DOMESTIC WATER SUPPLY

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Water is an essential ingredient for life and no living creature can survive without it. The human body contains over 80% water and it's depletion will dehydrate the body causing it to collapse. Thus water plays the major role in man's existence and yet is not given the significanoe due to it, by him or her.

From time immemorial, man and beast in all parts of the world living a Nomdic life, moved from location to location in search of water, as the circumstances arose. Giving due cogniscance to their wayward way of life in search of water, undergoing unnecessary hardships, they developed and settled at locations or areas where water was easily accessible Major cities today are located invariably where the water could be easily obtained, whereas during the Roman Empire period, major aqueman Empire period, major aqueducts had been constructed to bring this commodity, essential for life to places they wish to have it, if it was not readily available close at hand. The struggle for water is a never ending battle in a growing world and with this in focus, let me now develop the infrastructure in respect of Domestic Water Supply.

The term 'Domestic' may be a little out of place in today's world, but what it meant to convey was the basic need of water for a person's survival as a personal need. Taking the key from there, a Domestic Water Supply has the following major categories, besides sub-divisions of it, enveloping a much larger conceptional area than seen at a glance. They can be classified into four major groups as follows :

(a) Adequacy and easy accessibility of water required.

(b) Dependency and reliance on its availability

(d) Quality, and

(d) Recognition of the importance of the service.

In brief, in all the above, when reference is made to adequacy and easy accessibility, you come to my reference to the sub-divisions. Fundamentally on an analysis carried out internationally, the basic need for survival for an individual is only 15 litres per day, not taking into account other hygienic factors that can contribute to diseases caused by insanitary and unhealthy habits they adopt but only as the basic requirements . Where do we draw the line? Is it to be a certain quantum dependent on the need or the ability to afford? The question of quality is equally important. To what levels should this be achieved and what benefit do you gain against any marginal benefit, if it is treated to a sophisticated level? Very few attach importance to the effort that goes to provide water at the doorstep as it were; It is taken for granted without awareness of the process it goes through, before it is received.

Sri Lanka had a population of approximately 15 million people as at 1984 of which it is estimated that about 70 to 75% are in the rural areas of the Island or rather under developed areas in comparison to the Urban Sector.

The rural population accounts for over 11 million people as against the 4 million Urban. In the year 2000, at the present rate of population growth, the probable population in the Island could reach close to 20 million and if the proportion of the rural and urban remains very close to the present rate, the urban population will be around 6 million as against the 14 million in the rural. How the Domestic Water Supply expect to cater to this population is what the task being attempted by the National Water Decade Plan embarked on by the Prime Minister and the Government of Sri Lanka with the National Water Supply and Drainage Board as its implementing agency.

Let us examine the Urban sector first. Due to various causes, more attention has been paid to this area where the population tends to expand and congestion grows. No suitable alternative as a source of water other than a pipe borne system is the solution. Due to this more resources have been utilised for this area as against the rural and progressively the coverage has reached a level of 60 to 70% with pipe borne water in the urban areas. The provision of easy accessibility of domestic water by pipe borne systems encouraged and attracted expansive growth of cities extending their boundaries to cover adjacent areas and in turn compelling the existing systems to cope with the increasing demand placed on the system.

Failure to keep pace and timely action aggravates the position. Also, the time lag in provision tends to increase the costs due to deterioration and heavy burden on a system overloaded beyond its capacity. A very good example is the Greater Colombo area, where population has been expanding in leaps and bounds through various developments that have taken place both in industry and other forms of development that not only brought in more people as a community and a work force, but also the quantity used as per developing requirements. This is equally true of other major cities in the Island. Though all of them have a pipe borne system providing domestic water, some of them still suffer from inadequacy and time segmentation.

