consequences could ensue during periods of particularly heavy rainfall. An *Ery* which is silted is liable to fill up far too rapidly and overflow. It also has a high chance of breaching in the event of a sudden onrush of large quantities of water. And the breaching of a single *Ery* in a chain of *Erys* can cause the breaching of all the *Erys* lower down, thus leading to the rapid flooding of a vast area. Hence the need to keep *Erys* desilted and in good maintenance at all times.

(3) AS STORAGE DEVICES WHICH ACTED AS INSURANCE AGAINST LOW RAINFALL PERIODS AND ALSO RECHARGED GROUND WATER IN THE SURROUNDING AREAS:

According to their original design *Erys* were perhaps meant to contain water at all times. Even as recently as the end of 19th Century, the North Arcot District Manual noted that the Dusimamandur *Ery* in North Arcot District of Tamil Nadu stored water for 15 months. This was at a period when *Erys* were already on the decline due to poor maintenance and consequent silting. So it may be safely assumed that a well-maintained *Ery* would have stored water.

The disastrous consequences of allowing *Erys* to silt up without proper maintenance were experienced during the last two-three years in Chengalpattu District of Tamil Nadu. In 1985, due to very heavy rainfall during the North-East monsoon, a number of *Erys* breached. They were badly silted and could not handled the heavy inflows of water. Even the many *Erys* which did not breach could not retain much water. 1986 was a year of very poor rainfall and immediately there was a severe drought and water scarcity in Chengalpattu District. This would have seen the country through periods of low rainfall even if this occurred every other year, without leading to an overall drought and water scarcity, as is happening today. As water storage devices *Erys* also play a very important role in recharging groundwater.

Traditionally complementary use of *Ery* and well water was an important feature of cultivation under *Erys*. With the atomisation of village communities and modernisation of agriculture, use of well water has increased enormously and wells have become independent sources of irrigation as it were (See Table.5). However, *Erys* are absolutely essential for recharging of wells.

(4) AS A DEVICE WHICH WAS CRUCIAL TO THE OVERALL ECO-SYSTEM:

An *Ery* is not merely a reservoir of water for irrigation. The presence of *Ery* provides an appropriate micro-climate for agriculture. It also has an important role in the ecology of the surrounding area.

Catchment areas of *Erys* contained village forests and grazing pastures (known as *Gomala)* in Karnataka. Trees growing here were useful as timber for making ploughs and other agricultural implements. In the forest, farmers collected green manure and other organic matter used as manure. Rainwaters washed this organic matter down into the *Erys*. Hence *Ery* water contained sediments which fertilised the fields.

Trees were also grown on the bund or on its outside slope. These trees were useful to the village community and they also strengthened the bund.

Foreshore areas where normally soil erosion was high contained small ponds These ponds were so located as to minimise soil erosion and consequent siltation of *Erys*. *Ery ayacuts* normally contained a number of percolation ponds. These ponds also minimised soil erosion during times of heavy rains and flooding. The mud from these ponds was used as manure.

Desilting of *Erys* was connected to certain economic activities in the village. Mud was used in pottery and in construction. It also provided mud known as *Vandal* for use as manure.

THE MODE OF CONSTRUCTION OF ERYS IN ANCIENT INDIA

This brings us a consideration of the original scheme of these systems of *Erys*. It is conceivable that when the area of Northern Tamil Nadu known as Tondaimandalam (comprising the Chengalpattu and North Arcot Districts of Tamil Nadu) was first settled, an extensive network of *Erys* was also thought of, to be compatible with the overall ecology of this part of Tamil Nadu. Although inscriptional and other evidence indicates that *Erys* continued to be constructed over a long historical period, the original plan seems to have certainly been a grand one, which considered a large network of interconnected chains of *Erys*, running all the way from the Eastern Ghats down to the Bay of Bengal. It is difficult to imagine that *Erys* would have been constructed one by one and at some point would have formed perfectly connected systems.

A British expert writing in 1850 s observed:

The extent to which it (irrigation works) has been carried throughout all the irrigated region of the Madras Presidency is truly extraordinary. An imperfect record of the number of tanks in 14 districts (of the Madras Presidency) shows them to amount to no less than 43,000 in repair and 10,000 out of repair or 53,000 in all. It would be a moderate estimate of the length of embankment for each to fix it at half a mile; and the number of masonry works, in sluices of irrigation waste weirs, etc, would probably be not over-rated at an average of 6. These data, only assumed to give some definite idea of the extent of the system, would give close upon 30,000 miles of embankment (sufficient to put a girdle around the globe not less than 6 feet thick) and 3,00,000 separate masonry works. The whole of this gigantic machinery of irrigation is of purely native origin, as it is a fact that not one new tank has even been made by us, and the concurrent testimony of those best informed on the subject shows that a great many fine works of the kind have been allowed to fall into utter disrepair and uselessness. [2]

In order to construct an *Ery* or a reservoir a modern Engineer would first make a topographic survey in order to study thoroughly the catchment area, site of the reservoir and the land to be irrigated. The rainfall and hydrological characteristics of the area how water flows down in its minutest detail must be well known in order to design the bund, the overflow structures, the sluices and the channels to carry the water, the exact location of the fields, and to determine the area of water spread and the area to be irrigated, It is very important to know through a topographic survey, the precise topography over a fairly extensive area (in the case of large *Erys)* to be able to locate precisely the overflow structures with respect to the embankment of bund. There are some ancient *Erys* where the overflow structures are located as far away as two miles from the bund. This means that the entire topography must have been thoroughly understood over such a wide area, since the location of the overflow structure
are absolutely crucial to the safety of the *Ery*. The design of the bund and sluices and their actual construction is another formidable engineering task.

The famous Poramamilla (Cuddapah District of Andhra Pradesh) *Ery* inscription of 1291 AD provides some insights into the method of construction of the *Ery* and the technical complexities involved. It

appears that the science of *Hydraulics* or *Jala sastra* and *hydrology* or *Pathas sastra* were important branches of study and professionals, learned and competent in these sciences, were engaged in the construction of *Erys*. According to the Porumamilla *Ery* inscription.

(i) a king endowed with righteousness, rich, happy (and) desirous of (acquiring) the permanent wealth of fame (ii) a Brahmana learned in *pathas sastra* (*Hydrology*) (iii) a ground adorned with hard clay (iv) a river conveying sweet water (and) three *yojanas* distant (from its source) (v) the hill, parts of which are in contact with it, (the *Ery*) (vi) between these (portions of the hill) a dam (built) of a compact stone wall not too long (but) firm; (vii) two extremes (*Srimga*) pointing away from fruit(giving) land (*Phala-sthira*) outside, (viii) the bed extensive and deep (ix)and a quarry containing straight and long stones (x) the neighbouring fields rich in fruit (and) levels (xi) a water course (i.e.the sluices) having strong eddies (*Bhrame*) on account of the position of the mountain(*adri-sthana*) (xii) a group of men(skilled in the art of) its construction with these twelve essentials an excellent tank is easily attainable on this earth.

While (1) water coming from the dam (ii) saline soil (iii) (situation) at the boundary of two kingdoms (iv) elevation (*Kurma*) in the middle (of the tank) bed (v) scanty supply of water and extensive stretch of land (to be irrigated) (vi) and scanty ground and excess of water: (these are) the six faults in this connection.[3]

Such technical skill, perfected over the centuries, won the admiration of some British officials and experts writing in the 19th Century. Sir Arthur Corton writing in 1874 noted that, while the British had been cautious about laying a foundation in shifting sand for the Ganges Canal, the natives had proceeded with boldness and engineering talent to build weirs. These were built in sandy beds of rivers without any rock or sound stratum to found them on . In fact, adds Cotton, the natives have constructed tens of thousands of tanks in almost every kind of soil with earthen bunds without the puddle bank which English engineers have fancied necessary [4] Horsley, engineer of the Pandyan Canal describes how, in carrying out his works he felt contented and fully satisfied to follow in the footsteps of those whom I cannot but consider to have been masters their art [5] It seems odd, therefore that a prevailing modern view would state Initial construction of *Ery* required no special technical knowledge; simply an eye for the lie of the land and a lot of humping of the earth. (Baker, 1984,p.466)[6]

Only recently, modern irrigations experts have begun to consider an entire drainage basin as an appropriate unit for designing irrigation systems. This was an established practice in ancient times. Besides, it is now lawning on many experts that the curvature of the *Erybunds,* for example, do not follow any random configuration but were designed to be elliptical to give maximum strength to the embankment. Similarly, the stone facing on the inner wall of the bund is dressed in such a fashion as to minimise the action of waves- which are the most dangerous sources of erosion and damage to the bunds. The ancient studies are another outstanding example of the engineering ability of Indian builders. A Srilankan expert has suggested that the ancient sluices be preserved just as any priceless artifacts of the ancient times are. He warns that international agencies be not permitted to intervene and destroy these marvellous structures and replace them with crude cement substitutes.[7]

Closely related to the engineering design of the *Erys* is the social organisation necessary to maintain and manage this vast network in the Northern Tamil Nadu area. Two aspects of the *Ery* system are important in order to comprehend the related social organisation (1) Each *Ery* irrigates, usually, fields lying within one village (The larger Erys are exceptions to this). Hence, each *Ery* needs to be locally managed (ii) Where *Erys* are interconnected, which is usually the case, integration of supra-local or supra village localities must be possible in order to be able to maintain and manage the entire connected chain of *Erys*. The data currently available on the local and supra-local administration of pre-British Indian society does indeed suggest that the social and political organisation of pre-British India were designed to meet this need.[8]

MANAGEMENT OF ERYS IN PRE-BRITISH INDIA

Several inscriptions give a picture of how *Erys* were constructed, maintained and how the water was managed in the ancient times.

It was considered as act of great merit for an individual to construct and maintain works of irrigation, and a part of the duty of the state to undertake such works. Inscriptions still to be found on many *Erys* quote verses from ancient treatises extolling the merit of construction of such works. The famous inscription from Porumamilla *Ery* referred to above quotes As the water of a tank serves to nurture both movable and immovable creations on earth, even the lotus-seated (*Brahma)* is unable to recount the fruit of merit (attaching to it).

In other inscriptions, *Ery* construction is looked upon as one of the seven meritorious acts which a human being ought to perform during one s lifetime.

