# F OVERALL PROJECT JUSTIFICATION

## TABLE OF CONTENTS



## List of Tables

# F OVERALL PROJECT JUSTIFICATION

## F.1 Basic Justification on the Study

In the whole framework of the Study on Rehabilitation of Minor Irrigation Tanks for Rural Development carried out in 5 districts of Tamil Nadu (2 districts - Tiruvallur and Kanchipuram - in the Northern region and 3 districts - Ramathapuram, Sivaganga and Virudunagar - in the Southern region), approximately 2,100 PWD rainfed tanks (or almost 45 % of total rainfed tanks in this State) were subjected to the Master Plan Study of the Project.

This would cover a total command area of about 214,000 or about 75 % of the total presently irrigated area in these 5 districts (297,000 ha). In fact, the share of areas irrigated by PWD rainfed tanks in this State has been observed to have been decreasing far below from this figure due to the chronical situation of lacking tank water for efficient irrigation operations, particularly in the Southern Study Area where the average annual rainfall has been found very scarce in some parts.

Of the total population of approximately 8.5 million inhabitants in the 5 subjected districts, approximately 1.5 million persons or 18 % of the total population would be considered as beneficiaries of the whole Project framework for being family-members of about 300,000 farm units living in the Study Area.

The PWD rainfed or non-system tanks for minor irrigation subjected to the Study were mostly constructed several centuries ago by local kings or regional chiefs for collecting rainfall and surface water from each regional catchment to irrigate by gravity its nearby farmland for mainly rice cultivation, the traditional staple foodstuff in this State. These rainfed tanks are presently observed being very deteriorated in structures and functions for efficiently performing the normal irrigation operation.

As being turned over to the control by PWD since 1975 but basically operated by local Panchyat Unions, these rainfed tanks have been gradually faced with the deterioration in structures and functions mainly caused by encroachment in corresponding catchment areas, siltation of tank-beds, bund-damages, sluice-malfunctions, water conveyance loss in irrigation canals etc., resulting in the reduction of envisaged agricultural production and hampering the basic living conditions of local inhabitants.

Therefore, in order to regain the potential in irrigation capacities by these tanks, they should be firstly rehabilitated., and, then, subjected to the functioning of effective O&M operations under a new management organization to be established in this framework accordingly.

For the feasibility study of the Project, 10 Pilot Tank Areas (5 areas in the Northern region and 5 areas in the Southern region) from the total number of approximately 2,100

tank units were selected as the representative tanks from all subjected categories. The feasibility study is made as a pilot phase for modeling all related proceedings and procedures for the whole Project framework. The total command area for these 10 Pilot Tank Areas is approximately 1,560 ha (1,235 ha in the North Study Area and 325 ha in the South Study Area) or approximately 0.7 % of the total command area of the whole Project framework. (214,000 ha). This figure is observed somehow higher than the figure of 0.5 % for the share of 10 units in the total number of 2,100 tanks for the whole Project. As for the number of beneficiaries subjected to the feasibility study, the total number of about 2,450. farms or approximately 11,000 persons would be considered as beneficiaries., sharing also a figure of approximately 0.7 % of the total beneficiaries for the whole Project.

## F.2 Basic Justification on the Whole Project Framework

Basically the whole Project framework of the Master Plan study is aimed at firstly stabilizing the agricultural production in the main areas of the State which is observed being very unstable through the year recently due to the insufficient supply of irrigation water for cropping, particularly in the dry season, and secondly improving the production yields and farm revenues, especially for the small and marginal farm categories, for raising up their basic living conditions. In this connection, the related institutional aspects on O&M and value-added programmes for functioning the Project will be subjected to an intensive elaboration also. These both subjected aspects are considered basically to deal with the major socio-economic issues of food self-sufficiency and rural poverty in this State where an average population growth of 2 % per annum has been constantly taking place.

From the basic issue of chronic lack of irrigation water, the consideration on the development of available hydrological potentials for each area for the joint use, if possible, is also subjected to consideration in the framework of the Project. From the free cost of electricity for using in agricultural purpose at present, the utilization of groundwater with motor pumps, therefore, would be considered in a good opportunity The installation cost for an open well equipped with electric pump is approximately Rs.50,000 - Rs.60,000 at present, which could irrigate 2 - 3 ha of farmland in average. The problems presently confronted from this alternative would be as follows:

i) Scarcity in potentials of groundwater with proper quality in the drought prone areas, particularly in the Southern region.
ii) Cost requirements for searching proper groundwater sources.
iii) Relatively high cost for well installation. Normally small and marginal farms have no financial capability for this investment.
iv) Irrigation cost by well, therefore, is rather higher than the one for tank irrigation.
v) Limited acreage for irrigation by well (2 - 3 ha from one well)

At present, only some affluent farms can install wells for enjoying the utilization of electricity as free of charge. In the future, if the electricity used for agricultural purpose

is charged (the present electric fee is in the range of Rs.1.5 - Rs.3.0 per KA), the irrigation cost by this means will be largely increased.

## F.3 Justification on the Feasibility Study for Pilot Tank Areas

### F.3.1 Economic Justification

The Project is aimed mainly at stabilizing the agricultural production through the year and improving the presently old agricultural production techniques for a better farming system in the related command areas through the rehabilitation works of corresponding tanks.

With the Project implementation, the higher cropping intensities in both seasons and the higher yields per cropping unit along with the application of some higher valued cash crops will make a total amount of approximately Rs.12.5 million as the annual incremental crop benefits which are the main source of economic profits for the Project. In average ,therefore, one tank would have an annual incremental crop benefit of Rs.1.25 million.

For economic evaluation, Economic Internal Rate of Return (EIRR) was calculated under the following conditions.
i) EIRR in basic condition
ii) EIRR at 10% cost increase
iii) EIRR at 10% benefit decrease
iv) EIRR at 3 year benefit delay

The calculation details for all 10 tanks subjected to the Feasibility Studies are available in the table F.3.1 - F.3.10:

### F.3.2 Financial Justification

In the financial evaluation for mainly analyzing the farm budgets for the categories of the representative farms in each tank area for both cases of "without project" and "with project", the farm budgets of these farms were proved to be largely improved. With the Project implementation, in average, one farm would obtain an increase of annual net farm income of about Rs.8,600 and an amount of value added of about Rs.850 for a total amount of Rs.9,450.

### F.3.3 Environmental Assessement

From the results of the environmental impact assessment for the Pilot Tank Areas, it can be said that basically the Project will not induce any significant direct negative environmental impacts excepting groundwater component at some areas. Some minor impacts may be induced such as increase of conflict/friction on water sharing, increase of agrochemical use, outbreak of mosquito-related diseases and destroying peacocks nests in the southern area. However, these minor impacts can be avoided through

appropriate development procedures and countermeasures.

### F.3.4 Women in Development (WID)

The following effects are expected to be induced to the women of marginal farm families in the villages by modernizing the tank irrigation system.

i) Women in the Study Area are mainly employed in hard works of agricultural practices such as sowing/planting, weeding and harvesting, and their wage rates are set rather low. If marginal farmers' income is improved, they will be able to buy draught animals such as cows, etc. As a result, some of the women's work load in agricultural works will be done using those animals; in the case for some farmers, improvement of income may allow women to be free from such hard farm labor. Women will be able to have opportunity to get employed in the other works where salary may be higher.

ii) Women will be able to become more educated in the aspects of family planning, literacy, health and nutrition, etc. through the various activities carried out by the women and youth clubs under farmers' organization.

iii) Women and youth in the villages of the modernized tank will get in better diet and improved nutrition conditions, if their income is improved due to the modernization of irrigation tanks.

iv) The traditional discrimination of women may be mitigated and their social position may be improved in the future, if they are able to be much more educated due to improvement of their families' income.

## F.4 Overall Evaluation of the Project

The Project shows a basic EIRR of.18.4.%, (Table F.4.1) proving the economic and financial feasibility through the viability of this Project. The sensitivity analysis proved also that the Project is economically feasible with corresponding EIRRs of 16.6% (increase of Project cost at 10 %), 16.4 % (reduction of Project benefit at 10 % and 12.0 % (delay of Project benefit for 3 years).

With the Project implementation, along with the construction and installation works of related structures and facilities, the institutional development related to each aspect of the Project will be an important factor for functioning the Project in a correct direction to achieve the objectives envisaged by the Project.

In the whole Project framework, apart from an effective management and operation organization, a proper monitoring system, therefore, is recommended to be established in order to check periodically the results from implemented works for proper correction at each implementation stage as well as after the completion of project-works for following-up the results of works for the Project.

Due to the present difficulties in local conditions for implementing related public works, efforts should be largely made by all concerned persons from the Project start until its final stage with intensive checking and corrections at every stage and every period during the Project implementation including the reservation of penalty measures. The management and all organizations related to the Project, therefore, should be properly organized for implementing a correct operation.

# Table F.3.1 Economic Internal Rate of Return for Echur Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 1,717 |
| 2. Item 1*0.96 | 1,648 |
| 3. Item 2*0.80 | 1,319 |
| 4. Super Vision Charge | 52 |
| 5. Preparation Cost | 25 |
| 6. Overhead Charge 25% | 505 |
| Total (Item 3 to 6) | 1,901 |

No.1.(1). ECHUR TANK

Table 1.1 EIRR at Basic Conditions — Unit : 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 950.3 | 0.0 | 0.0 | 950.3 | 0.0 | 0.0 | 0.0 | -950.3 |
| 2 | 1999 | 950.3 | 95.0 | 0.0 | 1,045.4 | 129.5 | 16.1 | 145.6 | -899.8 |
| 3 | 2000 | 0.0 | 95.0 | 0.0 | 95.0 | 259.0 | 32.2 | 291.2 | 196.2 |
| 4 | 2001 | 0.0 | 95.0 | 0.0 | 95.0 | 388.5 | 48.3 | 436.8 | 341.8 |
| 5 | 2002 | 0.0 | 95.0 | 0.0 | 95.0 | 518.0 | 64.4 | 582.4 | 487.4 |
| 6 | 2003 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 7 | 2004 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 8 | 2005 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 9 | 2006 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 10 | 2007 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 11 | 2008 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 12 | 2009 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 13 | 2010 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 14 | 2011 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 15 | 2012 | 0.0 | 95.0 | 570.2 | 665.2 | 647.6 | 80.5 | 728.0 | 62.8 |
| 16 | 2013 | 0.0 | 95.0 | 570.2 | 665.2 | 647.6 | 80.5 | 728.0 | 62.8 |
| 17 | 2014 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 18 | 2015 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 19 | 2016 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 20 | 2017 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 21 | 2018 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 22 | 2019 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 23 | 2020 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 24 | 2021 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 25 | 2022 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 26 | 2023 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 27 | 2024 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 28 | 2025 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 29 | 2026 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| 30 | 2027 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728.0 | 633.0 |
| Total | | 1,900.7 | 2,756.0 | 1,140.4 | 5,797.0 | 17,484.0 | 2,172.4 | 19,656.4 | 13,859.4 |