It is relevant at this stage to consider what is adequate and

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inadequate. In any urban society, an average consumption per person has been generally assessed to be between 30 gallons or 40 gallons (140 litres or 180 litres) per day. This is on the basis that he or she resides in a dwelling provided with flush toilet disposal. The average reduces to around 20 to 25 gallons/day (44 litres or 5.8 litres) where such a facility is not available. A survey carried out on the various urban supplies, brought into focus that taking this average into consideration, there is a very high wastage level in the supplies ranging between 30 to 40% in most of the urban areas. The general level of such wastage should not exceed above 15% in an effective operational service that can be sustained by the service. We are struggling to do our best to classify the categories into which the levels of wastage occur. The prominent ones appear to be lack of understanding how it could occur. As an illustration, let me present what some of them are. A household with five people could be consuming within a limit of about 900 litres or a unit/day, totalling about 30 units, but increase this average by way of leaks, open taps for washing,, gardening and car washing or a function in your household of some nature, be it an almsgiving or birthday party etc. then the gathering itself is much more and usage is also undetermined. Thus one such function with the normal usage, pushes the charge to the higher slab of the normal preventive level, whereby the bill reflects this usage by the increased quantum used at the higher rate, making the bill a sizeable amount not in keeping with the normal usage. There are others that contribute to large bills that people find difficult to comprehend and thereby the real reason behind it is hidden and twisted in a form to distort this purpose. In summarizing the Urban sector water supply, it is important to visualise that with an enormous capital outlay, it entails whether the country can support such a service if proper maximum utilisation is not made but it is frittered away, where the service rendered only accounts for less than 1/3rd of the population, though argumentatively, they may be the ones who most need it and have no alternative.

The rural sector which I may term, the unfortunate area, has been the longest suffering in the water sector. The basis that has caused this is the underlying idea that water is freely available and there are sources that provide for them and further more, they have not felt the need nor clamoured for a service, taking it, as always done in these areas, as a burden they have to bear, whether their crop fails or they have to trek for miles to satisfy their need of water. From a very low coverage level of less than 7 to 7% upto 7 to 8 years ago, it has reached a level of 20 or more now and the more important aspect is the people's awareness that something could be done and if ably assisted, could alleviate their long suffering needs. The emphasis by the Government and the Hon. Prime Minister has brought about a tremendous impact in these areas with the Model Villages that automatically covered the basic amenities of water and sanitation and followed with low cost provision of safe water in the dry zone with the aid of deep wells where through prolonged droughts, the rural communities were worst hit for lack of water which in turn caused disease and loss of manpower time by sickness or the search for water taking their time which could have served them for a better purpose for their livelihood.

Changes in funding have now taken place to support the rural sector. Yet the immense task of achieving the target goals of a full coverage requires a massive input of manpower and financial resources. It has gained international support and hopefully we may be able to attain our target goals or near to it. The rural sector is not looking for any sophisticated form of supply. The success lies if we could satisfy in a little way their thirst for water, when most needed. To this end, the shift from the urban for the rural has taken place as you will see from the program pursued and developed for the next few years. When the deep well program was initiated, it was based on considerable community participation along with the newly formed Gramodaya Mandalayas, where prior to provision, a series of discussions are gone through obtaining various ideas and willingness of the people and how they view a project, how best it could serve them and be valued by them. Generally, a wealth of knowledge could be gathered at this stage that is helpful to formulate what is best suited for the community and how they could participate as well as to reduce the cost to materialise the scheme with the least expense. They willingly contribute when they are the beneficiaries. Recent attempts on IRC sponsored project at Haldummula, the enthusiasm and active involvement produced exceptionally high level of success unprecendted before, both in the water supply and sanitation that was to be done for this village. This type of approach was made in many rural projects embarked with UNICEF, DANIDA, IRC and other funding agencies. One instance, through the energetic action of the M.PP., people came forth to do Shramadana work in excavation, providing materials available locally as their contribution. Thus, in many ways, the cost is considerably reduced permitting to carry out works where it was earlier considered not viable for lack of funds. In the deep well program it was possible to get the people to build the apron cheaply or assist in fixing the hand pump and train them to maintain the pump as caretakers that will ease maintenance costs. The women as well are equally employed.

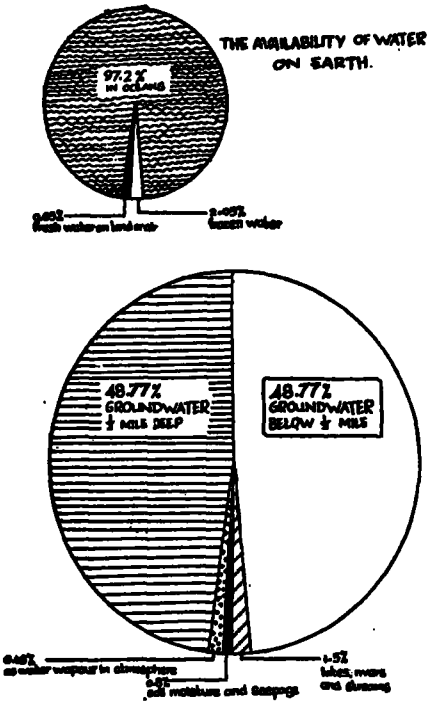
In the establishment of the deep wells a pre-survey team works in the area locating jointly with the people to position the wells. Thereafter, the drilling crews move and establish the wells followed by the