Generally, the agency responsible for maintenance work was the local governing body. Often, there was a committee called the Committee for Supervision of *Ery* (*Ery Variyam*). This Committee functioned as a committee of the village assembly. The famous Uttiramerur inscriptions (from the village of Uttiramerur in Chengalpattu District) give an elaborate description of the rules regarding the composition of this committee.[9] this body consisted of six members who held office for 360 days and then retired. (If anyone who served on the committee was guilty of any offence he was removed at once). This committee was in the main, concerned with raising of resources and their utilisation for the maintenance of irrigation works.*

Inscriptional evidence shows that grants of land called *Manyam*, held rent-free in hereditary and perpetual occupation, were made for the purpose of irrigation. Grants made for the construction and maintenance of irrigation works such as *Erys* were termed *Dasabanda Manyam*. *(*The evidence for those *manyams* is available from 9th Century A D onwards).[10]

The grant of such *manyams* continued to the end of the 18th Century in some parts of South India. In certain cases *Voddars* or tank diggers were directly given such *manyams*. Usually the recipients of these *manyam* were under obligation to maintain the works of irrigation in due repair. In certain cases, separate *manyams* for the repair of *Erys,* for the maintenance and upkeep of *Erys* and for constructing sluices to *Erys* were also made, i.e. land was assigned and earmarked for specific pieces of work in connection with the upkeep of an *Ery*.

Another source of funds to the local bodies for maintenance work was the income from the *Ery* itself. This income was in the nature of rents for the right of fishing in the *Ery*. These funds were utilized for deepening of the *Ery* or repairs.

The arrangements described in the inscriptions of the earlier periods seemed to have persisted well into the early British period. A survey undertaken in the 1760 s of all the villages of the then Chengalpattu District gives an indication as to how resources were mobilised and utilised locally in the maintenance of irrigation works such as *Erys*. About 4%-5% of the gross produce of each village seems to have been allocated for the maintenance of *Erys*. Other allocations were made for the village servants who were in charge of water distribution, management etc.[11] That share of the produce was allocated locally for the maintenance of irrigation works is borne out by several accounts of the period. According to one British observer The *pagodas* and Brahmins have a share of the produce of the lands. If I am not mistaken, the church has its share in the first instance. A certain proportion is allotted to preserve the tanks and water courses, and this is taken out of the gross produce of the lands, before

* An inscription of the 10th Century from Trichy area of Tamilnadu gives details as to how desilting was done and the expenditure incurred. Altogether provision was made for an expenditure of 412 kalams of paddy annually on the removal of silt. (At today s prices this amounts to more than Rs.1 lakh annually for this maintenance work).

any partition is made between Government and the inhabitants and it appears the free-gift (*Manyam*) lands paid greater share for the repair of tanks than the circar (rent-paying) grounds. [12] That maintenance work was done by means of granting *Enams* or revenue assignment to the persons who built and maintained these irrigation works, becomes clear by the accounts of several British collectors in the 18th century![*]

However, despite all the evidence describing the traditional arrangements for the maintenance and management of *Erys*, modern myths seem to persist. Take for instance W.H.Moreland s statement that in South India in the first half of 16th Century, there were no arrangements for keeping existing works in proper repair. [13]

Given this evidence, speculations such as maintenance of many *Erys* had probably once depended on forcedlabour [14]seem ridiculous.

It is also sometimes assumed that in the allocation of water the powerful in the village played a *dominant* role and managed the water allocation to their benefit. However, data regarding the *Kaniatchi* system and the *samudayam* villages in Tamil Nadu present a different picture. For instance the Collector of Tinnevelly and Ramnad Pollams. (In his report to the Madras BOR dated 29th December 1800) said from year to year, each ryot cultivates

His own land, unless distress come upon him or the supply of water be partial. On the latter (in the case of *Nunjah* (wet) land) all the inhabitants of the village assemble and having determined the extent of land that may be cultivated from the quantum of water in the tanks, it is apportioned out and to each inhabitant according to the extent of *Nunja*h land possessed by him in the village. When the crops have been cut, every inhabitant again returns to his own land .[15]

Similar is the system of land rotation among cultivators known as *Karalyeedu*, which was prevalent in the Tamil Nadu.[16] Land was allotted to the cultivators in a way that ensured a fair distribution of water collected in the *Ery*.

The historical material on irrigation organisation and structures and some recent data on the local and supra-local organisation of the pre-British Indian society together underline the fact that the Indian civilisation placed a great value on decentralisation of resources and political power which automatically set a limit to the size of irrigation structures. Large-scale systems such as modern Dams would not have been compatible with the values and goals of the Indian civilisation. The traditional irrigation technology of *Erys*, *anicuts* etc. were also ecologically the optimal solutions for the natural conditions obtaining in some parts of India. In this sense, traditional irrigation technology is certainly modern as well as sophisticated.

[*] See for instance the letter of the Collector of Baramahals. Alexander Reed to Board of Revenue (TNSA BRP: Conquered Countries: Vol.4 June-December 1792 pp 529-540). Cultivation might receive considerable increase by the repairing of certain nullas, the building of some tanks in fallow ground, and the reparing of others that have been long neglected. The custom of the country is to give whoever will build a tank a *chaut*, a fourth part, and to the minder of one that has long been out of repair, or requires a considerable labour, one eighth of the ground it waters as Enam to him and his heirs in Perpetuity. This existence of *manyams* for the repair of tanks is also taken note of in the Revenue and Judicial Report 23-8-1808 (IOB: Memo: Misc. Regn. 1074/B, P. 311). *Manyams* are likewise allotted for the maintenance of the pagodas and their attendants and for the repair of tanks. The newly appointed Principal collector of the ceded Districts also noted the existence of these *Enams* for the building of *Erys*. In his letter to the BOR dated 23.6.1801 he states: (Thomas Munro to the BOR 23.6.j1801 IOR: Boards Collections No.2570, Vol.147, pp-223-238). The sum of 43,265 pagodas is the amount of *Enams* granted for the building of tanks. In other districts the *Enam* is usually an eighth or tenth share of the circar share of the produce

It becomes important, therefore, to recapitulate the history of the decay of *Ery* irrigation systems. Much of our modern misconceptions regarding *Erys* stem from (a) our incomplete knowledge regarding pre-British Irrigation Systems and their management and (b) from the state of these systems as they survive after colonial intervention.

DECAY OF ERY IRRIGATION SYSTEMS

Arthur Cotton wrote When I first arrived in India, the contempt with which the natives justly spoke of us on account of this neglect of material improvement was very striking; they used to say we were a kind of civilised savages, wonderfully expert about fighting, but so inferior to their great men, that we wouldn t even keep in repair the works they had constructed, much less even imitate them in extending the system. [17]

When the British first came to India, they were, naturally, totally ignorant of the traditional irrigation technology, in particular of *Erys*, and their management. In the Northern Tamil Country for instance, the initial years of the British rule saw drastic changes in the land tenure system, in the quest for more and more efficient ways of extracting larger revenues. The enormous drain of the village revenue by appropriation by the state led to the disintegration of the traditional society and polity. At the local level, allocation for infrastructural arrangements such as irrigation systems for their maintenance and water management etc- were stopped.

Under early British rule, *Erys* were brought under the management of revenue officials. Subsequently civil engineers from the army were brought in as experts to deal with *Ery* irrigation. By early 129th century a Department for Tank Repairs was created, staffed by civil engineers. It was impossible for this centralised system, managed by engineers unfamiliar with the indigenous irrigation structures and organisation to take care of the *Erys*. In addition, the financial allocations made by the State for maintenance of *Erys* were negligible. *Erys* were not considered useful since it was felt then that investments made for the upkeep of *Erys* would not yield sufficient revenues to cover the investments.

Large areas under *Ery* irrigation began to be described deserted by cultivators who were left with no resources to maintain the irrigation systems nor could they pay the high revenues on irrigated lands. Data on Cuddapah District for 1822-31 reveals that revenue on account of repairs to *Erys* and water courses rises from 15% to 21% of total land revenue, where as a very small share of 2% or less was spent on repairs. The public expenditure on works of irrigation for the same area went down from Rs.47, 452 during 1816-1821 to Rs.23, 545 during 1846-1851. Consequently the number of *Erys* in operation declined from 8,650 in 2840 to 5,447 in 1856.[18] The state of affairs seems to have been typical of the Madras Presidency at this time. As revenues began to be adversely affected, the government responded by appointing various committees and commissions to look into the minor irrigation works as the *Erys* came to be termed.

In 1851, a commission was appointed by the Government to enquire into the system of public works (including *Erys*) in the Madras Presidency which submitted its first report in the year 1852 and the second in 1853. The first report of the commission said the annual outlay for repair and preservation of the work amounts, on the average of the last 10 years, to only about Rs.7, 00,000. Cost of repairs is less than 11/2% on the assumed original cost of the works, under 2% on their gross yearly proceeds and 42/3% on the annual revenue derived from them to Government 11/2% n original outlay must be too little to maintain in an efficient state, works designed for retention of water, consisting in a great part of earthern embankments and loose stone revetments In England, canals and other works in which water is retained require annual repair to the amount of, from 3% to 4% on their original cost .those canals are not exposed to the damage of a sudden and large influx of water like the tanks of this country, nor are their tanks exposed to the action of waves raised by a gale of wind .

Prima facie, then there is a presumption that the sum annually expended in the maintenance of existing works is too small and this is confirmed by a reference to the actual results. To whatever part

of the country we turn, we find the vast majority of tanks, even n a good season, watering far less land than they once did and far less than they could now irrigate if kept in proper repair, and there is abundant evidence to show that if the existing tanks were generally restored to their original capacity or efficiency, a very large increase of cultivation and revenue would be the result . [19]

This commission thus concluded that practically all the irrigation works in the Madras Presidency were operating below their state of full efficiency and were incapable of yielding their proper amount of irrigation. The commission reported that in 1850, the total extent of irrigated lands actually under cultivation was about half the total area and that it was believed that almost all of it had been formerly cultivated.*

That by the mid-19th century the vast and complex indigenous *Ery* system had been reduced, as a direct result of the British rule, to a ruinous state is confirmed by the reports of other contemporary observers. Things had reached such a pass that in 1881 the Collector Of Chengalpattu, J.F.Price proposed the total abandonment of a large proportion of the small tanks in his district and went on to recommend that their bunds should be levelled and their *ayacut* and water spread alike given over to dry assessment.[20]

By the end of the 19th century it came to be generally recognised that the irrigation *Erys* in Madras Presidency were badly in need of repair and maintenance and their poor condition was closely linked to the series of famines witnessed in the late 19th Century with a consequent loss in revenue to the State. (Some recent research reveals that tank construction under princely rule as in Hyderabad State experienced a major spurt after the turn of the 20th Century.[21] The famine commission of 1878-1880 recommended that a scheme be framed for systematically putting the tanks in repair so as to bring them to their original efficiency.