**IRR= 22.81%**

No.1(2). ECHUR TANK

Table 1.2 EIRR at 10% Increase of Cost — Unit : 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,045.4 | 0.0 | 0.0 | 1,045.4 | 0.0 | 0.0 | 0.0 | -1,045.4 |
| 2 | 1999 | 1,045.4 | 104.5 | 0.0 | 1,149.9 | 129.5 | 16.1 | 145.6 | -1,004.3 |
| 3 | 2000 | 0.0 | 104.5 | 0.0 | 104.5 | 259.0 | 32.2 | 291.2 | 186.7 |
| 4 | 2001 | 0.0 | 104.5 | 0.0 | 104.5 | 388.5 | 48.3 | 436.8 | 332.3 |
| 5 | 2002 | 0.0 | 104.5 | 0.0 | 104.5 | 518.0 | 64.4 | 582.4 | 477.9 |
| 6 | 2003 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 7 | 2004 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 8 | 2005 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 9 | 2006 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 10 | 2007 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 11 | 2008 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 12 | 2009 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 13 | 2010 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 14 | 2011 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 15 | 2012 | 0.0 | 104.5 | 627.2 | 731.8 | 647.6 | 80.5 | 728.0 | -3.7 |
| 16 | 2013 | 0.0 | 104.5 | 627.2 | 731.8 | 647.6 | 80.5 | 728.0 | -3.7 |
| 17 | 2014 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 18 | 2015 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 19 | 2016 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 20 | 2017 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 21 | 2018 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 22 | 2019 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 23 | 2020 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 24 | 2021 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 25 | 2022 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 26 | 2023 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 27 | 2024 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 28 | 2025 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 29 | 2026 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| 30 | 2027 | 0.0 | 104.5 | 0.0 | 104.5 | 647.6 | 80.5 | 728.0 | 623.5 |
| Total | | 2,090.7 | 3,031.5 | 1,254.4 | 6,376.7 | 17,484.0 | 2,172.4 | 19,656.4 | 13,279.7 |

**IRR= 20.598%**

No.1(3). ECHUR TANK

Table 1.3 EIRR at 10% Decrease of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 950.3 | 0.0 | 0.0 | 950.3 | 0.0 | 0.0 | 0.0 | -950.3 |
| 2 | 1999 | 950.3 | 95.0 | 0.0 | 1,045.4 | 103.6 | 12.9 | 116.5 | -928.9 |
| 3 | 2000 | 0.0 | 95.0 | 0.0 | 95.0 | 181.3 | 22.5 | 203.8 | 108.8 |
| 4 | 2001 | 0.0 | 95.0 | 0.0 | 95.0 | 272.0 | 33.8 | 305.8 | 210.7 |
| 5 | 2002 | 0.0 | 95.0 | 0.0 | 95.0 | 362.6 | 45.1 | 407.7 | 312.7 |
| 6 | 2003 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 7 | 2004 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 8 | 2005 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 9 | 2006 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 10 | 2007 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 11 | 2008 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 12 | 2009 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 13 | 2010 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 14 | 2011 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 15 | 2012 | 0.0 | 95.0 | 570.2 | 665.2 | 582.8 | 72.4 | 655.2 | -10.0 |
| 16 | 2013 | 0.0 | 95.0 | 570.2 | 665.2 | 582.8 | 72.4 | 655.2 | -10.0 |
| 17 | 2014 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 18 | 2015 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 19 | 2016 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 20 | 2017 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 21 | 2018 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 22 | 2019 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 23 | 2020 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 24 | 2021 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 25 | 2022 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 26 | 2023 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 27 | 2024 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 28 | 2025 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 29 | 2026 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| 30 | 2027 | 0.0 | 95.0 | 0.0 | 95.0 | 582.8 | 72.4 | 655.2 | 560.2 |
| Total | | 1,900.7 | 2,756.0 | 1,140.4 | 5,797.0 | 15,489.5 | 1,924.6 | 17,414.1 | 11,617.1 |

**IRR= 18.879%**

No.1 (4). ECHUR TANK

Table 1.4 EIRR at 3 year delay of Benefit — Unit : 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 950.3 | 0.0 | 0.0 | 950.3 | 0 | 0 | 0 | -950 |
| 2 | 1999 | 950.3 | 95.0 | 0.0 | 1,045.4 | 0 | 0 | 0 | -1,045 |
| 3 | 2000 | 0.0 | 95.0 | 0.0 | 95.0 | 0 | 0 | 0 | -95 |
| 4 | 2001 | 0.0 | 95.0 | 0.0 | 95.0 | 0 | 0 | 0 | -95 |
| 5 | 2002 | 0.0 | 95.0 | 0.0 | 95.0 | 129.5 | 16.1 | 146 | 51 |
| 6 | 2003 | 0.0 | 95.0 | 0.0 | 95.0 | 259.0 | 32.2 | 291 | 196 |
| 7 | 2004 | 0.0 | 95.0 | 0.0 | 95.0 | 388.5 | 48.3 | 437 | 342 |
| 8 | 2005 | 0.0 | 95.0 | 0.0 | 95.0 | 518.0 | 64.4 | 582 | 487 |
| 9 | 2006 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 10 | 2007 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 11 | 2008 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 12 | 2009 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 13 | 2010 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 14 | 2011 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 15 | 2012 | 0.0 | 95.0 | 570.2 | 665.2 | 647.6 | 80.5 | 728 | 63 |
| 16 | 2013 | 0.0 | 95.0 | 570.2 | 665.2 | 647.6 | 80.5 | 728 | 63 |
| 17 | 2014 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 18 | 2015 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 19 | 2016 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 20 | 2017 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 21 | 2018 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 22 | 2019 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 23 | 2020 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 24 | 2021 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 25 | 2022 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 26 | 2023 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 27 | 2024 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 28 | 2025 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 29 | 2026 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| 30 | 2027 | 0.0 | 95.0 | 0.0 | 95.0 | 647.6 | 80.5 | 728 | 633 |
| Total | | 1,900.7 | 2,756.0 | 1,140.4 | 5,797.0 | 15,541.3 | 1,931.0 | 17,472.3 | 11,675.3 |

**IRR= 14.063%**

# Table F.3.2 Economic Internal Rate of Return for Cherukkanur Big Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 2,848 |
| 2. Item 1*0.96 | 2,734 |
| 3. Item 2*0.80 | 2,187 |
| 4. Super Vision Charge | 85 |
| 5. Preparation Cost | 41 |
| 6. Overhead Charge 25% | 836 |
| Total (Item 3 to 6) | 3,149 |

No 2.1 CHERUKKANUR BIG TANK

Table 2.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,574.6 | 0.0 | 0.0 | 1,574.6 | 0.0 | 0.0 | 0.0 | -1,574.6 |
| 2 | 1999 | 1,574.6 | 157.5 | 0.0 | 1,732.1 | 141.9 | 34.4 | 176.4 | -1,555.7 |
| 3 | 2000 | 0.0 | 157.5 | 0.0 | 157.5 | 283.8 | 68.9 | 352.7 | 195.2 |
| 4 | 2001 | 0.0 | 157.5 | 0.0 | 157.5 | 425.7 | 103.3 | 529.1 | 371.6 |
| 5 | 2002 | 0.0 | 157.5 | 0.0 | 157.5 | 567.6 | 137.8 | 705.4 | 547.9 |
| 6 | 2003 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 7 | 2004 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 8 | 2005 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 9 | 2006 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 10 | 2007 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 11 | 2008 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 12 | 2009 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 13 | 2010 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 14 | 2011 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 15 | 2012 | 0.0 | 157.5 | 944.8 | 1,102.2 | 709.6 | 172.2 | 881.8 | -220.5 |
| 16 | 2013 | 0.0 | 157.5 | 944.8 | 1,102.2 | 709.6 | 172.2 | 881.8 | -220.5 |
| 17 | 2014 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 18 | 2015 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 19 | 2016 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 20 | 2017 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 21 | 2018 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 22 | 2019 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 23 | 2020 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 24 | 2021 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 25 | 2022 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 26 | 2023 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 27 | 2024 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 28 | 2025 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 29 | 2026 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| 30 | 2027 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 881.8 | 724.3 |
| Total | | 3,149.3 | 4,566.4 | 1,889.6 | 9,605.3 | 19,158.1 | 4,649.2 | 23,807.3 | 14,202.0 |

**IRR= 15.945%**

No 2.2. CHERUKKANUR BIG TANK

Table 2.2 EIRR at 10% Increase of Cost — Unit million Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,732.1 | 0.0 | 0.0 | 1,732.1 | 0.0 | 0.0 | 0.0 | -1,732.1 |
| 2 | 1999 | 1,732.1 | 173.2 | 0.0 | 1,905.3 | 141.9 | 34.4 | 176.4 | -1,729.0 |
| 3 | 2000 | 0.0 | 173.2 | 0.0 | 173.2 | 283.8 | 68.9 | 352.7 | 179.5 |
| 4 | 2001 | 0.0 | 173.2 | 0.0 | 173.2 | 425.7 | 103.3 | 529.1 | 355.8 |
| 5 | 2002 | 0.0 | 173.2 | 0.0 | 173.2 | 567.6 | 137.8 | 705.4 | 532.2 |
| 6 | 2003 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 7 | 2004 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 8 | 2005 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 9 | 2006 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 10 | 2007 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 11 | 2008 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 12 | 2009 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 13 | 2010 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 14 | 2011 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 15 | 2012 | 0.0 | 173.2 | 1,039.3 | 1,212.5 | 709.6 | 172.2 | 881.8 | -330.7 |
| 16 | 2013 | 0.0 | 173.2 | 1,039.3 | 1,212.5 | 709.6 | 172.2 | 881.8 | -330.7 |
| 17 | 2014 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 18 | 2015 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 19 | 2016 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 20 | 2017 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 21 | 2018 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 22 | 2019 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 23 | 2020 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 24 | 2021 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 25 | 2022 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 26 | 2023 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 27 | 2024 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 28 | 2025 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 29 | 2026 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| 30 | 2027 | 0.0 | 173.2 | 0.0 | 173.2 | 709.6 | 172.2 | 881.8 | 708.5 |
| Total | | 3,464.2 | 5,023.1 | 2,078.5 | 10,565.8 | 19,158.1 | 4,649.2 | 23,807.3 | 13,241.5 |

**IRR= 14.07%**

No 2 3. CHERUKKANUR BIG TANK

Table 2.3 IRR at 10% Decrease of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,574.6 | 0.0 | 0.0 | 1,574.6 | 0.0 | 0.0 | 0.0 | -1,574.6 |
| 2 | 1999 | 1,574.6 | 157.5 | 0.0 | 1,732.1 | 113.5 | 27.6 | 141.1 | -1,591.0 |
| 3 | 2000 | 0.0 | 157.5 | 0.0 | 157.5 | 198.7 | 48.2 | 246.9 | 89.4 |
| 4 | 2001 | 0.0 | 157.5 | 0.0 | 157.5 | 298.0 | 72.3 | 370.3 | 212.9 |
| 5 | 2002 | 0.0 | 157.5 | 0.0 | 157.5 | 397.4 | 96.4 | 493.8 | 336.3 |
| 6 | 2003 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 7 | 2004 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 8 | 2005 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 9 | 2006 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 10 | 2007 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 11 | 2008 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 12 | 2009 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 13 | 2010 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 14 | 2011 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 15 | 2012 | 0.0 | 157.5 | 944.8 | 1,102.2 | 638.6 | 155.0 | 793.6 | -308.7 |
| 16 | 2013 | 0.0 | 157.5 | 944.8 | 1,102.2 | 638.6 | 155.0 | 793.6 | -308.7 |
| 17 | 2014 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 18 | 2015 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 19 | 2016 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 20 | 2017 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 21 | 2018 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 22 | 2019 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 23 | 2020 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 24 | 2021 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 25 | 2022 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 26 | 2023 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 27 | 2024 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 28 | 2025 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 29 | 2026 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| 30 | 2027 | 0.0 | 157.5 | 0.0 | 157.5 | 638.6 | 155.0 | 793.6 | 636.1 |
| Total | | 3,149.3 | 4,566.4 | 1,889.6 | 9,605.3 | 16,972.6 | 4,118.8 | 21,091.5 | 11,486.2 |

