

Table 6. Recovery data from the well at Thiruvananthapuram

Time since pumping started in minutes	Time since recovery starts in minutes	Depth to water level b.m.p in metres	Residual drawdown in metres	Depth of w.c in the well in metres
15	0	8.870	0.850	3.660
17	2	8.755	0.735	3.775
18	3	8.705	0.685	3.825
19	4	8.650	0.630	3.880
20	5	8.610	0.590	3.920
25	10	8.450	0.430	4.080
30	15	8.330	0.310	4.200
40	25	8.200	0.180	4.330
50	35	8.140	0.120	4.390
60	45	8.100	0.080	4.430
70	55	8.080	0.060	4.450
80	65	8.065	0.045	4.465
90	75	8.055	0.035	4.475
105	90	8.045	0.025	4.485
135	120	8.030	0.010	4.500
165	150	8.020	0.000	4.800

Hence the recuperation rete is fast as compared to Sreekaryam.

- \* The other well sites are tapping water from the fully penetrating aquifers of weathered rock with sand. Both wells are located in hilly slopes and the recovery trends (TFR) range between 52 minutes and 294 minutes. Hence these wells can be pumped more than 5 times in a day during

the end of monsoon.

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## PEOPLE'S PARTICIPATION IN SOIL & WATER MANAGEMENT

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### 1. Introduction

The importance of soil and water conservation has always been neglected by the farmers and the society. The interaction between the land and water determines the productivity and socio-economic conditions of a given area. Therefore, the precions natural resources like soil and water should be preserved and well maintained, not only for us, but for our future generation also.

The high rate of population growth, both human and live-stock (Anon, 1976) has resulted in over exploitation of natural resources to meet the ever increasing demand for food, fodder and fuel.

Even though no systematic survey for ascertaining the extent of various problem areas in the country has so far been conducted, it is estimated (Gurmel Singh et al, 1995) that out of a total reported geographical area of 329 m ha, about 167

m ha (about 51% of total) are affected by serious water and wind erosion, erosion due to shifting cultivation and erosion of cultivable waste lands.

Similarly, water is going to be the limiting factor and constraint for increasing agricultural production in the future. Therefore, utmost care in management and fore sight is necessary to use water judiciously and economically by various means through conservation, development, storage, distribution, mation and reuse in 21st century for sustainable food security in the country as well as in the world (R K Sivanappan, Survey of Indian Agrl. 1996).

Each farm needs a soil and water conservation plan tailored to fit that farm, since it presents a different combination of problems than every other farms. This plan consists of a combination of practices especially designed to fit the different kinds of land, the climate, the adapted crops, the habits and desires of the farmer, markets and may other factors.

India can be counted among the fore most nations in the third world, to have take note of these serious problems of soil erosion, land degradation and water scarcity, with the beginning of the planned development in India in 1951.

The development of technical solutions is only one part of solving the soil conservation problem, It is also necessary to put these solutions into practice. There have been several approaches to achieving this objective.

1. The concept that soil conservation is such a good thing that it is only necessary to show the people what to do any they will start to do it. In this scheme, once the technical know-how is available, all that is required is education and extension.

2. Another approach is to use financial incentives to encourage the implementation of conservation works by the government paying a substantial part of the cost of the works and the rest being a charge to the land owner.

3. The third possibility is to use coercion. This may range from low-key pressure, a kind of moral blackmail to make people feel bad if they do not conform, to the out right enforcement of legislation. Various combinations of these three elements are possible.

The problems in soil and water conservation usually arises from a complicated interaction between a large number of factors. For convenience, these are discussed under the three main categories of political aspects, soical difficulties and economic problems.

## **2. Political Policy**

Government policies are not translated into action programmes unless there is political will to make them work. So, the situation in many countries today is that plans are made for the conservation of natural resources, but they have little

practical effect. At the level of National policies, ther can be a conflict between the short-term objective of self-sufficiency and the long term maintenance of the country's land resource base. The understandable desire of national governments to increase food production can lead to excessive pressure on the land. Soil conservation programmes can only be effective only when they are moved from below, i.e., by full involvement of the rural population (Dudal, 1981). Programmes which are imposed from above will not succeed even if they are technically correct.