This recommendation was accepted by the Madras Government and a Tank maintenance scheme which later on came to be called a Tank Restoration Scheme (TRS) was introduced in 1883. The intention was to conduct a systematic survey of every minor basin and restore the *Ery* to their standard level of storage. The famine commission also recognised the impossibility of the PWD being able to maintain such an extensive system of *Erys*. *Erys* were classified in terms of their *ayacut* and it was recommended that only *Erys* that have an *ayacut* of more than 200 acres possessing some other *special* importance should remain in the hands of the PWD. The commission also recommended that smaller *Erys* irrigating not less than 50 acres, should after being brought up to the standard , be handed over to the villagers to maintain and that *Erys* watering less than the area should be handed over as they were to the villagers to keep up; Although *Erys* were initially transferred to *ryots*, the village communities were not given sufficient grants nor any remissions in revenue for them to be able to maintain the *Erys*. Hence this scheme was a failure and was discontinued, and *Erys* continued under Government control.

In August 1889 the Government of Madras informed the Government of India that as where the experiment has been tried, the ryots refuse to undertake the maintenance of the restored tanks under the conditions imposed, and as in the absence of a customary labour law it is impossible to enforce the obligation, the experiment cannot be initiated and must be given up, and Government must therefore undertake, under the most economical arrangements possible, the duty of maintaining the tanks. [22] As a response to this Government of India, asked the Government of Madras if it was advisable to continue the TRS operation on such an extensive scale, (Letter No.1431 dated 9th August 1890). It proposed to the Government of Madras that *Erys* irrigating less than 50 acres be abandoned.

* By this time 1/3 of the irrigated land had actually gone out of cultivation because of very high rates of assessment at times more than the gross produce and because of the neglect of the *Ery* system in the previous 50-100 years.

This TRS scheme resulted in the preparation of a Tank Memoir for each *Ery* taken up for restoration, in which hydrological details such as capacity, standard levels etc. for that *Ery* were recorded. Also the estimates for the repairs to be executed wee prepared in detail. Incidentally, this tank memoir forms a major record, which even to this day is the only record that the PWD possesses regarding most of the *Erys* under its jurisdiction.

The famine commission was followed by the irrigation commission of 1901-1903. *This commission estimated that by 1901, less than 1/3 the area irrigated by Erys had been covered by the investigation under the Tank Restoration Scheme recommended by the famine commission.* It was also estimated that at the rate of investigation and restoration then in progress it would take another 40 years to complete the work of tank restoration in Madras Presidency. The Commission said: . Outlay on Tank restoration is but a small portion of the expenditure annually incurred on the maintenance of these works. During the ten years ending 1899-1900 it averaged Rs.4, 76,000. During the same period, the annual expenditure on ordinary repairs averaged over 13 lakhs, of which Rs.2, 66,000 was incurred in the Revenue and the balance in the PWD. This outlay is incurred mainly on works which have not been restored . If, therefore, tank investigation and restoration work were altogether discontinued, there would still be an annual expenditure of not less than 18 lakhs on ordinary tank repairs, but the operation would be carried on without system and the annual outlay would steadily rise. If on the other hand, the present rate of progress and expenditure on tank restoration be increased and the works are put into thorough repair on a systematic plan, there will be a diminution in the cost of ordinary repairs, and a gradual reduction in the total annual expenditure on tank maintenance to the amount required for the upkeep of works which have once been restored or put into thorough order . We strongly recommend that the work on tank restoration should be more vigorously prosecuted and that the grants for maintenance of minor works should be increased until it has been completed . The Board of Revenue has pointed out that within the last ten years 9 to 10 percent of the demand(revenue) on the land irrigated from these works was remitted on account of defective supply; and that a very large part of these remissions was necessitated by the fact that the works were not in a state of thorough repair and efficiency. We think that an annual expenditure on the works of not less than 26 lakhs, which is less than one third of the net revenue derived from them should be contemplated, of which about half would be available for investigation and restoration work which should then be complete within 15 years .

Thus the irrigation commission recommended that the work on tank restoration be more vigorously pursued and completed. The commission recognised that in the case of *Erys* Government undertakes restoration in the interest of not only the *ryots* but of itself; and as the only means of preventing serious loss of revenue .[23]

THE MYTH OF KUDI MARAMATH

As described earlier, the village communities lost their ability to maintain *Erys* with the draining away by the state, during the British Rule, of revenue which left the cultivators in an impoverished condition and broke down the system of allocations made at the local level for maintenance and management of irrigation structures and systems.

During early British rule, basing itself on the European experience, the British official view insisted that *Erys* had always been maintained by some form of forced labour. While the land tenure and revenue policy of the British state took away all surplus resources from the hands of the village communities and asserted that common resources such as the *Erys* belonged to the state, in actual practice it was impossible for the PWD to maintain the *Erys* without any cooperation from village communities. And as *Erys* systems became more and more dysfunctional, revenues started falling and there was an urgent need to take care of the *Erys* in the only way in which this could possibly be done by involving the village communities in some manner. But by then the impoverished village communities had become thoroughly disrupted and turned into what the British (and even today s Westernised elite) termed as

apathetic . Given this context, about the only way the British state could think of making the village communities take any responsibility for maintaining *Erys* was through some form of coercion. Hence the need to build a myth about *Kudi Maramath* and equate this to voluntary labour customarily undertaken by village communities in maintaining *Erys* and other irrigation infrastructure. And since this labour was not voluntarily forthcoming, the attempt to enforce this by means of legislation became the automatic choice for the state.

It was unlikely that at any period prior to the arrival of the British, when the village society was functional, the cultivators, either under coercion or voluntarily, donated their labour for he routine maintenance of *Erys* without the necessary funds provided by the village level and the larger economy as regular allocations. It is likely however that on certain festive occasions cultivators came together to desilt inlet channels to *Erys* but such occasions should have been merely symbolic and not actually events where the desilting of *Erys* was routinely carried out. The desilting and maintenance of *Erys* was paid for from the allocation at the local level and such desilting was done by groups of professionals who specialised in earth work.[24] To this day, there re, in may parts of South India communities which specialise in stone work and earth work[*].

Due to collapse of the system of local level allocations it was no longer possible for village communities to support these professionals who performed the service of desilting *Erys*. This then, was the situation that gave rise to the propagation of the myth of *Kudi-Maramath*. Since then this myth has been picked up by administrators and historians alike.

From time to time in the last hundred and fifty years, legislation has been introduced to enforce *Kudi-Maramath*; the purpose of such legislation being, to coerce the cultivators into voluntarily undertaking maintenance work. However, every such attempt by the state met with complete non-cooperation on the part of the people. The chequered history of *Kudi-Maramath* legislation tells its own story about the conditions to which Indian village communities had been reduced by British rule, the relationship of the cultivators with the state, and the struggle, veiled and open, between the two.

In 1858, Madras Compulsory Labour Act was passed with the specific objective of enforcement of customary labour. This act legalised the customary obligation (of *Kudi-Maramath*) and penalised its non-performance. It declared Wherever by local custom any work for the purpose of irrigation or drainage, or connected herewith, is usually executed by the joint labour of a village community, any person bound by such custom to contribute labour to such work, who neglects or refuses without reasonable cause to comply with a requisition for such customary aid made to him by the head of the village under the orders of the Tahsildar or other superior Revenue officer, shall be liable to pay a sum equal to twice the value of labour which he inbound to contribute .The mode of determining the amount so payable was left to the decision of (local) irrigation panchayats.

So, like elsewhere during British rule, here too was an attempt by the state to coerce the people by defining what the custom was and to enforce this custom through legislation. The people responded to this legislation by evasion and dereliction of their customary obligation and demanded remissions of revenue where cultivation suffered as a result of lack of maintenance of supply channels and *Erys*. They seemed to look to the state to Maintain irrigation sources in good order. When this act failed to achieve its goals, the administrators sought to introduce fresh legislation by tightening the earlier legislation. Such legislation was repeatedly recommended by the Public Works Commission of 1870, the Famine Commission of 1879 and the Irrigation Commission of 1901-1903.

[*] The community of *Voddas* specialise in such work. *Vodda* is derived from the word *Oddu* in Telegu meaning a Bank. This community should have specialised in doing the stone and earth work in building *Ery* bunds, excavating *Erys and* desilting them.

The Public Works Commission of 1870 recommended the ascertainment by local inquiry, of the description of the work which it had been customary for the ryots to execute in each district and its enforcement by legislative enactment. This Commission also advocated the transfer of the ordinary repairs of agricultural works to the landholders whose crops depended on them, and a remission of assessment not exceeding the estimated annual cost of keeping the works in repair after deducting the value of customary labour being granted at the annual settlement.

A Bill was drafted to legalise *Kudi-Maramath* and was introduced into the Legislative Council of Madras in June 1883 but it was subsequently dropped.

The irrigation Commission (1901-1903) talked of the Cultivators losing all sense of responsibility for the maintenance and upkeep of tanks, which custom had formerly imposed on them and recommended that all routine maintenance work be handed over to the ryots after persuading them to undertake *Kudi-Maramath*. The commission further recommended that if *Kudi-Maramath* could not be enforced without legislation, then legislation should be undertaken. If Kudi-Maramath did not work, then legislation should provide for a cess on land irrigated from tanks whose funds would be administered by local panchayats.