**IRR= 12.92%**

No 2.4. CHERUKKANUR BIG TANK

Table 2.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,574.6 | 0.0 | 0.0 | 1,574.6 | 0 | 0 | 0 | -1,575 |
| 2 | 1999 | 1,574.6 | 157.5 | 0.0 | 1,732.1 | 0 | 0 | 0 | -1,732 |
| 3 | 2000 | 0.0 | 157.5 | 0.0 | 157.5 | 0 | 0 | 0 | -157 |
| 4 | 2001 | 0.0 | 157.5 | 0.0 | 157.5 | 0 | 0 | 0 | -157 |
| 5 | 2002 | 0.0 | 157.5 | 0.0 | 157.5 | 141.9 | 34.4 | 176 | 19 |
| 6 | 2003 | 0.0 | 157.5 | 0.0 | 157.5 | 283.8 | 68.9 | 353 | 195 |
| 7 | 2004 | 0.0 | 157.5 | 0.0 | 157.5 | 425.7 | 103.3 | 529 | 372 |
| 8 | 2005 | 0.0 | 157.5 | 0.0 | 157.5 | 567.6 | 137.8 | 705 | 548 |
| 9 | 2006 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 10 | 2007 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 11 | 2008 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 12 | 2009 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 13 | 2010 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 14 | 2011 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 15 | 2012 | 0.0 | 157.5 | 944.8 | 1,102.2 | 709.6 | 172.2 | 882 | -220 |
| 16 | 2013 | 0.0 | 157.5 | 944.8 | 1,102.2 | 709.6 | 172.2 | 882 | -220 |
| 17 | 2014 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 18 | 2015 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 19 | 2016 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 20 | 2017 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 21 | 2018 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 22 | 2019 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 23 | 2020 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 24 | 2021 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 25 | 2022 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 26 | 2023 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 27 | 2024 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 28 | 2025 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 29 | 2026 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| 30 | 2027 | 0.0 | 157.5 | 0.0 | 157.5 | 709.6 | 172.2 | 882 | 724 |
| Total | | 3,149.3 | 4,566.4 | 1,889.6 | 9,605.3 | 17,029.4 | 4,132.6 | 21,162.0 | 11,556.8 |

**IRR= 10.03%**

## Table F.3.3 Economic Internal Rate of Return for Polambakkam Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 2,493 |
| 2. Item 1*0.96 | 2,393 |
| 3. Item 2*0.80 | 1,915 |
| 4. Super Vision Charge | 75 |
| 5. Preparation Cost | 35 |
| 6. Overhead Charge 25% | 732 |
| Total (Item 3 to 6) | 2,757 |

No.3.1. POLAMBAKKAM TANK

Table 3.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,378.3 | 0.0 | 0.0 | 1,378.3 | 0.0 | 0.0 | 0.0 | -1,378.3 |
| 2 | 1999 | 1,378.3 | 137.8 | 0.0 | 1,516.1 | 251.7 | 22.9 | 274.6 | -1,241.5 |
| 3 | 2000 | 0.0 | 137.8 | 0.0 | 137.8 | 503.4 | 45.8 | 549.2 | 411.4 |
| 4 | 2001 | 0.0 | 137.8 | 0.0 | 137.8 | 755.2 | 68.7 | 823.8 | 686.0 |
| 5 | 2002 | 0.0 | 137.8 | 0.0 | 137.8 | 1,006.9 | 91.6 | 1,098.4 | 960.6 |
| 6 | 2003 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 7 | 2004 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 8 | 2005 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 9 | 2006 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 10 | 2007 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 11 | 2008 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 12 | 2009 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 13 | 2010 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 14 | 2011 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 15 | 2012 | 0.0 | 137.8 | 827.0 | 964.8 | 1,258.6 | 114.4 | 1,373.0 | 408.2 |
| 16 | 2013 | 0.0 | 137.8 | 827.0 | 964.8 | 1,258.6 | 114.4 | 1,373.0 | 408.2 |
| 17 | 2014 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 18 | 2015 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 19 | 2016 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 20 | 2017 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 21 | 2018 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 22 | 2019 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 23 | 2020 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 24 | 2021 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 25 | 2022 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 26 | 2023 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 27 | 2024 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 28 | 2025 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 29 | 2026 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| 30 | 2027 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373.0 | 1,235.2 |
| Total | | 2,756.6 | 3,997.1 | 1,654.0 | 8,407.7 | 33,982.2 | 3,090.1 | 37,072.3 | 28,664.6 |

**IRR= 29.62%**

No.3.2. POLAMBAKKAM TANK

Table .3.2 EIRR at 10% Increase of Cost — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,516.1 | 0.0 | 0.0 | 1,516.1 | 0.0 | 0.0 | 0.0 | -1,516.1 |
| 2 | 1999 | 1,516.1 | 151.6 | 0.0 | 1,667.8 | 251.7 | 22.9 | 274.6 | -1,393.1 |
| 3 | 2000 | 0.0 | 151.6 | 0.0 | 151.6 | 503.4 | 45.8 | 549.2 | 397.6 |
| 4 | 2001 | 0.0 | 151.6 | 0.0 | 151.6 | 755.2 | 68.7 | 823.8 | 672.2 |
| 5 | 2002 | 0.0 | 151.6 | 0.0 | 151.6 | 1,006.9 | 91.6 | 1,098.4 | 946.8 |
| 6 | 2003 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 7 | 2004 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 8 | 2005 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 9 | 2006 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 10 | 2007 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 11 | 2008 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 12 | 2009 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 13 | 2010 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 14 | 2011 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 15 | 2012 | 0.0 | 151.6 | 909.7 | 1,061.3 | 1,258.6 | 114.4 | 1,373.0 | 311.7 |
| 16 | 2013 | 0.0 | 151.6 | 909.7 | 1,061.3 | 1,258.6 | 114.4 | 1,373.0 | 311.7 |
| 17 | 2014 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 18 | 2015 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 19 | 2016 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 20 | 2017 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 21 | 2018 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 22 | 2019 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 23 | 2020 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 24 | 2021 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 25 | 2022 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 26 | 2023 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 27 | 2024 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 28 | 2025 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 29 | 2026 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| 30 | 2027 | 0.0 | 151.6 | 0.0 | 151.6 | 1,258.6 | 114.4 | 1,373.0 | 1,221.4 |
| Total | | 3,032.3 | 4,396.8 | 1,819.4 | 9,248.5 | 33,982.2 | 3,090.1 | 37,072.3 | 27,823.8 |

**IRR= 27.02%**

No 3.3. POLAMBAKKAM TANK

Table 3.3 EIRR at 10% Decrease of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,378.3 | 0.0 | 0.0 | 1,378.3 | 0.0 | 0.0 | 0.0 | -1,378.3 |
| 2 | 1999 | 1,378.3 | 137.8 | 0.0 | 1,516.1 | 201.4 | 18.3 | 219.7 | -1,296.5 |
| 3 | 2000 | 0.0 | 137.8 | 0.0 | 137.8 | 352.4 | 32.0 | 384.5 | 246.6 |
| 4 | 2001 | 0.0 | 137.8 | 0.0 | 137.8 | 528.6 | 48.1 | 576.7 | 438.8 |
| 5 | 2002 | 0.0 | 137.8 | 0.0 | 137.8 | 704.8 | 64.1 | 768.9 | 631.1 |
| 6 | 2003 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 7 | 2004 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 8 | 2005 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 9 | 2006 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 10 | 2007 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 11 | 2008 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 12 | 2009 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 13 | 2010 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 14 | 2011 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 15 | 2012 | 0.0 | 137.8 | 827.0 | 964.8 | 1,132.7 | 103.0 | 1,235.7 | 270.9 |
| 16 | 2013 | 0.0 | 137.8 | 827.0 | 964.8 | 1,132.7 | 103.0 | 1,235.7 | 270.9 |
| 17 | 2014 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 18 | 2015 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 19 | 2016 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 20 | 2017 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 21 | 2018 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 22 | 2019 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 23 | 2020 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 24 | 2021 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 25 | 2022 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 26 | 2023 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 27 | 2024 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 28 | 2025 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 29 | 2026 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| 30 | 2027 | 0.0 | 137.8 | 0.0 | 137.8 | 1,132.7 | 103.0 | 1,235.7 | 1,097.9 |
| Total | | 2,756.6 | 3,997.1 | 1,654.0 | 8,407.7 | 30,105.7 | 2,737.6 | 32,843.3 | 24,435.6 |

**IRR= 24.63%**

No 3.4. POLAMBAKKAM TANK

Table 3.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,378.3 | 0.0 | 0.0 | 1,378.3 | 0 | 0 | 0 | -1,378 |
| 2 | 1999 | 1,378.3 | 137.8 | 0.0 | 1,516.1 | 0 | 0 | 0 | -1,516 |
| 3 | 2000 | 0.0 | 137.8 | 0.0 | 137.8 | 0 | 0 | 0 | -138 |
| 4 | 2001 | 0.0 | 137.8 | 0.0 | 137.8 | 0 | 0 | 0 | -138 |
| 5 | 2002 | 0.0 | 137.8 | 0.0 | 137.8 | 251.7 | 22.9 | 275 | 137 |
| 6 | 2003 | 0.0 | 137.8 | 0.0 | 137.8 | 503.4 | 45.8 | 549 | 411 |
| 7 | 2004 | 0.0 | 137.8 | 0.0 | 137.8 | 755.2 | 68.7 | 824 | 686 |
| 8 | 2005 | 0.0 | 137.8 | 0.0 | 137.8 | 1,006.9 | 91.6 | 1,098 | 961 |
| 9 | 2006 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 10 | 2007 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 11 | 2008 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 12 | 2009 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 13 | 2010 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 14 | 2011 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 15 | 2012 | 0.0 | 137.8 | 827.0 | 964.8 | 1,258.6 | 114.4 | 1,373 | 408 |
| 16 | 2013 | 0.0 | 137.8 | 827.0 | 964.8 | 1,258.6 | 114.4 | 1,373 | 408 |
| 17 | 2014 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 18 | 2015 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 19 | 2016 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 20 | 2017 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 21 | 2018 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 22 | 2019 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 23 | 2020 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 24 | 2021 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 25 | 2022 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 26 | 2023 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 27 | 2024 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 28 | 2025 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 29 | 2026 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| 30 | 2027 | 0.0 | 137.8 | 0.0 | 137.8 | 1,258.6 | 114.4 | 1,373 | 1,235 |
| Total | | 2,756.6 | 3,997.1 | 1,654.0 | 8,407.7 | 30,206.4 | 2,746.8 | 32,953.2 | 24,545.5 |

**IRR= 17.62%**

# Table F.3.4 Economic Internal Rate of Return for Enadur Big Tank Area

No 4 1. ENADUR BIG TANK

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 11,449 |
| 2. Item 1*0.96 | 10,991 |
| 3. Item 2*0.80 | 8,793 |
| 4. Super Vision Charge | 343 |
| 5. Preparation Cost | 165 |
| 6. Overhead Charge 25% | 3,361 |
| Total (Item 3 to 6) | 12,662 |