pump installation crew. It is intended to provide wells at intervals of 500 metres and on this basis, over 30,000 wells are expected to be drilled in the next seven years or so with about 25 drilling rigs. Each rig is capable of drilling about 15 wells per month when properly organised with least movement over long distances. The distance of 500 metres between wells is as much or closer than standpipes that are fixed in a rural scheme and they provide the same service except that one is turning a tap and the other is levering the water up which even a small child could do. Not only are deep wells being drilled in this manner but also shallow wells where hand pumps are being fixed to assist in easy extraction and to prevent pollution of the well by the normal bucket system.

It is interesting to indicate the basic concept of the adequay of water. When it is freely available and easily accessible the user pattern is accelerated as there is no need for conservation and it is taken for granted. This is the reason why when it is pointed out that 40 gallons/day is sufficient, it is not conceived what quantum it is. If you have to carry 40 gallons, it means you will lift 400 lbs. for use and in a household of five people, around one ton of water. If it is brought to your tap, it means some energy has to be utilised. Thus it becomes no longer free and in addition through pollution water is not safe and requires treatment that adds to the cost. This bring the vital question of how much can we afford Today developing countries are trying out low cost supplies that can be sustained by the society it serves or it becomes a burden to them, unwittingly created by themselves. To say that we require so much for health reasons and should be freely available is a form of payment that indirectly society has to bear. For instance, with increased costs of energy, the cost of poeration has increased tenfold and a deficit of Rs.200 million was experienced by the National Water Supply and Drainage Board last year. That is, people's own hard-earned incomes of the country that could be put to better development purposes if the drain against wastage etc. could be avaided. It has become increasingly important to operate and maintain efficiently any system to maximise the usage for longer and lesser rehabilitation needs, through neglect and lack of resources to do so. In place of a piped water system, a simple gravity or well system that answers the needs, is the need of the hour.

No sophisticated apeing the developed countries would solve our problem till we could afford it. In various developing countries numerous methods are being pursued with this view, for example, in Phillippines, forms have been used to overcome the supply by controls that prevent undue excessive wastage and use to suitably distribute the available water to all. We are attempting in so many ways to create a satisfactory service for all who are badly in need of safe water for their general use. To amplify a little bit more on this, may I show what is possible to overcome inequitable distribution that creates an imbalance where they who receive a good supply continue to have it while those who receive a meagre supply remain in that position. In Phillippines to provide a 24 hour supply, a control check valve is inserted into each delivery connection to control and see that only that amount of water agreed upon is delivered and will be used by the consumer in a manner he desires. This shows that if we wish to reduce costs with the help of the people we could do so where in the design it is not necessary to have peak effects etc. that makes the pipe diameters and other installations to be provided at a much higher cost. The argument that may be raised is that such a device or method may be against the inflexibility of improvements or to cater to increased demands in an expanding area.

But let us look at the potential in a pre-determined urban development or village level set up where the probable expansion is limited and within limits and in that type of set up whether it is not possible to adopt the above that is helpful to everybody. There are many such examples that can be adopted without following age old beaten tracks outdated in a modern over-developing world. In the Hon. Prime Minister's One Million Housing Program. the primary aim is not exactly housing construction, but better housing and environment that makes life easier for the rural poor. In that program it is made clear that the people were made to place their priorities. It is significant that high priority level was in water and sanitation. Let us look to the reason and it may be that with the suffering they may have undergone, that now realise the importance and need for the satisfactory water supply and sanitation that could enliven their livelihood to a better purpose in life. To this end what I referred to and submitted earlier is the aim we in the National