In accordance with the recommendation of the Irrigation Commission, attempts were made again and again to bring in legislation for enforcing *Kudi-Maramath* or for imposing an irrigation Cess in its place. But all these attempts proved abortive. The irrigation Bills of 1906,1922,1924, 1928, and1934-1936 were all such abortive attempts.
The 1924 Bill make it mandatory for every occupier of land irrigated by any irrigation work to perform *Kudi-Maramath* work in respect of certain specified items such as (a) filling up gullies, creeks, ruts and holes (b) removing prickly pear and other rank undergrowth (c) clearing away Underwood (d) clearing the silt from sluices and channels (e) replacing stones displaced from revetments (stone facing of the bund) dams, etc. (f) keeping clear the space between the upright stones of the calingulas (overflow weirs) and (g) any other labour which might by notification, be declared by the Government as customary labour (Notice how the Government has arrogated to itself the authority to pronounce what is customary). Those cultivators who refused to contribute labour were to be liable to a fine not exceeding four times the value of labour. But a cess would be imposed in lieu of labour where the majority agreed to pay it. The performance of customary repairs to tanks nod channels and the settlement of irrigation disputes were to be left to irrigation Panchayats wherever possible.

The 1928 Bill declared and defined the duties of the occupiers of lands in almost the same terms but it provided that, where a cooperative society or village Panchayat had been legally constituted for the execution of *Kudi-Maramath*, work in respect of an irrigation work, the irrigation officer might, at the request of the owners of a major portion of the lands served by such work, hand over the execution of the work to such a society or a panchayat and empower it to recover the cost from the owners of all the lands proportionately. It also enabled the Government to levy an annual cess in lieu of *Kudi-Maramath* work from persons bound to contribute such work wherever the owners of the major portion of the lands served by such work so desired.

By the time the 1934 36 Bill was drawn up there seems to emerge a slightly changed outlook. An opinion gradually gained ground that such legislation was neither justifiable nor desirable. Some administrators began to urge that *Kudi-Maramath* had never been either a universal or a voluntary institution. They said that, whatever legislation might be introduced to make it so, it would ultimately result in coercion and opposition. One British civil servant declared, I cannot accept the positing that it is impossible for the Government to look after the tanks and I think it is their duty to do so. If, in fact they cannot do so, and the very small tanks go to ruin, it will not be an unmixed evil, for many of these little tanks are mere evaporating pans and they intercept and diminish the supply to larger works lower down the barrier. I would not do away with these but I would not foster their existence. [25] Clearly, the concern of these critics was not the regeneration of *Erys* and the welfare of the cultivators who depended on them.

The growing consciousness that *Kudi-Maramath* was unworkable in practice and could not be imposed made it necessary for administrators to think of other alternatives. The collectors conference of 1933 favoured the extension; of irrigation cess fund system a system which, by then, had been voluntarily resorted to in some districts in lieu of *Kudi-Maramth* to the whole of the province. And in 1934-36 the Board of Revenue and the Government considered the passing of a special Act for that purpose; they drafted a special Bill in which they proposed to take power to levy an annual cess from the owners of the lands served by an irrigation work whenever the owners of not less than two-thirds of the lands served by such work so desired. And, they declared, the proceeds of the cess would be utilised for the maintenance of the works and the ryots thereby relieved of *Kudi-Maramath*.

After 1935, the state gradually took over at least nationally works that until then had been considered normally to be done by *Kudi-Maramath*.

What is important, from the present day context is that the attitude of the British state towards the cultivators had been internalised by generations of Indian elite, and such attitudes remain to this day amongst our ruling elite. A senior administrator writing in 1949 on the failure of the *Kudi-Maramath* legislation lamented thus: . It was, besides, an age of enlightenment, be enforced with harshness, as of old .[26] Here was a post-independence administrator lamenting that the state could not take recourse to harsh measures, to coerce people to comply with legislation, all this presumably in their own interest!

Another senior administrator in 1947 suggested that one of the reasons for the failure of the policy of enforcing *Kudi-Maramath* was the Policy of spoon-feeding and *benevolence* practised by the Government .[27]

The attitude that the villagers have lost all sense of responsibility prevails among large section of our elite even today. For instance, the Committee on Plan projects reporting on Minor Irrigation Works in A.P. in 1960 referred to the lack of timely repairs to *Erys* as a result of neglect of customary repair work to be done by ryots (i.e. *Kudi-Maramath*). It strongly recommended the effective implementation of the Madras compulsory labour act, 1858 and even got a copy of the Act appended to the Committee s report![28]

After 1947 irrigation was put under the control of the State Governments, but the Central Government provided much of the financial support for irrigation development.

In Tamil Nadu, Revenue and PWD Departments initially shared responsibility for *Erys*. In 1958, the local Panchayat Unions and BDO s were given responsibility for some aspects of the operations and maintenance of *Erys*.

After the reorganisation of the panchayat system in 1958, groups of upto twenty village panchayats were joined into panchayat Unions. Each representative panchayat Union was associated with a BDO Officer of the Community Development Scheme. The BDO was assigned a staff of administrative and technical personnel employed by the state, including an extension supervisor-cum junior engineer, who is responsible for *Ery* maintenance. The Block Development Offices were placed under the supervision of District Development Councils.

A present, the engineer in the Block Development Office is responsible for the maintenance of *Erys* with an *ayacut* of less than 40 hectares if they are not directly linked to a river system. The circle system of inspection and maintenance is used. Under this system, one-fifth of all *Erys* in each panchayat Union are inspected each year, a system which is supposed to ensure that all *Erys* are inspected once in a each five-year cycle. In cases of emergency such as flooding or breaching of a bund, a *Ery* may be inspected and repaired out of its turn in this

cycle. After inspecting each tank, and noting needed repairs, the engineer prepares an estimate of the cost, submits it to the Highways and Rural Works Department for approval then opens the job for local contractors to tender bids. After the job is complete, the engineer again inspects the *Ery* to ensure that repairs are done correctly.

The Public Works Department (PWD) is responsible for maintaining all river irrigation systems, al *Erys* with a command area of 40 hectares or more, and all *Erys* connected to river systems, regardless of command area. Although as Table 3 shows there are fewer of these types of *Erys* than Panchayat Union *Erys* tanks in Tamil Nadu, these *Erys* are important because of their size and/or because, as system *Erys*, they have the most reliable water supplies. The PWD does not use the circle system of inspection; instead, an engineer inspects as *Ery* when a need arises and the farmers in command bring it to the attention of the PWD. Except in an emergency, an *Ery* will not be inspected more often than once in three years. After the inspection, the procedure for repair of an *Ery* tank is much the same as for the BDO engineer; an estimate is prepared, sanction given by higher officials in the PWD, and the contract given out on bid. The work is carried out by a private contractor and is inspected upon completion by the engineer.

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Both the BDO and PWD are responsible for the beds, bunds, sluices, and waste weirs of the *Erys* in their charge. The PWD is also responsible for weirs on rivers and for major man-made channels connecting the rivers and system *Erys*. The responsibility of both agencies stops at the bunds; neither is responsible for distributaries and field channels feeding into the *Erys* are also outside the purview of both agencies.

The Revenue Department is in charge of collecting land revenue and any extra water cess charges. It is officially responsible for auctioning the annual rights to the fish and trees in the *Erys*. The Revenue Department shares responsibility with the panchayat Union for non-system *Erys* of less than 40 hectares command area. Those *Erys* that have been surveyed since the beginning of the Tank Restoration Scheme have been handed over to the panchayat Unions. The income from fish and trees in these transferred or vested *Erys* is credited to the panchayat Unions *Erys* in the former *zamindari* areas that have not been surveyed are termed no transferred or no vested *Erys*, and are officially under the Revenue Department. These are particularly important in areas such as the Ramanathapuram District of Tamil Nadu. The BDO maintain the nonvested *Erys* under a special grant, but the Revenue Department, rather than the panchayat Union, receives the incomes from the fish and trees.

Authority over water regulation is also shred by the PWD, the Revenue Department, and the Panchayats. The PWD controls water along with the river system and issues water from each *anicut*, or river weir. Officially, the Revenue Department is responsible for water regulation in *Erys* with a command of 40 hectares or more, and the village panchayats for regulation of water in *Erys* of less than 40 hectares of command area. However, water regulation from the *Erys* is generally left to the farmers themselves, without any official interference.

The involvement of one other Government agency in *Ery* irrigation should be noted; the forest Department is responsible for planting trees on any public or peromboke land. Since 1963 it has been particularly active in planting *Karuvelan* (*Acacia arabica)* trees on the foreshores of *Erys* under a social forestry project.

While it is true that there is a general sense of apathy amongst many sections of our people in the rural areas, the reason for this has to be sought in the total disruption of the village society and economy during British Rule, the subsequent disintegration and atomisation of the village society and the perpetuation of the same relationship between the institutions of the State and the village communities in the post independence period.

ROLE OF INDIAN STATE IN MANAGEMENT OF ERYS

After Independence the intervention of the state and the consequent weakening of local institutions and the discouraging of local initiative continues perhaps as a hangover from the period of British rule the same institutions of the state continue to operate and under the same norms. The *Erys* continue to be neglected under the PWD since the *Ery* system is so vast and extensive that there is no earthly possible of the PWD maintaining these *Erys*.
In fact the PWD does not even have any reliable data on the states of the *Erys* under its jurisdiction. Even today, the only information the field staff of the PWD have is from the tank memoirs prepared in most cases some 75 years ago. There is no effort on the part of the State to involve local communities in *Ery* maintenance work, nor is there any recognition or understanding of the fact that it is the village communities who are still responsible for irrigation management in most villages. The response of the officials when confronted with this fact of traditional irrigation management still being alive is to simply deny that such a thing ever existed. And when confronted with the most essential need today of the *Erys*, namely desilting, the PWD claims that its resources do not permit it to undertake such a mamoth task. One scholar reports after a study of the Andhra Pradesh situation that the financial stringency for minor irrigation works in general and their maintenance in particular has been one of the important reasons for the decline of the area of irrigation under the tanks .[29] However it is the community management of *Erys* which continues to this day inspite of the hostility which the state continues to evince (again a colonial hangover) for any form of peoples initiative.

COMMUNITY MANAGEMENT OF THE ERYS*

Modern irrigation structures are of two kinds. (1) Dams/Canals these are highly centralized structures which can be controlled by a handful of officials in a central place. (2) Borewells/tubewells etc which are completely privately owned and managed leading to unrestrained exploitation of resources (ground water).

As a contrast to these two, *Erys* can neither be centrally controlled, since they have highly dispersed structures nor can they be normally privately owned since they are far too large for this. An *Ery* has to be managed by a community of users.