Table 4.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,220.6 | 0.0 | 0.0 | 4,220.6 | 0.0 | 0.0 | 0.0 | -4,220.6 |
| 2 | 1999 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 477.0 | 73.9 | 550.9 | -4,302.8 |
| 3 | 2000 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 953.9 | 147.9 | 1,101.8 | -3,751.9 |
| 4 | 2001 | 0.0 | 633.1 | 0.0 | 633.1 | 1,430.9 | 221.8 | 1,652.7 | 1,019.6 |
| 5 | 2002 | 0.0 | 633.1 | 0.0 | 633.1 | 1,907.8 | 295.7 | 2,203.5 | 1,570.4 |
| 6 | 2003 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 7 | 2004 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 8 | 2005 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 9 | 2006 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 10 | 2007 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 11 | 2008 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 12 | 2009 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 13 | 2010 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 14 | 2011 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 15 | 2012 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,384.8 | 369.6 | 2,754.4 | -1,677.2 |
| 16 | 2013 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,384.8 | 369.6 | 2,754.4 | -1,677.2 |
| 17 | 2014 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 18 | 2015 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 19 | 2016 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 20 | 2017 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 21 | 2018 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 22 | 2019 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 23 | 2020 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 24 | 2021 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 25 | 2022 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 26 | 2023 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 27 | 2024 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 28 | 2025 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 29 | 2026 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| 30 | 2027 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754.4 | 2,121.3 |
| Total | | 12,661.8 | 18,359.7 | 7,597.1 | 38,618.6 | 64,389.2 | 9,980.3 | 74,369.4 | 35,750.8 |

**IRR= 11.75%**

No 4 2 ENADUR BIG TANK

Table 4.2 EIRR at 10% Increase of Cost — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,642.7 | 0.0 | 0.0 | 4,642.7 | 0.0 | 0.0 | 0.0 | -4,642.7 |
| 2 | 1999 | 4,642.7 | 696.4 | 0.0 | 5,339.1 | 477.0 | 73.9 | 550.9 | -4,788.2 |
| 3 | 2000 | 4,642.7 | 696.4 | 0.0 | 5,339.1 | 953.9 | 147.9 | 1,101.8 | -4,237.3 |
| 4 | 2001 | 0.0 | 696.4 | 0.0 | 696.4 | 1,430.9 | 221.8 | 1,652.7 | 956.3 |
| 5 | 2002 | 0.0 | 696.4 | 0.0 | 696.4 | 1,907.8 | 295.7 | 2,203.5 | 1,507.1 |
| 6 | 2003 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 7 | 2004 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 8 | 2005 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 9 | 2006 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 10 | 2007 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 11 | 2008 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 12 | 2009 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 13 | 2010 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 14 | 2011 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 15 | 2012 | 0.0 | 696.4 | 4,178.4 | 4,874.8 | 2,384.8 | 369.6 | 2,754.4 | -2,120.4 |
| 16 | 2013 | 0.0 | 696.4 | 4,178.4 | 4,874.8 | 2,384.8 | 369.6 | 2,754.4 | -2,120.4 |
| 17 | 2014 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 18 | 2015 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 19 | 2016 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 20 | 2017 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 21 | 2018 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 22 | 2019 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 23 | 2020 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 24 | 2021 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 25 | 2022 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 26 | 2023 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 27 | 2024 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 28 | 2025 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 29 | 2026 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| 30 | 2027 | 0.0 | 696.4 | 0.0 | 696.4 | 2,384.8 | 369.6 | 2,754.4 | 2,058.0 |
| Total | | 13,928.0 | 20,195.6 | 8,356.8 | 42,480.4 | 64,389.2 | 9,980.3 | 74,369.4 | 31,889.0 |

**IRR= 9.92%**

No.4.3. ENADUR BIG TANK

Table .4.3 EIRR at 10% Decrease of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,220.6 | 0.0 | 0.0 | 4,220.6 | 0.0 | 0.0 | 0.0 | -4,220.6 |
| 2 | 1999 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 381.6 | 59.1 | 440.7 | -4,413.0 |
| 3 | 2000 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 667.7 | 103.5 | 771.2 | -4,082.5 |
| 4 | 2001 | 0.0 | 633.1 | 0.0 | 633.1 | 1,001.6 | 155.2 | 1,156.9 | 523.8 |
| 5 | 2002 | 0.0 | 633.1 | 0.0 | 633.1 | 1,335.5 | 207.0 | 1,542.5 | 909.4 |
| 6 | 2003 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 7 | 2004 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 8 | 2005 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 9 | 2006 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 10 | 2007 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 11 | 2008 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 12 | 2009 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 13 | 2010 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 14 | 2011 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 15 | 2012 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,146.3 | 332.7 | 2,479.0 | -1,952.7 |
| 16 | 2013 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,146.3 | 332.7 | 2,479.0 | -1,952.7 |
| 17 | 2014 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 18 | 2015 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 19 | 2016 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 20 | 2017 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 21 | 2018 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 22 | 2019 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 23 | 2020 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 24 | 2021 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 25 | 2022 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 26 | 2023 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 27 | 2024 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 28 | 2025 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 29 | 2026 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| 30 | 2027 | 0.0 | 633.1 | 0.0 | 633.1 | 2,146.3 | 332.7 | 2,479.0 | 1,845.9 |
| Total | | 12,661.8 | 18,359.7 | 7,597.1 | 38,618.6 | 57,044.0 | 8,841.8 | | 27,267.2 |

**IRR= 9.01%**

No.4.4. ENADUR BIG TANK

Table.4.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,220.6 | 0.0 | 0.0 | 4,220.6 | 0 | 0 | 0 | -4,221 |
| 2 | 1999 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 0 | 0 | 0 | -4,854 |
| 3 | 2000 | 4,220.6 | 633.1 | 0.0 | 4,853.7 | 0 | 0 | 0 | -4,854 |
| 4 | 2001 | 0.0 | 633.1 | 0.0 | 633.1 | 0 | 0 | 0 | -633 |
| 5 | 2002 | 0.0 | 633.1 | 0.0 | 633.1 | 477.0 | 73.9 | 551 | -82 |
| 6 | 2003 | 0.0 | 633.1 | 0.0 | 633.1 | 953.9 | 147.9 | 1,102 | 469 |
| 7 | 2004 | 0.0 | 633.1 | 0.0 | 633.1 | 1,430.9 | 221.8 | 1,653 | 1,020 |
| 8 | 2005 | 0.0 | 633.1 | 0.0 | 633.1 | 1,907.8 | 295.7 | 2,204 | 1,570 |
| 9 | 2006 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 10 | 2007 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 11 | 2008 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 12 | 2009 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 13 | 2010 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 14 | 2011 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 15 | 2012 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,384.8 | 369.6 | 2,754 | -1,677 |
| 16 | 2013 | 0.0 | 633.1 | 3,798.5 | 4,431.6 | 2,384.8 | 369.6 | 2,754 | -1,677 |
| 17 | 2014 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 18 | 2015 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 19 | 2016 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 20 | 2017 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 21 | 2018 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 22 | 2019 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 23 | 2020 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 24 | 2021 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 25 | 2022 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 26 | 2023 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 27 | 2024 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 28 | 2025 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 29 | 2026 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| 30 | 2027 | 0.0 | 633.1 | 0.0 | 633.1 | 2,384.8 | 369.6 | 2,754 | 2,121 |
| Total | | 12,661.8 | 18,359.7 | 7,597.1 | 38,618.6 | 57,234.8 | 8,871.3 | 66,106.2 | 27,487.6 |

**IRR= 7.10%**

# Table F.3.5 Economic Internal Rate of Return for Vadakkupattu Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 12,023 |
| 2. Item 1*0.96 | 11,542 |
| 3. Item 2*0.80 | 9,234 |
| 4. Super Vision Charge | 361 |
| 5. Preparation Cost | 175 |
| 6. Overhead Charge 25% | 3,531 |
| Total (Item 3 to 6) | 13,301 |

No 5.1. VADAKKUPATTU TANK

Table 5.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,433.6 | 0.0 | 0.0 | 4,433.6 | 0.0 | 0.0 | 0.0 | -4,433.6 |
| 2 | 1999 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 347.6 | 111.6 | 459.2 | -4,639.4 |
| 3 | 2000 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 695.2 | 223.2 | 918.4 | -4,180.2 |
| 4 | 2001 | 0.0 | 665.0 | 0.0 | 665.0 | 1,042.9 | 334.8 | 1,377.6 | 712.6 |
| 5 | 2002 | 0.0 | 665.0 | 0.0 | 665.0 | 1,390.5 | 446.4 | 1,836.8 | 1,171.8 |
| 6 | 2003 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 7 | 2004 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 8 | 2005 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 9 | 2006 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 10 | 2007 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 11 | 2008 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 12 | 2009 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 13 | 2010 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 14 | 2011 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 15 | 2012 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,738.1 | 557.9 | 2,296.0 | -2,359.2 |
| 16 | 2013 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,738.1 | 557.9 | 2,296.0 | -2,359.2 |
| 17 | 2014 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 18 | 2015 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 19 | 2016 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 20 | 2017 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 21 | 2018 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 22 | 2019 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 23 | 2020 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 24 | 2021 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 25 | 2022 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 26 | 2023 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 27 | 2024 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 28 | 2025 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 29 | 2026 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| 30 | 2027 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296.0 | 1,631.0 |
| Total | | 13,300.7 | 19,286.0 | 7,980.4 | 40,567.0 | 46,928.7 | 15,064.5 | 61,993.2 | 21,426.2 |

**IRR= 7.42%**

No 5.2 VADAKKUPATTU TANK

Table 5.2 EIRR at 10% Increase of Cost — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,876.9 | 0.0 | 0.0 | 4,876.9 | 0.0 | 0.0 | 0.0 | -4,876.9 |
| 2 | 1999 | 4,876.9 | 731.5 | 0.0 | 5,608.4 | 347.6 | 111.6 | 459.2 | -5,149.2 |
| 3 | 2000 | 4,876.9 | 731.5 | 0.0 | 5,608.4 | 695.2 | 223.2 | 918.4 | -4,690.0 |
| 4 | 2001 | 0.0 | 731.5 | 0.0 | 731.5 | 1,042.9 | 334.8 | 1,377.6 | 646.1 |
| 5 | 2002 | 0.0 | 731.5 | 0.0 | 731.5 | 1,390.5 | 446.4 | 1,836.8 | 1,105.3 |
| 6 | 2003 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 7 | 2004 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 8 | 2005 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 9 | 2006 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 10 | 2007 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 11 | 2008 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 12 | 2009 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 13 | 2010 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 14 | 2011 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 15 | 2012 | 0.0 | 731.5 | 4,389.2 | 5,120.8 | 1,738.1 | 557.9 | 2,296.0 | -2,824.7 |
| 16 | 2013 | 0.0 | 731.5 | 4,389.2 | 5,120.8 | 1,738.1 | 557.9 | 2,296.0 | -2,824.7 |
| 17 | 2014 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 18 | 2015 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 19 | 2016 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 20 | 2017 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 21 | 2018 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 22 | 2019 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 23 | 2020 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 24 | 2021 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 25 | 2022 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 26 | 2023 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 27 | 2024 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 28 | 2025 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 29 | 2026 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| 30 | 2027 | 0.0 | 731.5 | 0.0 | 731.5 | 1,738.1 | 557.9 | 2,296.0 | 1,564.5 |
| Total | | 14,630.7 | 21,214.6 | 8,778.4 | 44,623.7 | 46,928.7 | 15,064.5 | 61,993.2 | 17,369.5 |