## **3. Social Features**

### ***Land ownership and land tenure:***

Among the factors which lead to an over stressing of land resources, we must put high on the list, the cultural ethic that everyone has an automatic right to own land. Partly it is historical; in the past, there was enough land for everyone to have some and increase in population just meant bringing more land to use. It is also partly because in dominantly agriculture economies, there are no alternatives to working on the land.

### ***Fragmentation:***

Another consequence of the concept of a universal right to own land is that it leads to the progressive subdivision of land holdings. Extreme examples of this are seen in Indian Villages (Shaxson, 1981). In some states, this has led to the 'consolidation programme' which in effect puts all the land into a common pool and redistributes it in more manageable parcels. In India, another regularator is that although the law has for some years decreed that the father's estate should not be shared among the daughters as well as the sons, this is seldom applied to land, However, neither these modifying influences, nor changes in the laws of inheritance are likely to alter the basic fact that fragmentation is a serious constraint on optimal land use.

### ***Reluctance to move:***

It is a fact of life that humans are gregarious and do not like to move from their accustomed environment. India has the worst problem of all. The over-crowded, over-grazed, over-cultivated foothills of the Himalayas are disintegrating so fast that the sediment load of the main rivers is higher by an order of magnitude than comparable rivers on the other continents.

### ***Reluctance to change:***

It is common place to refer to the conservatism of the peasant farmer or to his inertia and the difficulty of changing existing patterns. There is no doubt that change occurs infrequently and slowly, but the reasons for this are sometimes misunderstood. The small-scale peasant farmer is usually an experienced and efficient practitioner of his craft, but this craft is not the business of farming as in the developed countries where the object is to maximize yield and profit, rather it is

the art of survival. He is not unwilling to change, but he is locked into an economic prison form which he is unable to escape.

#### **4. Economic Constraints**

##### ***The element of risk:***

The economic prison holding the subsistence farmer is his inability to take risks. The essence of farming is trying to improve the odds in the gamble against weather, pest and disease. The peasant has no risk capital to gamble with, so his whole strategy is geared to safety. It is neither stupidity nor lethargy when he sticks to his old variety, it is accepting the realities of life.

##### ***The time scale for soil conservation:***

In order to measure the benefit of conserving the soil, one has to use a long time scale. The farmer's economic cycle is very short. He is probably working on cash flows over 12 months, so it is unreasonable to expect him to pay now for preserving the land for posterity. That is a luxury he cannot afford. A quotation from Dudal (1981) is appropriate. 'The first requirement for effective soil conservation is that the income from the farm is large enough to provide a sufficient proportion for the maintenance of the soil capital'.

##### ***Who benefits and who should pay?***

Apart from the on-site benefits of erosion control, there may be other reasons why erosion control is required. The downstream damage caused by sedimentation (increased flooding, reduced hydro-electric power, interference with irrigation) may be more important than the loss of soil. The peasant farmer in the site cannot reasonably be expected to care very much about the silting of an irrigation reservoir thousand kilometers away from him and he certainly should not be expected to pay for the required remedial measures. If sedimentation is increasing, then the increased cost or the cost of corrective measures, should be passed on to the consumer or borne by the state. Rosenberry et al., (1980) conclude that 'the cost of erosion control to farmers is greater than the economic return from controlling erosion'.

A great deal more work requires to be done on this subject because the decision makers need to have more reliable evidence on which to make their judgments, but progress is encouraging.

##### ***Importance of People's participation:***

The Community approach and the people's participation is very much essential in a soil water conservation programme. The entire population of the society should be made aware about the importance of soil and water management practices and with the help and cooperation of each and every individual, soil and water conservation measures should be taken up. The role of local leaders, grama panchayath, Dis-

trict and State administration and other developmental agencies is also vital. Soil and water conservation committees should be constituted in state, district and panchayath level. State, District and Panchayat administrators, officers from concerned Government departments, eminent experts in related fields and local leaders should be the members of the committee. The committee can study the problems related with water scarcity and soil erosion and suitable remedial measures can be taken up.