* This section is based on our field work in villages of Chengalpattu District and also on a recent field study in Tirunelvely District.

It is important here to take note of one significant fact. During the entire British period, while the Ery system was forced into a state of neglect and disrepair due to the Governmental policy, *Erys* and water distribution and management in particular were in the hands of village communities. And these communities did manage irrigation according to their traditional methods, norms and practices. Although the state had formal control of *Erys*, the writ of the state ran only upto the bund of the *Ery* and no further. It was the village community which decided what to do with the water that collected in the *Ery*. Details such as when to open the sluices, how long would the sluice be open, how much water was to flow to each field and how, what particular crops would be cultivated in which part of the *ayacut*, which cultivator could cultivate and what etc, were all worked out by the community of cultivators, decisions usually arrived at by consensus. However, none of these organisations existed officially and there was certainly no recognition that very sound principles were involved in arriving at these decisions. These traditional irrigation organisations continue to exist, as virtually underground organisations, receiving no official recognition or state patronage. And practically all the cultivation under *Erys* except for a handful of very large *Erys* is even today managed by village communities along traditional methods of management. In fact, for irrigation to go on at all, there must be an organisation at the village level to manage the irrigation. And irrigation under *Erys* is indeed going on with no assistance from any outside source in all villages where *Erys* exist.

There is a great variety in the features of irrigation organisations depending on the supply of the water to the *Ery*, the size of the *Ery*, number of sluices etc, as well as the particular cultural, social and political history of the area and the composition of the castes that live in the village. But the general principles governing these organisation are the same- the way the organisation is constituted, the relationship it has to its members and employees, the mode of payment of the employees, the mode of mobilising funds, and the manner of distribution of water etc.

Here we shall see some features of traditional irrigation management as it is found even today in many South Indian villages.

Community management of irrigation is undertaken by various types of organisations (1) *Kulam* or Jati panchayats (20 Village based organisations such as *Oor* (village) panchayats (3) Macro-level organisation which take care of supra-local level management, for example different reaches of a river. Or there may be a specific water users association consisting of all cultivators under the *Ery* or other irrigation source concerned. Hence, often the office bearers and the head of the irrigation organisation are village elders, who are also members of the (informal) caste or village panchayat organisation.[*]

Irrigation association and office bearers represent a wide cross section of castes and all religions. A study from the Tirunelveli area of Tamil Nadu reveals that the irrigation association consist of members from a number of castes such as Vellalas, Nadars; Muppan, Konar, Asari, Maravar, Harijan Sambadavar, as well as the three religions namely Hindu, Muslim and Christian.

These "water users associations consisting of all cultivators under the *Erys* and the office bearers of such associations are normally elected by consensus at a meeting of the association. The number of office bearers depends on the size of the *ayacut* i.e. the number of members of the organisation. The distribution of water is handled by village servants known, variously as *Kambukatti*, *Neerkatti, Neerghanti*, *Neerpaychi, Neerani, and Madayan Thotti etc. in different parts* of Tamil Nadu. The irrigation servants are employees of the water users association and these employees as well as the office bearers may be removed by the association if the members are not satisfied with any of them. Irrigation servants are almost always drawn from the Harijan Community. Often this position comes down hereditarily in the same families. For their services, these *Kambukattys* receive wages in kind

[*] In some Chengalpattu villages the Nattar who is the head of the informal village panchayat is automatically the head of irrigation also. He is assisted by the members of the *Nattamai,* which is the (informal) governing body of the village. In the Tambraparni area of Southern Tamil Nadu formal registered associations of cultivators known as *Oppidi Sangams* undertake irrigation management including maintenance of all channals.

still in most villages. (In some Chengalpattu villages their wages amount to 5 kg of paddy per acre per crop per *Kambukatty)*.

Kambukatty are respected in the community and their word is strictly obeyed by all cultivators in matters relating to irrigation and water distribution.

Where the *Ery* is a system *Ery* i.e. where the supply to the *Ery* is from a Channel from an *anaicut* (a diversion structure) on a river, there may be village servants who are responsible for bringing the water to the *Ery*. They patrol the channel from the *anaicut* to the *Ery*, checking against potential water theft or damage to structures. (In some parts of Tamil Nadu these functionaries are called *Neeranis*). Since several *Erys* are involved in receiving water from an *anaicut*, often conflicts arise in the sharing of water. Conflicts are normally resolved at the level of the village servants or if that is not possible, by the office bearers of the respective water users associations involved.

The *Neerghatis* or Kambukattys are next responsible for opening and closing the sluices of the *Erys* for irrigation. In the first crop season, known as Samba in Tamil Nadu (normally August-January) the sluices are opened towards the end of the season when the rains no longer provide sufficient water for the paddy crop. The date of first issue of water is decided normally by the office bearers of the association, and an appropriate and auspicious date is chosen. In some *Erys*, all the sluices may be opened simultaneously and each sluice irrigates a specific portion of the *ayacut*. In others, the most elevated sluice may be opened first and allowed to irrigate all the lands. After this sluice is exhausted, the other sluices are opened, one by one, in some pre-determined sequence, until the deepest sluice is exhausted.

Before the second crop (called *Navarai* in Chengalpattu) is started, the irrigation association considers the amount of water in the *Ery* and, based on the estimate of the quantity of water, decides how much of the *ayacut* should be cultivated, what crop/crops ought to be cultivated (i.e.whether the water is sufficient for the cultivation of paddy or not) and if the entire *ayacut* cannot be cultivated, even details such as which of the cultivators ought to cultivate which plots etc.

If the water availability is such that the entire *ayacut* cannot be cultivated, then the irrigated areas is restricted to a part of the *ayacut*. Here, this decision like all other decisions is arrived at by consensus. Hence, there is a good deal of give and take and use of discretion taking into consideration the situation of each cultivator as far as possible. For instance, water scarcity normally implies that cultivation is confined to the part of the *ayacut* closest to the bund or only the head-reach, but if a tail-reach or far away farmer has to cultivate and he is poor, either he gets a special allotment of water or he is given a plot in the head-reach through exchange of plots with another cultivator and asked to cultivate the head-reach plot. This kind of a transaction takes place in the village meeting of the irrigation association and it is mediated by the head of the association. In some parts of Bihar, plots under the *Erys* are so owned and distributed that each cultivator has plots near the bunds as well as far away. Thus the benefits of irrigation are distributed fairly evenly among all cultivators.[30]

Similarly, water scarcity may compel the association to decide that members (cultivators) should not cultivate any paddy and cultivate only crops which have relatively low water requirements such as milets ground nut etc. Or, different crops may be allocated for different parts of the *ayacut*, e.g. paddy in the head-reach and dry crops in the tail-reach etc.

The *Kambukattys* are the only once normally authorised to open and close the sluices. Once the sluices are opened, they are kept open until the entire *ayacut* is irrigated according to the rules followed for such irrigation. Normally, the fields are irrigated sequentially from the head (nearest to bund) to the tail-reach (farthest from bund) of the *ayacut*. There are *Erys* where the reverse sequence i.e, tail-to-head irrigation, is followed. Once the entire *ayacut* is irrigated, the sluice is closed by the *Kambukatty* in charge until the next round of irrigation.

In larger *Erys* a *Kambukatty* may be in charge of one specific sluice. When the *ayacut* divided and each sluice is assigned to irrigate a specified portion of the *ayacut*, each *Kambukatty* in charge of a sluice will have to make sure the specific portion of the *ayacut* under his charge is completely irrigated. Each *Kambukatty* personally diverts the water into each plot under his jurisdiction and shuts off the plot when the requisite amount of water let into each field is trusted and accepted by the cultivators[*].

If any *Kambukatty* loses the trust of a number of cultivators, he may be removed and another appointed in his place. This can be done at an annual meeting of the association where such decisions are taken. The role of *Kambukatty* is important since it minimises conflicts between cultivators over water distribution.[**]

The other important functionary is the head of the Irrigation Organisation. The head of the irrigation organisation has two important responsibilities. He supervises all the activities of the association and he serves as a link between the association and the world outside, be it other associations or the bureaucracy. Although he receives no salary, his position is socially very prestigious. In the case of system-*Erys* there is a need to coordinate activities related to the supply of water into the *Ery*, with other *Ery*-associations in the system, resolve conflicts etc. His role is important from the point of view of the PWD as well, since he is the only source of information to the PWD regarding the status of the *Ery* concerned. In situations requiring quick mobilisation of the cultivators, such as closing and opening the overflow weirs, the head of the association has to mobilise the help needed.

The concern of the community irrigation association is to maximise the efficiency of water use by making the best possible use of it. Hence, often during water scarcity, cultivation is restricted to the head-reach. Of course, discretion is used in exceptional circumstances. But normally, a head-reach first policy maximises overall production. This made eminent sense in a society where all the produce was pooled together out of which deductions were made for all the inhabitants of the community, as it used to happen in the pre-British Chengalpattu villages and perhaps elsewhere in South India too.[31]

The only maintenance undertaken by the irrigation association is to keep all the channels in the *ayacut* clean. This is enforced by the association and each farmer is expected to clear the channel passing next to his fields. If the cultivator falls to do this, the head of the irrigation association may get this done through hired labour and charge the cultivator the amount for this labour.

The major and often the only source of funds to the association is the income from the sale of fish in the *Ery*. This fund is used in all the minor repair and maintenance work, as well as in the maintenance of temples and for conducting temple festivals in many villages. In other words, irrigation related expenditure is only one part of the total expenditure charged on this fund. Much more needs to be mobilized very often and this is done by collecting a contribution from each cultivator.

There are instances where, when PWD is unwilling to undertake repairs to the *Ery*, the association mobilises the requisite funds and undertake the repairs on its won. A study has estimated that one association managed to mobilise as much as Rs.250-350 per hectare per year locally through voluntary contribution from the cultivators. This study concludes that cultivators who are members of an active

- When the water level in the *Erys* is too low to irrigate, the sluices are left open and often farmers are allowed to bail out water (or pump the water out) on an individual basis, according to each one s need. Until then usually only the *Kambukatty* is allowed to handle the water distribution.