**IRR= 5.73%**

No.5 3. VADAKKUPATTU TANK

Table 5.3 EIRR at 10% Decrease of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,433.6 | 0.0 | 0.0 | 4,433.6 | 0.0 | 0.0 | 0.0 | -4,433.6 |
| 2 | 1999 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 278.1 | 89.3 | 367.4 | -4,731.2 |
| 3 | 2000 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 486.7 | 156.2 | 642.9 | -4,455.7 |
| 4 | 2001 | 0.0 | 665.0 | 0.0 | 665.0 | 730.0 | 234.3 | 964.3 | 299.3 |
| 5 | 2002 | 0.0 | 665.0 | 0.0 | 665.0 | 973.3 | 312.4 | 1,285.8 | 620.8 |
| 6 | 2003 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 7 | 2004 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 8 | 2005 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 9 | 2006 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 10 | 2007 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 11 | 2008 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 12 | 2009 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 13 | 2010 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 14 | 2011 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 15 | 2012 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,564.3 | 502.2 | 2,066.4 | -2,588.8 |
| 16 | 2013 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,564.3 | 502.2 | 2,066.4 | -2,588.8 |
| 17 | 2014 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 18 | 2015 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 19 | 2016 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 20 | 2017 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 21 | 2018 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 22 | 2019 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 23 | 2020 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 24 | 2021 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 25 | 2022 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 26 | 2023 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 27 | 2024 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 28 | 2025 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 29 | 2026 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| 30 | 2027 | 0.0 | 665.0 | 0.0 | 665.0 | 1,564.3 | 502.2 | 2,066.4 | 1,401.4 |
| Total | | 13,300.7 | 19,286.0 | 7,980.4 | 40,567.0 | 41,575.4 | 13,346.0 | 72,657.0 | 14,354.4 |

**IRR= 5.06%**

No.5.4. VADAKKUPATTU TANK

Table 5.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 4,433.6 | 0.0 | 0.0 | 4,433.6 | 0 | 0 | 0 | -4,434 |
| 2 | 1999 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 0 | 0 | 0 | -5,099 |
| 3 | 2000 | 4,433.6 | 665.0 | 0.0 | 5,098.6 | 0 | 0 | 0 | -5,099 |
| 4 | 2001 | 0.0 | 665.0 | 0.0 | 665.0 | 0 | 0 | 0 | -665 |
| 5 | 2002 | 0.0 | 665.0 | 0.0 | 665.0 | 347.6 | 111.6 | 459 | -206 |
| 6 | 2003 | 0.0 | 665.0 | 0.0 | 665.0 | 695.2 | 223.2 | 918 | 253 |
| 7 | 2004 | 0.0 | 665.0 | 0.0 | 665.0 | 1,042.9 | 334.8 | 1,378 | 713 |
| 8 | 2005 | 0.0 | 665.0 | 0.0 | 665.0 | 1,390.5 | 446.4 | 1,837 | 1,172 |
| 9 | 2006 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 10 | 2007 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 11 | 2008 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 12 | 2009 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 13 | 2010 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 14 | 2011 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 15 | 2012 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,738.1 | 557.9 | 2,296 | -2,359 |
| 16 | 2013 | 0.0 | 665.0 | 3,990.2 | 4,655.2 | 1,738.1 | 557.9 | 2,296 | -2,359 |
| 17 | 2014 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 18 | 2015 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 19 | 2016 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 20 | 2017 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 21 | 2018 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 22 | 2019 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 23 | 2020 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 24 | 2021 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 25 | 2022 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 26 | 2023 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 27 | 2024 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 28 | 2025 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 29 | 2026 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| 30 | 2027 | 0.0 | 665.0 | 0.0 | 665.0 | 1,738.1 | 557.9 | 2,296 | 1,631 |
| Total | | 13,300.7 | 19,286.0 | 7,980.4 | 40,567.0 | 41,714.4 | 13,390.7 | 55,105.1 | 14,538.1 |

**IRR= 4.11%**

# Table F.3.6 Economic Internal Rate of Return for Siruvalai Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 1,857 |
| 2. Item 1*0.96 | 1,783 |
| 3. Item 2*0.80 | 1,426 |
| 4. Super Vision Charge | 56 |
| 5. Preparation Cost | 26 |
| 6. Overhead Charge 25% | 545 |
| Total (Item 3 to 6) | 2,053 |

NO.6.1 SIRUVALAI Table 6.1 EIRR at Basic Conditions Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM 5% | Replacement 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,026.6 | 0.0 | 0.0 | 1,026.6 | 0.0 | 0.0 | 0.0 | -1,026.6 |
| 2 | 1999 | 1,026.6 | 102.7 | 0.0 | 1,129.2 | 67.8 | 10.0 | 77.8 | -1,051.4 |
| 3 | 2000 | 0.0 | 102.7 | 0.0 | 102.7 | 135.6 | 20.1 | 155.7 | 53.0 |
| 4 | 2001 | 0.0 | 102.7 | 0.0 | 102.7 | 203.4 | 30.1 | 233.5 | 130.8 |
| 5 | 2002 | 0.0 | 102.7 | 0.0 | 102.7 | 271.2 | 40.1 | 311.3 | 208.6 |
| 6 | 2003 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 7 | 2004 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 8 | 2005 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 9 | 2006 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 10 | 2007 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 11 | 2008 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 12 | 2009 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 13 | 2010 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 14 | 2011 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 15 | 2012 | 0.0 | 102.7 | 616.0 | 718.6 | 339.0 | 50.1 | 389.1 | -329.5 |
| 16 | 2013 | 0.0 | 102.7 | 616.0 | 718.6 | 339.0 | 50.1 | 389.1 | -329.5 |
| 17 | 2014 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 18 | 2015 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 19 | 2016 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 20 | 2017 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 21 | 2018 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 22 | 2019 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 23 | 2020 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 24 | 2021 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 25 | 2022 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 26 | 2023 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 27 | 2024 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 28 | 2025 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 29 | 2026 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| 30 | 2027 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389.1 | 286.5 |
| Total | | 2,053.2 | 2,977.1 | 1,231.9 | 6,262.2 | 9,152.8 | 1,353.6 | 10,506.4 | 4,244.2 |

**IRR= 8.70%**

No.6.2 SIRUVALAI TANK

Table 6.2 EIRR at 10% Increase of Cost Unit : 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,129.2 | 0.0 | 0.0 | 1,129.2 | 0.0 | 0.0 | 0.0 | -1,129.2 |
| 2 | 1999 | 1,129.2 | 112.9 | 0.0 | 1,242.2 | 67.8 | 10.0 | 0.0 | -1,242.2 |
| 3 | 2000 | 0.0 | 112.9 | 0.0 | 112.9 | 135.6 | 20.1 | 0.0 | -112.9 |
| 4 | 2001 | 0.0 | 112.9 | 0.0 | 112.9 | 203.4 | 30.1 | 77.8 | -35.1 |
| 5 | 2002 | 0.0 | 112.9 | 0.0 | 112.9 | 271.2 | 40.1 | 155.7 | 42.7 |
| 6 | 2003 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 233.5 | 120.6 |
| 7 | 2004 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 311.3 | 198.4 |
| 8 | 2005 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 9 | 2006 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 10 | 2007 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 11 | 2008 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 12 | 2009 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 13 | 2010 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 14 | 2011 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 15 | 2012 | 0.0 | 112.9 | 677.5 | 790.5 | 339.0 | 50.1 | 389.1 | -401.3 |
| 16 | 2013 | 0.0 | 112.9 | 677.5 | 790.5 | 339.0 | 50.1 | 389.1 | -401.3 |
| 17 | 2014 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 18 | 2015 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 19 | 2016 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 20 | 2017 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 21 | 2018 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 22 | 2019 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 23 | 2020 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 24 | 2021 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 25 | 2022 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 26 | 2023 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 27 | 2024 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 28 | 2025 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 29 | 2026 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| 30 | 2027 | 0.0 | 112.9 | 0.0 | 112.9 | 339.0 | 50.1 | 389.1 | 276.2 |
| Total | | 2,258.5 | 3,274.8 | 1,355.1 | 6,888.4 | 9,152.8 | 1,353.6 | 9,728.2 | 2,839.7 |

**IRR= 4.83%**

No.6.3. SIRUVALAI TANK

Table 6.3 EIRR at 10% Decrease of Benefit

Unit : 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,026.6 | 0.0 | 0.0 | 1,026.6 | 0.0 | 0.0 | 0.0 | -1,026.6 |
| 2 | 1999 | 1,026.6 | 102.7 | 0.0 | 1,129.2 | 54.2 | 8.0 | 62.3 | -1,067.0 |
| 3 | 2000 | 0.0 | 102.7 | 0.0 | 102.7 | 94.9 | 14.1 | 109.0 | 6.3 |
| 4 | 2001 | 0.0 | 102.7 | 0.0 | 102.7 | 142.4 | 21.1 | 163.5 | 60.8 |
| 5 | 2002 | 0.0 | 102.7 | 0.0 | 102.7 | 189.8 | 28.1 | 217.9 | 115.3 |
| 6 | 2003 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 7 | 2004 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 8 | 2005 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 9 | 2006 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 10 | 2007 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 11 | 2008 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 12 | 2009 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 13 | 2010 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 14 | 2011 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 15 | 2012 | 0.0 | 102.7 | 616.0 | 718.6 | 305.1 | 45.1 | 350.2 | -368.4 |
| 16 | 2013 | 0.0 | 102.7 | 616.0 | 718.6 | 305.1 | 45.1 | 350.2 | -368.4 |
| 17 | 2014 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 18 | 2015 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 19 | 2016 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 20 | 2017 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 21 | 2018 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 22 | 2019 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 23 | 2020 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 24 | 2021 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 25 | 2022 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 26 | 2023 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 27 | 2024 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 28 | 2025 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 29 | 2026 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| 30 | 2027 | 0.0 | 102.7 | 0.0 | 102.7 | 305.1 | 45.1 | 350.2 | 247.6 |
| Total | | 2,053.2 | 2,977.1 | 1,231.9 | 6,262.2 | 8,108.7 | 1,199.3 | 9,308.0 | 3,045.8 |

**IRR= 6.37%**

No.6.4. SIRUVALAI TANK

Table 6.4 EIRR at 3 year delay of Benefit

Unit : 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Cash Flow |
| 1 | 1998 | 1,026.6 | 0.0 | 0.0 | 2,258.5 | 0 | 0 | 0 | -2,258 |
| 2 | 1999 | 1,026.6 | 102.7 | 0.0 | 1,129.2 | 0 | 0 | 0 | -1,129 |
| 3 | 2000 | 0.0 | 102.7 | 0.0 | 102.7 | 0 | 0 | 0 | -103 |
| 4 | 2001 | 0.0 | 102.7 | 0.0 | 102.7 | 0 | 0 | 0 | -193 |
| 5 | 2002 | 0.0 | 102.7 | 0.0 | 102.7 | 67.8 | 10.0 | 78 | -25 |
| 6 | 2003 | 0.0 | 102.7 | 0.0 | 102.7 | 135.6 | 20.1 | 156 | 53 |
| 7 | 2004 | 0.0 | 102.7 | 0.0 | 102.7 | 203.4 | 30.1 | 233 | 131 |
| 8 | 2005 | 0.0 | 102.7 | 0.0 | 102.7 | 271.2 | 40.1 | 311 | 209 |
| 9 | 2006 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 10 | 2007 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 11 | 2008 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 12 | 2009 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 13 | 2010 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 14 | 2011 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 15 | 2012 | 0.0 | 102.7 | 616.0 | 718.6 | 339.0 | 50.1 | 389 | -329 |
| 16 | 2013 | 0.0 | 102.7 | 616.0 | 718.6 | 339.0 | 50.1 | 389 | -329 |
| 17 | 2014 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 18 | 2015 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 19 | 2016 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 20 | 2017 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 21 | 2018 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 22 | 2019 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 23 | 2020 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 24 | 2021 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 25 | 2022 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 26 | 2023 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 27 | 2024 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 28 | 2025 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 29 | 2026 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| 30 | 2027 | 0.0 | 102.7 | 0.0 | 102.7 | 339.0 | 50.1 | 389 | 286 |
| Total | | 2,053.2 | 2,977.1 | 1,231.9 | 7,494.1 | 8,135.8 | 1,203.2 | 9,339.0 | 1,844.9 |