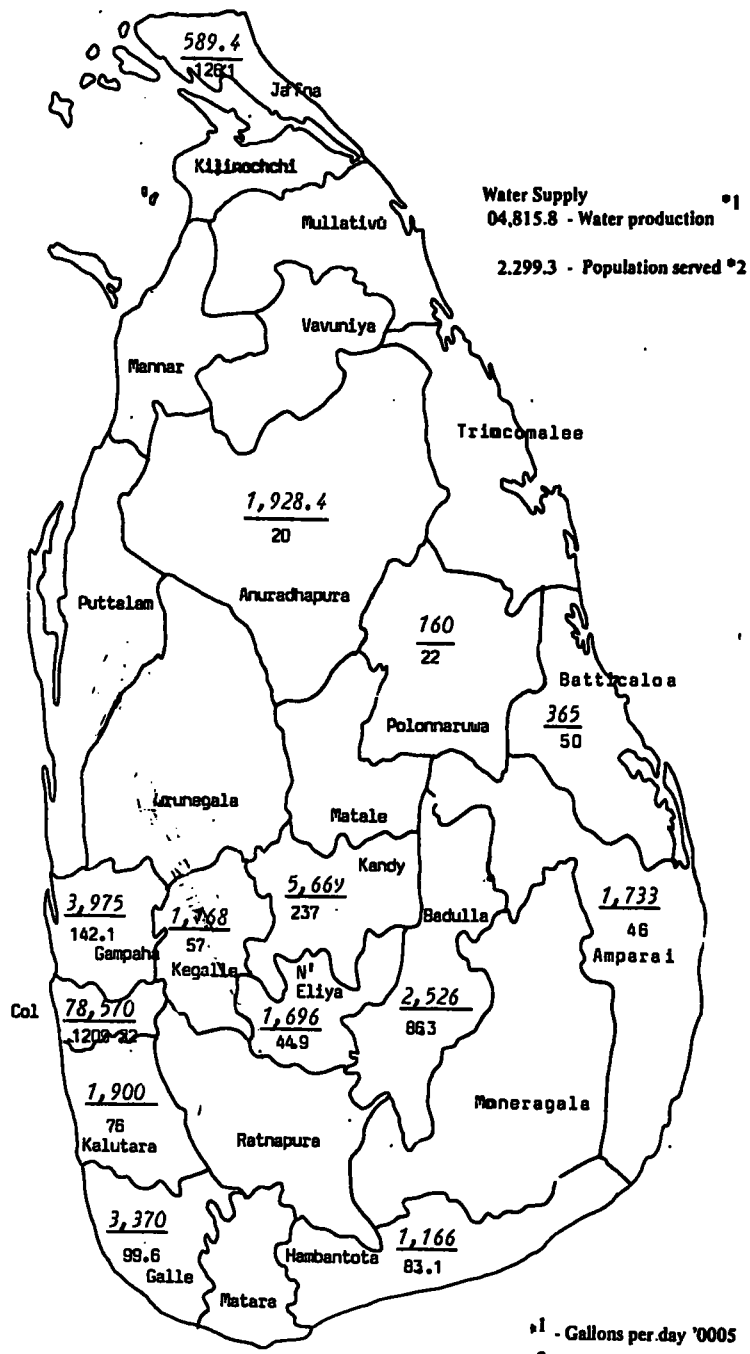


Water Supply and Drainage Board are gearing ourselves to do and may be a dedicated service that needs the support of every individual, within or without the Board. Having referred to the Million Housing Program, I would fail if I do not delve into the infrastructure in respect of Health Education.

People need two to three types of water, (a) for cooking and drinking good quality water, (b) washing and bathing not the same quality but should be satisfactorily free from pollution and colour or odour, (c) lesser quality for gardening and other purposes.. It is not economical to provide separate quality level of supply unless the necessity of scarcity warrants it as in cases in little or more developed congested cities. Yet with the potential of water sources available to our people in the three categories, they are easily attainable if people can be made to assess or realise what it means. For instance, in the village, they can collect the quality water from the stand pipe or hand pump for drinking and cooking, move to

a water source for requirements or use for other purposes. In Urban it may be more difficult, but use of the water that has been provided and used for bathing can easily be used for gardening or even washed soiled water that is supposed to be better for gardening etc. In this way our approaches could be adjusted to suit the progressive nature we wish to attain.

DOMESTIC WATER SUPPLY SITUATION IN SRI LANKA



Let me before I finally conclude, stress one very significant point of note to Engineers in this field. It is very important to know the role you play. Basic Engineering and the relevant Engineering practices are not the be all and end all of your task. You can no longer be disassociated from the public in an essential public service. Where we Engineers may fail is that we feel, our task is done once we competently or otherwise complete the implementation. But it is the aftermath of Your action that is mosthighlighted in a service of this nature. Where you complete a bridge or road or structure it is done with, but in our field it is the beginning and failure to understand this aspect that has resulted in adverse comment against the Enginners. The best Managers are those of technological supported individuals who translated his view as those of whom he helps to develop. Thus in Domestic Water Supply the role played is much more mainfold than in other fields for the simple reason that you can do with-out sophisticated power, transport etc. but not without water.