[**] It has been argued that traditionally *Kambukattys* have been Harijans and since Harijans had no land and a low social status, they could be trusted not to act arbitrarily. However this argument is not convincing since *Kambukattys* seem to have considerable *manyams* (grants of rents free land) in Chengalpattu village and were also landowners/cultivators. Traditionally Harijans were always the key witnesses that the community relied upon when land nd water disputes needed to be arbitrated. This was a status accorded to them traditionally by the community, and does not necessarily have any relation to their social or economic status.

Ery organisation contribute much greater financial resources for *Ery* management than (what) the PWD spends for repairs. (See Table.6)

Thus the presence of the informal irrigation association provides several benefits to its members, the cultivators, and namely-

(i) Reliable water distribution

(ii) Minimising of conflicts The role of *Kambukattys* and the mediation by the head of association, all these serve to minimise conflicts.

(iii) Better maintenance of the *Ery*, since PWD is not able to attend to all repairs. When emergency repairs are needed, such as temporary closing of breaches to the bund, the association normally mobilises the members to attend to the work;

(iv) Better organisation and maintenance of the *Ery* and other resources, such as fish, trees etc. and a capacity and confidence to deal with the Governmental machinery;

It has also been argued that the functioning of irrigation associations is associated with better distribution of water and higher yields.[32]

As mentioned earlier, in the governmental view these traditional organisations simply do not have any status. As an illustration, consider the proposal for the pilot projects of the Tank Modernization programme, drawn up by the Tamil Nadu PWD (1979).[33]

It states: Presently there is no defined and recognised authority for water regulation from the tank, as well as within the command area. However, in order to ensure smooth and efficient functioning of this regulation, it is proposed to constitute two committees comprising of official and non-official members.

The first committee, responsible for water distribution from the sluice to 10-hectare blocks in the *ayacut*, was to include the assistant executive engineer of the PWD, the district agricultural officer and three progressive farmers nominated by the engineers. The second committee for water management within the 10-hectare blocks was to include the panchayat president and three progressive farmers nominated by the district agricultural officer.

There are many obvious problems with this suggestion. The major problem is of course, the attitude reflected here of the tank modernisers towards our people and their traditional modes of organisations. At least in one of these *Erys* where the pilot project was implemented there was the traditional village *Nattamai* which was in charge of the irrigation management. That the PWD did not take this into account is perhaps not surprising. But to insist the committees made up of Government servants and their nominees among the farmers would be able to ensure smooth and efficient functioning of the irrigation seems utterly ridiculous.

One feature of these committee is that the farmers nominated are expected to be progressive . This normally means that they are economically well-off and are open to taking up modern cultivation i.e. they are open to the ideology of modernisation. These committees are responsible to the cultivators.

While it is true that in some villages the irrigation organisation is less organised than in others, it is inconceivable that in any village it is entirely absent since *Ery* irrigation and cultivation have to go on and without some such organisation it just cannot. The major reason for the weakening of the traditional organisation is the taking away of that resource base, a process which began in the period of British rule and which continues to this day. Perhaps the Indian state today is not as conscious as the British state was in depriving the village institutions of their resources, but since the same state institutions and norms operate, the process of weakening the institutions of the people continues unabated. For example, the revenue from fishing in the *Erys* used to belong to the village communities historically (as described earlier) and this revenue was used to maintain

Erys and generally finance the activities of the irrigation organisation. Now there is an attempt to take away this source of revenue from village communities and not allow village communities to take the fishing rights in auction. This will destroy what could perhaps be the last available resource of the village communities. In fact, the fishing rights ought to belong to the village communities as a rights

The process of modernisation has transformed not only the agriculture and irrigation requirements but has also led to the state directly intervening in the villages. In the following section, an example of such intervention can be seen in the programme for Tank Modernisation introduced in Tamil Nadir.

MODERNIZATION OF TANK IRRIGATION

In Tamil Nadu, within the last several years, a situation has been reached, where there was hardly any scope for new major irrigation projects. So, the focus shifted to minor irrigation works.

In the late 70 s under a scheme funded by the European Economic Community (EEC), the PWD initiated a Programme for Tank Modernisation . Under this programme, the following factors were identified as impairing irrigation efficiency of *Erys*: (1) Reduced inflow into tanks, mainly due to the silting up of feeder canals (2) Siltation of *Ery* bed leading to reduced capacity of the *Ery* (3) Weak bunds leading to breaching and loss of water (4) Sluices needing major repairs and design changes (5) Surplus weirs needing redesign and repairs (6) Siltation of the water distribution system (7) Seepage losses in the water delivery systems (i.e. channels)(8) Lack of equity in water regulation (9) Field-to-field irrigation.

Although the reduced capacity due to siltation of *Erys* is one of the stated concerns of the programme, desilting was not to be among the items of actual work undertaken. The actual work of modernisation is carried out by two departments of the Government, the Public Works Department and the Agricultural Engineering Department (AED). While the PWD is concerned with the repairing of bunds and sluices, overflow weirs etc. the AED handles only the On farm Development (OFD) works Cement lining of channels and construction of the necessary infrastructures for implementing rotational irrigation to ensure technologically that each cultivator receives the same quantity of water at regular intervals. These are aimed at preventing seepage losses in conveyance and bringing about equity in water distribution respectively. Betterment levies are collected from the farmers for the OFD works.

In an earlier section, the proposal of the pilot study was briefly mentioned in connection with the committees for irrigation management. In District a pilot study was launched in 1982, in one *Ery* as part of a pilot study involving eight *Erys* all over Tamil Nadu.

The following is a brief evaluation of the Tank modernisation scheme, as observed in two of the *Erys*, in villages PP and PN in Chengalpattu District where this programme was undertaken.

The most striking fact that emerges from the study is that there are two different views confronting each other in the context of the modernisation programme. One is the official view which emphasizes factors such as reduction in losses in conveyance and equity in the distribution of water (i.e, each farmer gets an identical measured quantity of water, no matter which part of the *ayacut* he cultivates). In fact, as will be explained below, the emphasis of the PWD has been on more efficient use of water and to this end On-farm Development (OFD) works have been undertaken as the major component of each tank-modernisation scheme. On the contrary what the farmers are interested in is in augmenting the supply of water to the tank and effecting repairs to the tank bund and sluices.

Farmers are primarily concerned about the desilting of the tank bed. They are unanimous in asserting that this is the single most important task that needs to be undertaken. Often farmers remarked Only if there is food in the vessel can it reach the leaf meaning that the capacity of the *Ery* should be first increased before undertaking the cement-lining of field channels etc. which seeks to minimize the wastage of water

Further, there has been no involvement of the farmers in planning and execution of these schemes. While the consent of farmers is sought at the beginning of the project, subsequent designing, construction and implementation of the works are carried out without any discussion with the farmers. In PN a committee to represent the farmers was formed and farmers from all reaches of the *ayacut* were nominated to this committee. However, this committee was not a popular one and hence not truly representative. Although several meetings were held between the implementing agency and the committee, farmers in general and some committee members themselves took no interest in these meetings. Another reason for the failure of the committee who was that one of the leading farmers in the *ayacut* was also given the contract for the On-Farm Development works. This created a great deal of distrust among the farmers, damaged the credibility of the committee and completely vitiated the functioning of the committee.

In PP, the *Nattamai* which is the existing village institution managing the irrigation, does not seem to have been involved in the planning and implementation of the scheme. Perhaps the PWD was not even aware of the existence and the important of *Nattamai* at the village level. This neglect ruled out any meaningful interaction between the PWD and the community of farmers.

Farmers accept only their own system of water distribution as fair. Traditionally certain equilibrium prevailed among water users which took into account various concerns of farmers and their needs such as head and tail each cultivation. An attempt, by an external agency such as the PWD, to impose a new order, in the name of equity is not going to make any headway especially since the supply has not been augmented and the new system tends to adversely affect the quantum, time, timeliness and reliability of the water supplies to users who are traditionally used to a certain pattern of water supply.

Further, this approach creates new expectations among tail-end users and creates new conflicts between head reach and tail reaches farmers and even between villages. Head reach farmers seem to insist on the first claim to the water and assurance of a minimum supply, equivalent to earlier use.

In many traditional systems, custom establishes that some sections of the command area have superior right and have first claim over available supplies. This seems to be the cases under *Erys* in PP and PN, where the head reach villages have the first claim to water as compared to tail-reach villages. It is not only from the point of view of the custom or tradition that the head-reach first system ought to be considered. The head reach first system uses water best in times of scarcity and also helps fields lower down by seepage so that water is most efficiently used and gives the maximum total yield.

In PP, farmers also pointed out as to how the system of rotational irrigation makes the whole process of irrigation slower as compared to their earlier method of irrigating directly from main channels. Thus farmers lower down wait for their turn for longer periods, often when timely irrigation is fairly critical. This also increases the possibility of conflicts among farmers.

Although some tail-end farmers were happy with cement lined channels and the idea of rotational irrigation, only through increasing capacity of the *Ery* by desilting can the tail enders receive an assured supply of water without threatening the interests of the head-reach farmers.

The concern of the PWD regarding the wastage of water by seepage during conveyance is based on unsound reasoning and not relevant in the cultivation of Paddy. Seepage does not seem to be a problem in cultivation of paddy under *Erys*. All the water that seeps into the soil must go either

towards recharging the ground water in the *ayacut* or in providing moisture to the fields further down. Hence there seems to be no need to worry about the wastage of water through seepage.

Often design features were very unsound and pointed to the lack of familiarity of the engineers with the system.

In PP, the new cement-lined channels at one end of the *ayacut* carried far too much water during heavy rains and used to flood part of a village nearby. The villagers have broken the channels to allow floodwater to go away from their village and to save their homes from flooding.

A new sluice which was built in PP was located at a vulnerable spot. When the new sluice was being planned, farmers seem to have objected to its location. The sluice was also located too close to the bund, thus weakening the bund. Subsequently the sluice gave way and the bund breached during heavy rains.

Cement lining of channels makes channels inflexible from the point of view of deepening them when it is necessary to draw water into them as the level of water goes down in the *Ery*. Cement lining also makes it impossible for bullock carts to cross the channels. This has compelled farmers to break the channels to make room for carts to pass through. Unlined canals were useful in several ways. Seepage is useful for plant growth and canals were also used for catching fish.

Often the new field channels were constructed at such a high level that as water went down in the *Ery* these channels could not draw any water. Farmers in PN had suggested to the engineers that these new channels ought to be constructed at lower levels.