**IRR= 2.39%**

# Table F.3.7 Economic Internal Rate of Return for A. Ramalingapuram Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 3,759 |
| 2. Item 1*0.96 | 3,609 |
| 3. Item 2*0.80 | 2,887 |
| 4. Super Vision Charge | 113 |
| 5. Preparation Cost | 55 |
| 6. Overhead Charge 25% | 1,104 |
| Total (Item 3 to 6) | 4,159 |

No.7.1. ARAMALINGAPURAM TANK

Table 7.1 EIRR at Basic Conditions Unit:000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 2,079.5 | 0.0 | 0.0 | 2,079.5 | 0.0 | 0.0 | 0.0 | -2,079.5 |
| 2 | 1999 | 2,079.5 | 207.9 | 0.0 | 2,287.4 | 200.9 | 17.8 | 218.7 | -2,068.7 |
| 3 | 2000 | 0.0 | 207.9 | 0.0 | 207.9 | 401.9 | 35.5 | 437.4 | 229.4 |
| 4 | 2001 | 0.0 | 207.9 | 0.0 | 207.9 | 602.8 | 53.3 | 656.1 | 448.1 |
| 5 | 2002 | 0.0 | 207.9 | 0.0 | 207.9 | 803.7 | 71.0 | 874.7 | 666.8 |
| 6 | 2003 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 7 | 2004 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 8 | 2005 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 9 | 2006 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 10 | 2007 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 11 | 2008 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 12 | 2009 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 13 | 2010 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 14 | 2011 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 15 | 2012 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 1,004.7 | 88.8 | 1,093.4 | -362.2 |
| 16 | 2013 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 1,004.7 | 88.8 | 1,093.4 | -362.2 |
| 17 | 2014 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 18 | 2015 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 19 | 2016 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 20 | 2017 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 21 | 2018 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 22 | 2019 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 23 | 2020 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 24 | 2021 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 25 | 2022 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 26 | 2023 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 27 | 2024 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 28 | 2025 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 29 | 2026 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| 30 | 2027 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093.4 | 885.5 |
| Total | | 4,158.9 | 6,030.4 | 2,495.3 | 12,684.7 | 27,125.8 | 2,396.5 | 29,522.3 | 16,837.7 |

**IRR= 14.69%**

No.7.2. ARAMALINGAPURAM TANK

Table 7.2 EIRR at 10% Increase of Cost Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 2,287.4 | 0.0 | 0.0 | 2,287.4 | 0.0 | 0.0 | 0.0 | -2,287.4 |
| 2 | 1999 | 2,287.4 | 228.7 | 0.0 | 2,516.1 | 200.9 | 17.8 | 218.7 | -2,297.5 |
| 3 | 2000 | 0.0 | 228.7 | 0.0 | 228.7 | 401.9 | 35.5 | 437.4 | 208.6 |
| 4 | 2001 | 0.0 | 228.7 | 0.0 | 228.7 | 602.8 | 53.3 | 656.1 | 427.3 |
| 5 | 2002 | 0.0 | 228.7 | 0.0 | 228.7 | 803.7 | 71.0 | 874.7 | 646.0 |
| 6 | 2003 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 7 | 2004 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 8 | 2005 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 9 | 2006 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 10 | 2007 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 11 | 2008 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 12 | 2009 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 13 | 2010 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 14 | 2011 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 15 | 2012 | 0.0 | 228.7 | 1,372.4 | 1,601.2 | 1,004.7 | 88.8 | 1,093.4 | -507.8 |
| 16 | 2013 | 0.0 | 228.7 | 1,372.4 | 1,601.2 | 1,004.7 | 88.8 | 1,093.4 | -507.8 |
| 17 | 2014 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 18 | 2015 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 19 | 2016 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 20 | 2017 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 21 | 2018 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 22 | 2019 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 23 | 2020 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 24 | 2021 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 25 | 2022 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 26 | 2023 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 27 | 2024 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 28 | 2025 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 29 | 2026 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| 30 | 2027 | 0.0 | 228.7 | 0.0 | 228.7 | 1,004.7 | 88.8 | 1,093.4 | 864.7 |
| Total | | 4,574.8 | 6,633.5 | 2,744.9 | 13,953.1 | 27,125.8 | 2,396.5 | 29,522.3 | 15,569.2 |

**IRR= 12.87%**

No.7.3. ARAMALINGAPURAM TANK

Table 7.3 EIRR at 10% Decrease of Benefit — Unit : 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 2,079.5 | 0.0 | 0.0 | 2,079.5 | 0.0 | 0.0 | 251.3 | -1,828.2 |
| 2 | 1999 | 2,079.5 | 207.9 | 0.0 | 2,287.4 | 160.7 | 14.2 | 174.9 | -2,112.5 |
| 3 | 2000 | 0.0 | 207.9 | 0.0 | 207.9 | 281.3 | 24.9 | 306.2 | 98.2 |
| 4 | 2001 | 0.0 | 207.9 | 0.0 | 207.9 | 422.0 | 37.3 | 459.2 | 251.3 |
| 5 | 2002 | 0.0 | 207.9 | 0.0 | 207.9 | 562.6 | 49.7 | 612.3 | 404.4 |
| 6 | 2003 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 7 | 2004 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 8 | 2005 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 9 | 2006 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 10 | 2007 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 11 | 2008 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 12 | 2009 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 13 | 2010 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 14 | 2011 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 15 | 2012 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 904.2 | 79.9 | 984.1 | -471.5 |
| 16 | 2013 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 904.2 | 79.9 | 984.1 | -471.5 |
| 17 | 2014 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 18 | 2015 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 19 | 2016 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 20 | 2017 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 21 | 2018 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 22 | 2019 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 23 | 2020 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 24 | 2021 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 25 | 2022 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 26 | 2023 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 27 | 2024 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 28 | 2025 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 29 | 2026 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| 30 | 2027 | 0.0 | 207.9 | 0.0 | 207.9 | 904.2 | 79.9 | 984.1 | 776.1 |
| Total | | 4,158.9 | 6,030.4 | 2,495.3 | 12,684.7 | 24,031.5 | 1,198.3 | | 13,721.2 |

**IRR= 12.56%**

No.7.4. ARAMALINGAPURAM TANK

Table 7.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 2,079.5 | 0.0 | 0.0 | 2,079.5 | 0 | 0 | 0 | -2,079 |
| 2 | 1999 | 2,079.5 | 207.9 | 0.0 | 2,287.4 | 0 | 0 | 0 | -2,287 |
| 3 | 2000 | 0.0 | 207.9 | 0.0 | 207.9 | 0 | 0 | 0 | -208 |
| 4 | 2001 | 0.0 | 207.9 | 0.0 | 207.9 | 0 | 0 | 0 | -208 |
| 5 | 2002 | 0.0 | 207.9 | 0.0 | 207.9 | 200.9 | 17.8 | 219 | 11 |
| 6 | 2003 | 0.0 | 207.9 | 0.0 | 207.9 | 401.9 | 35.5 | 437 | 229 |
| 7 | 2004 | 0.0 | 207.9 | 0.0 | 207.9 | 602.8 | 53.3 | 656 | 448 |
| 8 | 2005 | 0.0 | 207.9 | 0.0 | 207.9 | 803.7 | 71.0 | 875 | 667 |
| 9 | 2006 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 10 | 2007 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 11 | 2008 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 12 | 2009 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 13 | 2010 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 14 | 2011 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 15 | 2012 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 1,004.7 | 88.8 | 1,093 | -362 |
| 16 | 2013 | 0.0 | 207.9 | 1,247.7 | 1,455.6 | 1,004.7 | 88.8 | 1,093 | -362 |
| 17 | 2014 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 18 | 2015 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 19 | 2016 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 20 | 2017 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 21 | 2018 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 22 | 2019 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 23 | 2020 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 24 | 2021 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 25 | 2022 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 26 | 2023 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 27 | 2024 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 28 | 2025 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 29 | 2026 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| 30 | 2027 | 0.0 | 207.9 | 0.0 | 207.9 | 1,004.7 | 88.8 | 1,093 | 885 |
| Total | | 4,158.9 | 6,030.4 | 2,495.3 | 12,684.7 | 24,111.8 | 2,130.2 | 26,242.1 | 13,557.4 |

**IRR= 9.24%**

# Table F.3.8 Economic Internal Rate of Return for Pandikanmoi Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 1,797 |
| 2. Item 1*0.96 | 1,725 |
| 3. Item 2*0.80 | 1,380 |
| 4. Super Vision Charge | 54 |
| 5. Preparation Cost | 25 |
| 6. Overhead Charge 25% | 528 |
| Total (Item 3 to 6) | 1,987 |

No 8 1. PANDIKANMOI TANK

Table 8.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 993.5 | 0.0 | 0.0 | 993.5 | 0.0 | 0.0 | 0.0 | -993.5 |
| 2 | 1999 | 993.5 | 99.4 | 0.0 | 1,092.9 | 86.3 | 6.0 | 92.4 | -1,000.6 |
| 3 | 2000 | 0.0 | 99.4 | 0.0 | 99.4 | 172.6 | 12.1 | 184.7 | 85.3 |
| 4 | 2001 | 0.0 | 99.4 | 0.0 | 99.4 | 258.9 | 18.1 | 277.1 | 177.7 |
| 5 | 2002 | 0.0 | 99.4 | 0.0 | 99.4 | 345.2 | 24.2 | 369.4 | 270.0 |
| 6 | 2003 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 7 | 2004 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 8 | 2005 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 9 | 2006 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 10 | 2007 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 11 | 2008 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 12 | 2009 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 13 | 2010 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 14 | 2011 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 15 | 2012 | 0.0 | 99.4 | 596.1 | 695.5 | 431.5 | 30.2 | 461.8 | -233.7 |
| 16 | 2013 | 0.0 | 99.4 | 596.1 | 695.5 | 431.5 | 30.2 | 461.8 | -233.7 |
| 17 | 2014 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 18 | 2015 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 19 | 2016 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 20 | 2017 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 21 | 2018 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 22 | 2019 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 23 | 2020 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 24 | 2021 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 25 | 2022 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 26 | 2023 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 27 | 2024 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 28 | 2025 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 29 | 2026 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| 30 | 2027 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 461.8 | 362.4 |
| Total | | 1,987.1 | 2,881.3 | 1,192.3 | 6,060.6 | 11,651.4 | 816.0 | 12,467.4 | 6,406.8 |