The panchayath level committee can also constitute ward level committees and they can identify the problem areas. They can also suggest suitable soil and water conservation practices. Apart from the aid and help from the Government agencies the people can voluntarily take up proper conservation practices. For example, in Kunnoth paramba and Kalyasserry panchayaths of Kannur district, the ill-effects of draught and soil erosion is almost eliminated through people's participation. In Kunnothparamba panchayath, 117 training classes were conducted to make the people aware about the utter need of soil and water management practices. 35 check dams and other soil and water conservation measures were taken up with the active participation of the people. In Kalyasserry, 7 check dams and one water way are constructed and all other existing water ways (approx. 16 km long) were desilted and repaired. On March 19, 1995, a core group of 350 people constructed a new water way of approximately 1 km length within a single day. Through this, around 40 ha of uncultivable area is converted into cultivable area.

Another example of successfully implemented soil and water conservation project with people's participation is in Yethadka village of Kumbadje panchayath of Kasaragod District. A watershed development scheme is launched in 1993 under National Watershed Development Project for Rainfed Areas (NWDPPRA) in the village. Panchayath and ward level awareness programmes were conducted. Awareness and interactive programmes were also arranged with the help of social organisations FIEC, Mahila Mandals etc. Subsidies and other financial incentives were made available to the farmers through the state department of Agril. and Banks. A demonstration plot on different soil and water conservation measures were also prepared and maintained. Eventhough the people were slightly reluctant to adopt the various soil and water conservation packages in the beginning stage, they started adopting the measures by the second year of the programme onwards (because of the constant awareness programmes, encouragements, financial incentives etc.)

Today people started getting returns from the programmes. The water in their wells and other water resources keeps a higher level even in peak summer season. Drought, which was a common disaster in the pre implementation programme is now rather a strange phenomenon. More area

of land could be converted in cultivation: The data also shows a substantial increase in the productivity of land. (Source: Feedback survey by Krishi Vigyan Kendra, CPCRI).

## 5. Conclusion

It is very much understood that land and water management practices should be implemented through active participation of people only. The various methods/options to create awareness among the people are

1. Involve people/farmers and NGOs to create awareness about water scarcity and problems with soil erosion and to take up better soil and water management practices.

2. Transfer of technology to the needy. Training on soil conservation and water management to the extension staff, farmers, politicians, administrators and policy makers.
3. Posting extension officers/ workers for water management in each union block/ taluk/panchayat.
4. Make the different programmes for soil and water conservation and watershed management more transparent
5. Cultivate and integrated approach and a synergic feeling among the different departments, organisations and programme monitoring cells for the same purpose of land development and water management.

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## LAND USE MAPPING THROUGH REMOTE SENSING

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**Abstract:** An attempt has been made to delineate the land use of Thevaram basin, Tamil Nadu using multitemporal satellite data of IRS IB Liss II Geocoded data of March 1995 and September 1995. Adequate field check also has been done for accuracy based on this technique. Thevaram basin has been divided into three levels of land classes (level I, level II and level III). This gives a correct picture of the present land classes utilization of the land for different uses.

### 1. Introduction

Land is used for multifarious activities like agriculture, forestry, development of grasses, recreation, industrialization, urbanization, mining etc. Pressure on the land in the last few decades has considerably increased. Good and productive agricultural land is often converted into urban land or used for purposes other than agriculture. Remote sensing provides quick information about the current status of land use and the associated characteristics. The visual interpretation method, using geocoded data of India Remote sensing satellite with a scale of 1:50,000 is quite suitable for developing countries like India due to simplicity and low cost. The land use mapping by using remote sensing techniques has already acquired a Quasi-operation status in the country and will achieve operational status in future due to high resolution products from IRS-LISS (Linear Imaging Self Scanning System) II, LISS III and PAN images.

### 2. Mapping Techniques.

The survey and mapping of present land use by conventional methods are costly and time consuming. By the

time such maps reach to public and planners, the information obtained by these maps becomes outdated due to subsequent changes. Remote sensing techniques particularly from satellite platform due to synoptic view of large area and its spectral and temporal characteristics provide comparatively faster and cheaper way of collecting information about the land use. (George Joseph, 1993) During the decade, visual and digital remote sensing techniques have been extensively used by several organizations in India for surveying, classification and mapping of land use in conjunction with ground truth.

### 3. Definition

Land use describes how a parcel of land is used (for agriculture, residences of industry, accurate, current information on land use is essential for many planning activities.

### 4. Advantages of remote sensing for land use mapping.

- \* Image can be acquired rapidly
- \* The spatial resolution can be selected based on our requirement
- \* The ground survey hindrance can be eliminated