In PN, after repairs, the tank bund was left too vertical without a sufficient outside slope to carry away rainwater smoothly. Farmers pointed out that this increased the chance of the bund getting washed away.

As it has been described here, considerations such as equity and efficiency in the sense in which they seemed important from the PWD point of view did not seem significant at all from the farmer s point of view.

The PWD has never demonstrated in practice the superiority of the new system over the existing system of water distribution. No cost benefit analyses seem to have been done to show that the expenditure on OFD was indeed justified in terms of saving of water or the increase in over-all productivity. In the absence of such demonstration, particularly when water level of the *Ery* is low, the farmers are naturally suspicious of the claims of the implementing agency. Any attempt to change the existing scheme generates resistance since the users are not sure of the overall benefits from change and are in fact likely to be apprehensive about how it would affect each one of them.

Farmers do welcome efforts on the part of the Government to augment the water supply and repair the facilities such as the *Ery*, bund, sluice and *Kalangals*. The On Farm Development work did not seem to them to be necessary. Often this led to resentment and silent non-cooperation from the farmers or even active sabotaging of the OFD works. In PP, in about five years, almost all the cement-lined channels have been either broken or abandoned and the farmers have reverted back to their old system of irrigation. In PN, quite a number of the cement-lined channels are damaged and the new irrigation system has not been adopted.

If we examine the background to the modernisation programme, the conflict between the Government and the village community and the reasons for the rejection of the Programme become clearer.

The modernisation programme is funded by the EEC. A similar scheme is also to be funded by World Bank in the near future. When international agencies fund these projects, it appears that they direct the State Government to prepare the proposal according to the funding agency point of view.

The countries funding these modernisation schemes have historically no experience and understanding of *Ery* irrigation or for that matter any traditional irrigation technology and its management. Their idea of the Indian village community is derived usually from 19th Century view of the natives . Hence the basic premise of the modernisation programme is that the village community is unjust and unscientific and that methods of modern science and technology have to be used to break these old ways. The technocratic solutions proposed also basically aim at attaining the goal of all modernisation that of shifting the control of water management from the village to the government.

The two aspects of On Farm development works cement lining of field channels and implementation of rotational irrigation aim at controlling the last drop of water that reaches the fields of the farmers, in the interests of a so-called equity . It is this attempt by an outside (Governmental) agency to control the water that is resisted by the village community. And their response is to completely ignore OFD works and in fact break up the works, if possible, when they interfere with their usual ways of irrigation and go back to their old ways.

The village community is in favour of the repairs to the bunds and sluices but they seem to want to have nothing to do with any tampering of irrigation beyond the sluice, into the *ayacut*. The authority of the Government upto the bund is granted under the present circumstances in fact, this is expected as shown by the attitude of the village community towards desilting of *Ery*. In their rejection of the modernisation scheme, the village communities seemed to be unanimous. The poorer farmers seemed to reject the scheme more emphatically denying that there were any benefits to them at all. Some of the better off farmers wanted to see how the OFD works would be useful to them. Wherever possible, they utilised the cement-lined channels as part of the irrigation. But even they did not see any overall benefits from the scheme. Even the farmer in PN who was given the contract for the OFD- works and who stood to gain from the scheme could not whole-heartedly support the OFD scheme.

The demand for desilting the *Ery* was also quite unanimous from the whole community. Whereas in their proposals the Government recognises the need for desilting in practice only the modernisation of irrigation and rationalising water distribution are undertaken, presumably strictly conformity with the guidelines of the Western funding agencies.

In the *Kudi-Maramath* issue, the British state tried to coerce the village communities to do desilting of the *Erys* without providing them the material resources to make this effort possible. In the modernisation scheme, once again there is an attempt to compel the cultivators to economise on water use, without deepening the *Erys* and making the capacity of *Erys* larger. And once again the Government has met with a similar response from the cultivators. In rejecting the modernisation of *Ery* irrigation the village communities seem to be telling the state This far and no further .

THE WATESR MISSION

The National Technology Mission on drinking water (NTM) is to spend Rs.2000 crores in the 7th plan period for providing drinking water to nearby one lakh villages, at the rate of 40 litres per capita for

human consumption and 30 litres per head of cattle per day. Ground water is to be the source for providing all the drinking water. Under this mission, out of five, sub-mission , one is concerned with conservation of water and recharging of Aquifers . However 4 out of the 5 submissions are devoted to removal of various contaminations and impurities in water through high technology means.

And further the; methodology lists various steps such as, Improvement of traditional methods , Improvement of maintenances methods , Community involvement village panchayat -etc. Since these different components have not been elaborated, it is not clear what exactly will be the outcome of each.

In Tamil Nadu the mini-mission districts chosen are Ramanathapuram, South Arcot and Salem. Of these, two districts Ramnad and South Arcot have had a very large number of *Erys* which have been instrumental in the storage of rain water and charging of groundwater. So, if the technology mission is relying on conservation of water and recharging ground water, in such areas, the *Erys* will have to be first brought to their original condition and modalities will have to be worked out to involve the community in maintenance of the *Erys*. Without such measures to bring in traditional methods of water conservation, the problem of providing drinking water to villages in low-rainfall areas may become only a distant dream.

The spokespersons for Technology Missions often speak about the Missions as if only high-technological solutions are going to be useful in solving the drinking water problem. However, areas such as Ramnad district, have become drought prone only because all traditional water-conserving technology such as *Erys* have been allowed to become dysfunctional.

In order to be able to do justice to the objectives of the Mission, a very detailed and large scale analysis of the hydrology of various water-deficient regions of the country as well as a database on all traditional water-conservation resources in these regions need to be made immediately. The centralised planning authority under the Government ought to be able to at least build up the necessary data-base. It appears that such an exercise has not been conceived of under the NTM. Only a detailed understanding of the traditional water conserving resources will provide meaningful ides on way of extracting ground water to provide drinking water to all the villages in these regions. Merely proposing imported high-tech solutions under the erroneous impression that groundwater can be extracted freely without worrying about recharge at the outset itself can only make the crisis worse.

CONCLUSION

It has come to be widely acknowledged that decentralisation of water management is an important issue today. For such decentralisation to be successful it needs to be based on the existing irrigation or water control institutions or organisations at the village level. Among the most important of such organisations are the traditional village administrative institutions (such as the Nattamai) which have been briefly described in this article.

It has already been described how during the British rule of India, local communities and their participation in the local management of water resources were seriously disrupted. The mechanical continuation of this approach of the colonial period during the post-independence period has succeeded in further alienating the people and their institutions from the state. Irrigation development has remained the purview of engineers whose concern has been merely with quantities and structures and that too only as given in old reports. The consequences of such a dichotomy between the institutions of the state and those of the people are reflected in the ridiculous nature of schemes, such as the modernisation of Ery irrigation. While the Government and its agencies complain about the lack of participation of farmers in Governmental schemes, and lack of initiative on the part of village communities, there has been no attempt by the State agencies to understand this from an indigenous perspective which takes into account the shifting of the control of resources from village communities into the hands of the State during the British rule.

The introduction of new technology of cultivation under Green Revolution based on the new HYV seed varieties in paddy which claim to increase the productivity of a given amount of water have further helped only in putting more pressure on the village communities through the accentuation of economic disparities in the communities and creation of vested interests. The effect of modernisation of *Erys* is bound to be similar since it aims at some abstract equity which implies that all the users are to have a one-to-one relationship with the governmental agency implementing the scheme, and ignores the popular water sharing arrangements. This would only help in further atomising the community and creating conflicts among users. Hence, the efforts to modernise the village economy have only succeeded in further destroying the village community and stifling its initiative in the management of irrigations. In fact, every Governmental intervention seems to accentuate this process.

What the situation demands is a major restructuring of Indian polity among indigenous lines. The village institutions which are reasonably functional even today, ought to be fully involved in any plan to improve irrigation management. Not only this, resources which are essential for the healthy functioning of these institutions need to be restored to them. Once their role and importance in the functioning of irrigation system is recognised, resources must be appropriately allocated to them to enable them to function effectively. In the absence of such resources, merely appealing to or exhorting the village communities to undertake voluntary action to maintain *Erys* will have no impact, as is evident from looking at the *Kudi-Maramath* issue. The state should seriously consider modalities through which *Erys* once again become the property of village communities. Given the complexity of the legal system and the reality of the vested interests created through the history of State intervention this may not be a simple task. However, without somehow creating in the people of the village a sense of owning the *Ery*, i.e the feeling that the *Ery* is theirs, it would be impossible to maintain the *Erys* in a proper working condition.

In the old Murray (water distribution rights) systems, for example, in the Tambraparani area of Tamil Nadu, water was defined as a customary right of village communities. In countries such as Japan collective rights of communities to water is granted even today.

Recent research has also pointed out the tremendous scope for extending *Ery* construction in areas where potential exists in the form of appropriate landscape, rainfall and so on. The efforts of the state Governments in this respect so far have been very ill conceived. For example. Karnataka Government has spent crores of rupees in constructing new *Erys* in areas where all that was necessary was to repair and revive old *Erys*. The first effort must be to revive all the old *Erys* which are gradually dying and disappearing into urban extensions, and building sites. Such blind expansion of urban areas needs to be hatted with immediate effect.[*]

It must be still be possible to harness the run off waters from a large portion of the semi-arid tracts of India by a proper extension of the indigenous *Ery* technology. Without a proper study and understanding of the *Ery* technology, the modern civil engineers will not be able to play any innovative role in providing water to regions in India which have become perennially drought-prone .

In order to be able to effectively rejuvenate and extend the *Ery* system the most basic requirement is a data base. The data currently available with the PWD and other Governmental agencies is far from reliable or adequat. (For instance, even the District Census Handbooks have no useful information on *Erys*). There is no reliable data as to how many *Erys* actually exist in our country and what the status of each *Ery* is. Appropriate agencies must be created to generate this data and such data can be generated only by involving knowledgeable individuals from each village which has an *Ery*.

[*] The city of Madras is an example of such expansion. What was once a landscape, full of *Erys* has been converted into city suburbs, by filling in all the old *Erys*. The result is that there is no way of holding rainwater and recharging groundwater. Instead during heavy rainfalls, entire residential areas become water logged since they are all low-lying .