**IRR= 12.34%**

No 8 2. PANDIKANMOI TANK

Table 8.2 EIRR at 10% Increase of Cost — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,092.9 | 0.0 | 0.0 | 1,092.9 | 0.0 | 0.0 | 0.0 | -1,092.9 |
| 2 | 1999 | 1,092.9 | 109.3 | 0.0 | 1,202.2 | 86.3 | 6.0 | 92.4 | -1,109.8 |
| 3 | 2000 | 0.0 | 109.3 | 0.0 | 109.3 | 172.6 | 12.1 | 184.7 | 75.4 |
| 4 | 2001 | 0.0 | 109.3 | 0.0 | 109.3 | 258.9 | 18.1 | 277.1 | 167.8 |
| 5 | 2002 | 0.0 | 109.3 | 0.0 | 109.3 | 345.2 | 24.2 | 369.4 | 260.1 |
| 6 | 2003 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 7 | 2004 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 8 | 2005 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 9 | 2006 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 10 | 2007 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 11 | 2008 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 12 | 2009 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 13 | 2010 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 14 | 2011 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 15 | 2012 | 0.0 | 109.3 | 655.7 | 765.0 | 431.5 | 30.2 | 461.8 | -303.3 |
| 16 | 2013 | 0.0 | 109.3 | 655.7 | 765.0 | 431.5 | 30.2 | 461.8 | -303.3 |
| 17 | 2014 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 18 | 2015 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 19 | 2016 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 20 | 2017 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 21 | 2018 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 22 | 2019 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 23 | 2020 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 24 | 2021 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 25 | 2022 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 26 | 2023 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 27 | 2024 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 28 | 2025 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 29 | 2026 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| 30 | 2027 | 0.0 | 109.3 | 0.0 | 109.3 | 431.5 | 30.2 | 461.8 | 352.5 |
| Total | | 2,185.8 | 3,169.4 | 1,311.5 | 6,666.7 | 11,651.4 | 816.0 | 12,467.4 | 5,800.7 |

**IRR= 10.61%**

No 8.3. PANDIKANMOI TANK

Table 8.3 EIRR at 10% Decrease of Benefit — Unit : 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 993.5 | 0.0 | 0.0 | 993.5 | 0.0 | 0.0 | 0.0 | -993.5 |
| 2 | 1999 | 993.5 | 99.4 | 0.0 | 1,092.9 | 69.0 | 4.8 | 73.9 | -1,019.0 |
| 3 | 2000 | 0.0 | 99.4 | 0.0 | 99.4 | 120.8 | 8.5 | 129.3 | 29.9 |
| 4 | 2001 | 0.0 | 99.4 | 0.0 | 99.4 | 181.2 | 12.7 | 193.9 | 94.6 |
| 5 | 2002 | 0.0 | 99.4 | 0.0 | 99.4 | 241.7 | 16.9 | 258.6 | 159.2 |
| 6 | 2003 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 7 | 2004 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 8 | 2005 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 9 | 2006 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 10 | 2007 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 11 | 2008 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 12 | 2009 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 13 | 2010 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 14 | 2011 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 15 | 2012 | 0.0 | 99.4 | 596.1 | 695.5 | 388.4 | 27.2 | 415.6 | -279.9 |
| 16 | 2013 | 0.0 | 99.4 | 596.1 | 695.5 | 388.4 | 27.2 | 415.6 | -279.9 |
| 17 | 2014 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 18 | 2015 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 19 | 2016 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 20 | 2017 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 21 | 2018 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 22 | 2019 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 23 | 2020 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 24 | 2021 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 25 | 2022 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 26 | 2023 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 27 | 2024 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 28 | 2025 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 29 | 2026 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| 30 | 2027 | 0.0 | 99.4 | 0.0 | 99.4 | 388.4 | 27.2 | 415.6 | 316.2 |
| Total | | 1,987.1 | 2,881.3 | 1,192.3 | 6,060.6 | 10,322.2 | 722.9 | 11,045.2 | 4,984.5 |

**IRR= 9.70%**

No 8.4. PANDIKANMOI TANK

Table: 8.4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 993.5 | 0.0 | 0.0 | 993.5 | 0 | 0 | 0 | -994 |
| 2 | 1999 | 993.5 | 99.4 | 0.0 | 1,092.9 | 0 | 0 | 0 | -1,093 |
| 3 | 2000 | 0.0 | 99.4 | 0.0 | 99.4 | 0 | 0 | 0 | -99 |
| 4 | 2001 | 0.0 | 99.4 | 0.0 | 99.4 | 0 | 0 | 0 | -99 |
| 5 | 2002 | 0.0 | 99.4 | 0.0 | 99.4 | 86.3 | 6.0 | 92 | -7 |
| 6 | 2003 | 0.0 | 99.4 | 0.0 | 99.4 | 172.6 | 12.1 | 185 | 85 |
| 7 | 2004 | 0.0 | 99.4 | 0.0 | 99.4 | 258.9 | 18.1 | 277 | 178 |
| 8 | 2005 | 0.0 | 99.4 | 0.0 | 99.4 | 345.2 | 24.2 | 369 | 270 |
| 9 | 2006 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 10 | 2007 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 11 | 2008 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 12 | 2009 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 13 | 2010 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 14 | 2011 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 15 | 2012 | 0.0 | 99.4 | 596.1 | 695.5 | 431.5 | 30.2 | 462 | -234 |
| 16 | 2013 | 0.0 | 99.4 | 596.1 | 695.5 | 431.5 | 30.2 | 462 | -234 |
| 17 | 2014 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 18 | 2015 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 19 | 2016 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 20 | 2017 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 21 | 2018 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 22 | 2019 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 23 | 2020 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 24 | 2021 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 25 | 2022 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 26 | 2023 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 27 | 2024 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 28 | 2025 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 29 | 2026 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| 30 | 2027 | 0.0 | 99.4 | 0.0 | 99.4 | 431.5 | 30.2 | 462 | 362 |
| Total | | 1,987.1 | 2,881.3 | 1,192.3 | 6,060.6 | 10,356.8 | 725.4 | 11,082.1 | 5,021.5 |

**IRR= 7.70%**

# Table F.3.9 Economic Internal Rate of Return for Sengangulam Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 2,156 |
| 2. Item 1*0.96 | 2,070 |
| 3. Item 2*0.80 | 1,656 |
| 4. Super Vision Charge | 65 |
| 5. Preparation Cost | 31 |
| 6. Overhead Charge 25% | 633 |
| Total (Item 3 to 6) | 2,385 |

No.9.1. SENGANGULAM TANK

Table: 9.1 EIRR at Basic Conditions — Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,192.4 | 0.0 | 0.0 | 1,192.4 | 0.0 | 0.0 | 0.0 | -1,192.4 |
| 2 | 1999 | 1,192.4 | 119.2 | 0.0 | 1,311.6 | 141.9 | 17.4 | 159.3 | -1,152.3 |
| 3 | 2000 | 0.0 | 119.2 | 0.0 | 119.2 | 283.8 | 34.8 | 318.7 | 199.4 |
| 4 | 2001 | 0.0 | 119.2 | 0.0 | 119.2 | 425.8 | 52.3 | 478.0 | 358.8 |
| 5 | 2002 | 0.0 | 119.2 | 0.0 | 119.2 | 567.7 | 69.7 | 637.4 | 518.1 |
| 6 | 2003 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 7 | 2004 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 8 | 2005 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 9 | 2006 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 10 | 2007 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 11 | 2008 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 12 | 2009 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 13 | 2010 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 14 | 2011 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 15 | 2012 | 0.0 | 119.2 | 715.4 | 834.7 | 709.6 | 87.1 | 796.7 | -38.0 |
| 16 | 2013 | 0.0 | 119.2 | 715.4 | 834.7 | 709.6 | 87.1 | 796.7 | -38.0 |
| 17 | 2014 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 18 | 2015 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 19 | 2016 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 20 | 2017 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 21 | 2018 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 22 | 2019 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 23 | 2020 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 24 | 2021 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 25 | 2022 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 26 | 2023 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 27 | 2024 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 28 | 2025 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 29 | 2026 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| 30 | 2027 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 796.7 | 677.5 |
| Total | | 2,384.8 | 3,458.0 | 1,430.9 | 7,273.7 | 19,159.2 | 2,351.7 | 21,510.9 | 14,237.2 |

**IRR= 19.67%**

No.9.2. SENGANGULAM TANK

Table: 9.2 EIRR at 10% Increase of Cost — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,311.6 | 0.0 | 0.0 | 1,311.6 | 0.0 | 0.0 | 0.0 | -1,311.6 |
| 2 | 1999 | 1,311.6 | 131.2 | 0.0 | 1,442.8 | 141.9 | 17.4 | 159.3 | -1,283.5 |
| 3 | 2000 | 0.0 | 131.2 | 0.0 | 131.2 | 283.8 | 34.8 | 318.7 | 187.5 |
| 4 | 2001 | 0.0 | 131.2 | 0.0 | 131.2 | 425.8 | 52.3 | 478.0 | 346.9 |
| 5 | 2002 | 0.0 | 131.2 | 0.0 | 131.2 | 567.7 | 69.7 | 637.4 | 506.2 |
| 6 | 2003 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 7 | 2004 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 8 | 2005 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 9 | 2006 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 10 | 2007 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 11 | 2008 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 12 | 2009 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 13 | 2010 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 14 | 2011 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 15 | 2012 | 0.0 | 131.2 | 787.0 | 918.2 | 709.6 | 87.1 | 796.7 | -121.5 |
| 16 | 2013 | 0.0 | 131.2 | 787.0 | 918.2 | 709.6 | 87.1 | 796.7 | -121.5 |
| 17 | 2014 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 18 | 2015 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 19 | 2016 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 20 | 2017 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 21 | 2018 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 22 | 2019 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 23 | 2020 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 24 | 2021 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 25 | 2022 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 26 | 2023 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 27 | 2024 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 28 | 2025 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 29 | 2026 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| 30 | 2027 | 0.0 | 131.2 | 0.0 | 131.2 | 709.6 | 87.1 | 796.7 | 665.5 |
| Total | | 2,623.3 | 3,803.8 | 1,574.0 | 8,001.0 | 19,159.2 | 2,351.7 | 21,510.9 | 13,509.9 |

**IRR= 17.62%**

No.9.3. SENGANGULAM TANK

Table 9.3 EIRR at 10% Decrease of Benefit — Unit : 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,192.4 | 0.0 | 0.0 | 1,192.4 | 0.0 | 0.0 | 0.0 | -1,192.4 |
| 2 | 1999 | 1,192.4 | 119.2 | 0.0 | 1,311.6 | 113.5 | 13.9 | 127.5 | -1,184.2 |
| 3 | 2000 | 0.0 | 119.2 | 0.0 | 119.2 | 198.7 | 24.4 | 223.1 | 103.8 |
| 4 | 2001 | 0.0 | 119.2 | 0.0 | 119.2 | 298.0 | 36.6 | 334.6 | 215.4 |
| 5 | 2002 | 0.0 | 119.2 | 0.0 | 119.2 | 397.4 | 48.8 | 446.2 | 326.9 |
| 6 | 2003 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 7 | 2004 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 8 | 2005 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 9 | 2006 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 10 | 2007 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 11 | 2008 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 12 | 2009 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 13 | 2010 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 14 | 2011 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 15 | 2012 | 0.0 | 119.2 | 715.4 | 834.7 | 638.6 | 78.4 | 717.0 | -117.7 |
| 16 | 2013 | 0.0 | 119.2 | 715.4 | 834.7 | 638.6 | 78.4 | 717.0 | -117.7 |
| 17 | 2014 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 18 | 2015 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 19 | 2016 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 20 | 2017 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 21 | 2018 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 22 | 2019 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 23 | 2020 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 24 | 2021 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 25 | 2022 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 26 | 2023 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 27 | 2024 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 28 | 2025 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 29 | 2026 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| 30 | 2027 | 0.0 | 119.2 | 0.0 | 119.2 | 638.6 | 78.4 | 717.0 | 597.8 |
| Total | | 2,384.8 | 3,458.0 | 1,430.9 | 7,273.7 | 16,973.6 | 2,083.4 | 19,057.1 | 11,783.4 |