Erys have always existed for the benefit of the people whom they served. And history shows us that it is the innovation and genius of our people that has given us this technology and the social and political organisation responsible for maintaining the *Ery* system in good condition. This extraordinary indigenous technology can once again play its historic role in the welfare of our people only if we once again find ways to give full scope to the innovation and creativity of our people and our village communities.

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[1] Nirmal Sen Gupta, Irrigation: Traditional Vs Modern , EPW Special, November 1985

[2] R.Baird Smith: The Cauvery, Kistnah and Godavery: Being a report on the works constructed on these rivers , London, 1856(p.136)

[3] Epigraphica Inida, Vol.XIV, p.97

[4] Sir Arthur Cotton Irrigation Works in India (1874). Lectures. Uddaraju Raman

[5] Quoted in A.Appadurai (1936), Economic Conditions in Southern India, 1000-1500 AD , University of Madras, 1936 Vol. I pp.200-229

[6] C.J.Baker An Indian Rural Economy, 1880-1955-The Tamil Nadu Countryside , Oxford University Press, 1984

[7] D.L.O.Mendis, Walking on two legs Inaugural address. The Institute of Engineers, Sri Lanka, 1986/87

[8] Dharampal (1986) Some aspects of Earlier Indian Society and Polity and their relevance to the Present , Parts I, II, III, New Quest 1986

[9] Uttiramerur Inscription-dated early 10th Century, Details from V.Venkayya (1904) Irrigation in Southern Indian in Ancient Times , Archaeological Survey of India, Annual Report, 1903-04

[10] Common Property and Community Maintenance: Dasabandam and Pre-Brittish Irrigation Works , V.Subbulakshmi, University of Hyderabad, Hyderabad. Presented at the Lokayan Workshop on Tank Irrigation, Bangalore, July 1988

[11] Barnards Survey- Details in Dharampal (1986) Ibid

[12] Alexander Dalrymple: A Short Account of the Gentoo Mode of Collecting the Revenue on the Coast of Choromandel, London, 1783,p.3

[13] W.H.Moreland (1920) India at the Death of Akbar , London 1920

[14] Baker (1984) Ibid

[15] Dharampal (1972) The Madras Panchayat System, Vol. I- A General Assessment , Impex India, Delhi

[16] Dharampal (1972) bid

[17] Cotton (1874) Ibid

[18] V.Subramaniyam Chetty, Tank Irrigation during East India Company- A Study of Cuddapah District , Paper presented at the Lokayan Workshop on Tank Irrigation, Bangalore, July 1988

[19] First Report of the commissioners appointed to enquire into and report upon the system of Superintending and executing Public Works in the Madras Presidency , Madras, 1852(Tamil Nadu Archives)

[20] D.Narasimha Reddy, A Note on the decline of Tank Irrigation , Talk presented at the Lokayan Workshop on Tank Irrigation, Bangalore, July 1988.
[21] M.Von Oppen and K.V.Subba Rao, Tank Irrigation in Semi-Arid Tropical India , ICRISAT, May 1980
[22] D.Narasimha Reddy, Ibid
[23] Report of the Indian Irrigation Commission, 1901-03,Tamil Nadu Archives
[24] G.R.Kuppuswamy, Irrigation System in Karnataka Methods and Techniques .
[25] Sir Gabriel Stokes in 1905, quoted in Baliga (1949) Studies in Madras Administration , Government of Madras, 1960 pp.199-208
[26] Baliga (1949) Ibid
[27] S.Y.Krishnaswamy (1947) Rural Problems in Madras , Madras, Government Press.
[28] D.Narasimha Reddy (1988) Ibid
[29] D.Narasimha Reddy (1988) Ibid
[30] Nirmal Sen Gupta (1985) Ibid
[31] Dharampal (1986) Ibid
[32] Palanisami, K, and William Easter (1983), The Tanks of South India (A potential for future expansion in irrigation) , University of Minnesota, Institute of Agriculture, Department of Agricultural and Applied Economics, Economics Report, ER 83-4,June.
[33] Proposal for the pilot Projects of the Tank Modernisation Programme, PWD, Tamil Nadu (1979)

TABLE -1

AREA UNDER ERY IRRIGATION: ALL INDIA FIGURES 1950-76

YEAR	NIET IRRIGATED AREA In Million Hectares	ERY IRRIGATED AREA In Million Hectares	WELL IRRIGATED AREA In Million Hectares
1950-51	20.9	3.6	5.9
1951-52	21.0	3.4	6.5
1952-53	21.2	3.2	6.6
1953-54	21.7	4.1	6.7
1954-55	21.9	4.0	6.7
1955-56	22.8	4.4	6.7
1956-57	22.5	4.5	6.2
1957-58	23.2	4.5	6.8
1958-59	23.4	4.8	6.7
1959-60	23.8	4.7	6.9
1960-61	24.6	4.6	7.3
1961-62	24.9	4.6	7.3
1962-63	25.7	4.8	7.6
1963-64	25.9	4.6	7.8
1964-65	26.6	4.8	8.1
1965-66	26.7	4.4	8.7
1966-67	27.1	4.6	9.2
1967-68	27.5	4.6	9.3
1968-69	29.0	4.0	10.8
1969-70	30.3	4.4	11.1
1970-71	31.4	4.5	11.9
1971-72	31.9	4.1	12.2
1972-73	32.0	3.6	13.0
1973-74	32.5	3.9	13.2
1974-75	33.7	3.5	14.2
1975-76	34.5	4.0	14.3

Source: Tank Irrigation in Semi-arid Tropical India Progress Report 2 by M.Von Oppen and K.V.Subba Rao, ICRISAT, 1980

TABLE - 2

ERY IRRIGATION IN SELECTED STATES IN INDIA

State Region District	Area Irrigated by Erys (Gross) (1000 Ha.)	Total Gross Irr. area by All sources (1000 Ha.)	No.of Erys 40 Ha.	40Ha	% Gross Ery irr.area to total irr.area	Average size of Erys(Ha)
Rajasthan	270*	2136*			13	
Gujarat	35	1166	271	20022	3	1.7
M.P	131	1523			9	2.2
Maharashtra	208	1570	1348	27857	13	7.1
A.P	1110	4423	7395	66114	25	15.1
Tamil Nadu	1084	3272	8726	27019	35	30.3
Karnataka	373	1144*				

- Net Irrigated Area

Sources: Tank Irrigation in Semi-Aried Tropical India Part I by M.Von Oppen and K.V.Subba Rao, ICRISAT, 1980.

TABLE-3
TANKS IN TAMIL NADU BY DISTRICT

District	PWD-Total	Panchayat Union Total	Ex-Zamin	State Total
Chengalpattu	1207	1783	756	3746
North Arcot	1169	2084	482	3735
South Arcot	757	1766	79	2602
Salem	188	549		737
Dharmapuri	101	1579	154	1834
Coimbatore	59	64		123
Thanjavur	685	491		1176
Pudukottai	530	5334		6394
Tiruchy	268		214	
Madurai	771	3391	331	4493
Ramanathapuram	1508	1333	7367	10208
Tirunelveli	686	965	445	2096
Kanyakumari	984	1074		2058
Nilgiris				
Total	8903	20413	9886	39202

Sources: Ruth Susheela Meinzen-Dick, Local Management of Tank Irrigation in South India: Organisation and Operation - Cornell Studies in Irrigation, Cornell University, 1984

TABLE-4
AREA IRRIGATED BY ERYS AND TOTAL CROPPED AREA IN THE REGION OF THE OLD MADRAS PRESIDENCY IN 1883 AND IN 1969-72
(Area in 000 acres)

DISTRICT	1882-83 Total Cropped area	Net Area Irrigated by Erys	Avg.for 1969-72 Total Cropped area	Net area Irrigated by Erys
	(1)	(2)	(3)	(4)
Anantapur	114	89	2249	78
Cuddapah	240	188	1142	42
Kurnool	72	39	3220	33
Bellary	72	53	1507	20
Krishna	287	39	1661	88
Nellore	225	151	1646	227
Vizag	48	30	1307	221
Salem	85	97	2283	80
Coimbatore	142	44	2068	12
Madurai	233	158	1601	130
Chengalpattu	430	315	1070	405
North Arcot	338	201	1589	260
South Arcot	397	213	1786	268
Thanjavur	104	46	2162	73
Tirunelveli	377	145	1376	189
Tiruchirapalli	247	132	2031	196
ALL DISTRICTS	3511	1940	28698	2320

Source: Tank Irrigation in Semi-arid Tropical India Part I by M.Von Oppen and K.V.Subba Rao, ICRISAT, 1980

TABLE-5
AREA IRRIGATED AND NUMBER OF MINOR IRRIGATION FACILITIES IN TAMIL NADU BY SOURCE

YEAR	Canals area irrig.ha	Tanks area irrig.ha	Area Irrig.ha	No.of wells Total No. of wells	Pumpsets	Other area irrig.ha	Net area irrigated ha
1960-61	881,771	936,400	675,477	873,689	35,078	46,164	2,462,251
1965-66	799,147	902,545	761,963	1,036,068	49,610	37,695	2,398,574
1970-71	883,661	897,923	898,675	1,243,905	41,231	35,625	2,591,836
1975-76	910,441	749,828	1,005,458		411,389	35,258	2,565,120

Source: Ruth Susheela Meinzen-Dick, Local Management of Tank Irrigation in South India: Organisation and Operation - Cornell Studies in Irrigation, Cornell University, 1984

TABLE 6
SANANERI AYACUT CULTIVATORS EXPENSUS ON TANK IRRIGATION

ITEM	APPROXIMATE CASH VALUE (Rupees/hectare	
	Low	High
Paddy for neeranis: at 1981-82 harvested price at 1982-83 harvested price	30.00	40.00
Paddy for neerpachi: at 1981-82 harvested price at 1982-83 harvested price	63.00	86.00
Cash contribution to tank fund	15.00	46.00
Labour for channel cleaning: Approximately 5 man-days/ha	144.00	80.00
TOTAL OF LOCALLY-MOBILISED CONTRIBUTIONS	252.00	352.00

Source: Ruth Susheela Meinzen,-Dick, Local Management of tank Irrigation in South India; Organisation and Operation -Cornell Studies in Irrigation, Cornell University, 1984