**IRR= 16.17%**

No.9.4. SENGANGULAM TANK

Table 9..4 EIRR at 3 year delay of Benefit — Unit: 000 Rs

| | | Cost | | | | Benefit | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM | Replacement | Total | Crop | Value added | Total | Net |
| 1 | 1998 | 1,192.4 | 0.0 | 0.0 | 1,192.4 | 0 | 0 | 0 | -1,192 |
| 2 | 1999 | 1,192.4 | 119.2 | 0.0 | 1,311.6 | 0 | 0 | 0 | -1,312 |
| 3 | 2000 | 0.0 | 119.2 | 0.0 | 119.2 | 0 | 0 | 0 | -119 |
| 4 | 2001 | 0.0 | 119.2 | 0.0 | 119.2 | 0 | 0 | 0 | -119 |
| 5 | 2002 | 0.0 | 119.2 | 0.0 | 119.2 | 141.9 | 17.4 | 159 | 40 |
| 6 | 2003 | 0.0 | 119.2 | 0.0 | 119.2 | 283.8 | 34.8 | 319 | 199 |
| 7 | 2004 | 0.0 | 119.2 | 0.0 | 119.2 | 425.8 | 52.3 | 478 | 359 |
| 8 | 2005 | 0.0 | 119.2 | 0.0 | 119.2 | 567.7 | 69.7 | 637 | 518 |
| 9 | 2006 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 10 | 2007 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 11 | 2008 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 12 | 2009 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 13 | 2010 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 14 | 2011 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 15 | 2012 | 0.0 | 119.2 | 715.4 | 834.7 | 709.6 | 87.1 | 797 | -38 |
| 16 | 2013 | 0.0 | 119.2 | 715.4 | 834.7 | 709.6 | 87.1 | 797 | -38 |
| 17 | 2014 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 18 | 2015 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 19 | 2016 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 20 | 2017 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 21 | 2018 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 22 | 2019 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 23 | 2020 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 24 | 2021 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 25 | 2022 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 26 | 2023 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 27 | 2024 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 28 | 2025 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 29 | 2026 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| 30 | 2027 | 0.0 | 119.2 | 0.0 | 119.2 | 709.6 | 87.1 | 797 | 677 |
| Total | | 2,384.8 | 3,458.0 | 1,430.9 | 7,273.7 | 17,030.4 | 2,090.4 | 19,120.8 | 11,847.1 |

**IRR= 12.28%**

## Table F.3.10 Economic Internal Rate of Return for Kurumbi Tank Area

| Item | Cost |
|---|---|
| 1. Total of Civil Work | 1,466 |
| 2. Item 1*0.96 | 1,407 |
| 3. Item 2*0.80 | 1,126 |
| 4. Super Vision Charge | 44 |
| 5. Preparation Cost | 21 |
| 6. Overhead Charge 25% | 431 |
| Total (Item 3 to 6) | 1,622 |

No.10.1. KURUMBI TANK

Table: 10.1 EIRR at Basic Conditions Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 1 | 1998 | 810.9 | 0.0 | 0.0 | 810.9 | 0.0 | 0.0 | 0.0 | -810.9 |
| 2 | 1999 | 810.9 | 81.1 | 0.0 | 892.0 | 204.6 | 20.6 | 225.3 | -666.8 |
| 3 | 2000 | 0.0 | 81.1 | 0.0 | 81.1 | 409.3 | 41.3 | 450.6 | 369.5 |
| 4 | 2001 | 0.0 | 81.1 | 0.0 | 81.1 | 613.9 | 61.9 | 675.8 | 594.7 |
| 5 | 2002 | 0.0 | 81.1 | 0.0 | 81.1 | 818.5 | 82.6 | 901.1 | 820.0 |
| 6 | 2003 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 7 | 2004 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 8 | 2005 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 9 | 2006 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 10 | 2007 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 11 | 2008 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 12 | 2009 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 13 | 2010 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 14 | 2011 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 15 | 2012 | 0.0 | 81.1 | 486.6 | 567.7 | 1,023.2 | 103.2 | 1,126.4 | 558.7 |
| 16 | 2013 | 0.0 | 81.1 | 486.6 | 567.7 | 1,023.2 | 103.2 | 1,126.4 | 558.7 |
| 17 | 2014 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 18 | 2015 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 19 | 2016 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 20 | 2017 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 21 | 2018 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 22 | 2019 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 23 | 2020 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 24 | 2021 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 25 | 2022 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 26 | 2023 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 27 | 2024 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 28 | 2025 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 29 | 2026 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| 30 | 2027 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126.4 | 1,045.3 |
| Total | | 1,621.9 | 2,351.7 | 973.1 | 4,946.8 | 27,625.8 | 2,786.7 | 30,412.4 | 25,465.7 |

**IRR= 40.09%**

No.10.2. KURUMBI TANK

Table: 10.2 EIRR at 10% Increase of Cost Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 1 | 1998 | 892.0 | 0.0 | 0.0 | 892.0 | 0.0 | 0.0 | 0.0 | -892.0 |
| 2 | 1999 | 892.0 | 89.2 | 0.0 | 981.2 | 204.6 | 20.6 | 225.3 | -756.0 |
| 3 | 2000 | 0.0 | 89.2 | 0.0 | 89.2 | 409.3 | 41.3 | 450.6 | 361.4 |
| 4 | 2001 | 0.0 | 89.2 | 0.0 | 89.2 | 613.9 | 61.9 | 675.8 | 586.6 |
| 5 | 2002 | 0.0 | 89.2 | 0.0 | 89.2 | 818.5 | 82.6 | 901.1 | 811.9 |
| 6 | 2003 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 7 | 2004 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 8 | 2005 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 9 | 2006 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 10 | 2007 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 11 | 2008 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 12 | 2009 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 13 | 2010 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 14 | 2011 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 15 | 2012 | 0.0 | 89.2 | 535.2 | 624.4 | 1,023.2 | 103.2 | 1,126.4 | 502.0 |
| 16 | 2013 | 0.0 | 89.2 | 535.2 | 624.4 | 1,023.2 | 103.2 | 1,126.4 | 502.0 |
| 17 | 2014 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 18 | 2015 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 19 | 2016 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 20 | 2017 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 21 | 2018 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 22 | 2019 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 23 | 2020 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 24 | 2021 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 25 | 2022 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 26 | 2023 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 27 | 2024 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 28 | 2025 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 29 | 2026 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| 30 | 2027 | 0.0 | 89.2 | 0.0 | 89.2 | 1,023.2 | 103.2 | 1,126.4 | 1,037.2 |
| Total | | 1,784.1 | 2,586.9 | 1,070.4 | 5,441.4 | 27,625.8 | 2,786.7 | 30,412.4 | 24,971.0 |

**IRR= 36.84%**

No.10.3. KURUMBI TANK

Table 10.3 EIRR at 10% Decrease of Benefit  Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 1 | 1998 | 810.9 | 0.0 | 0.0 | 810.9 | 0.0 | 0.0 | 0.0 | -810.9 |
| 2 | 1999 | 810.9 | 81.1 | 0.0 | 892.0 | 163.7 | 16.5 | 180.2 | -711.8 |
| 3 | 2000 | 0.0 | 81.1 | 0.0 | 81.1 | 286.5 | 28.9 | 315.4 | 234.3 |
| 4 | 2001 | 0.0 | 81.1 | 0.0 | 81.1 | 429.7 | 43.3 | 473.1 | 392.0 |
| 5 | 2002 | 0.0 | 81.1 | 0.0 | 81.1 | 573.0 | 57.8 | 630.8 | 549.7 |
| 6 | 2003 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 7 | 2004 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 8 | 2005 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 9 | 2006 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 10 | 2007 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 11 | 2008 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 12 | 2009 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 13 | 2010 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 14 | 2011 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 15 | 2012 | 0.0 | 81.1 | 486.6 | 567.7 | 920.9 | 92.9 | 1,013.7 | 446.1 |
| 16 | 2013 | 0.0 | 81.1 | 486.6 | 567.7 | 920.9 | 92.9 | 1,013.7 | 446.1 |
| 17 | 2014 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 18 | 2015 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 19 | 2016 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 20 | 2017 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 21 | 2018 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 22 | 2019 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 23 | 2020 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 24 | 2021 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 25 | 2022 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 26 | 2023 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 27 | 2024 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 28 | 2025 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 29 | 2026 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| 30 | 2027 | 0.0 | 81.1 | 0.0 | 81.1 | 920.9 | 92.9 | 1,013.7 | 932.7 |
| Total | | 1,621.9 | 2,351.7 | 973.1 | 4,946.8 | 24,474.4 | 2,468.8 | 26,943.2 | 21,996.4 |

**IRR= 33.26%**

No.10.4. KURUMBI TANK

Table: 10.4 EIRR at 3 year delay of Benefit  Unit: 000 Rs

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 1 | 1998 | 810.9 | 0.0 | 0.0 | 810.9 | 0 | 0 | 0 | -811 |
| 2 | 1999 | 810.9 | 81.1 | 0.0 | 892.0 | 0 | 0 | 0 | -892 |
| 3 | 2000 | 0.0 | 81.1 | 0.0 | 81.1 | 0 | 0 | 0 | -81 |
| 4 | 2001 | 0.0 | 81.1 | 0.0 | 81.1 | 0 | 0 | 0 | -81 |
| 5 | 2002 | 0.0 | 81.1 | 0.0 | 81.1 | 204.6 | 20.6 | 225 | 144 |
| 6 | 2003 | 0.0 | 81.1 | 0.0 | 81.1 | 409.3 | 41.3 | 451 | 369 |
| 7 | 2004 | 0.0 | 81.1 | 0.0 | 81.1 | 613.9 | 61.9 | 676 | 595 |
| 8 | 2005 | 0.0 | 81.1 | 0.0 | 81.1 | 818.5 | 82.6 | 901 | 820 |
| 9 | 2006 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 10 | 2007 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 11 | 2008 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 12 | 2009 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 13 | 2010 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 14 | 2011 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 15 | 2012 | 0.0 | 81.1 | 486.6 | 567.7 | 1,023.2 | 103.2 | 1,126 | 559 |
| 16 | 2013 | 0.0 | 81.1 | 486.6 | 567.7 | 1,023.2 | 103.2 | 1,126 | 559 |
| 17 | 2014 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 18 | 2015 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 19 | 2016 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 20 | 2017 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 21 | 2018 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 22 | 2019 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 23 | 2020 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 24 | 2021 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 25 | 2022 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 26 | 2023 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 27 | 2024 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 28 | 2025 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 29 | 2026 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| 30 | 2027 | 0.0 | 81.1 | 0.0 | 81.1 | 1,023.2 | 103.2 | 1,126 | 1,045 |
| Total | | 1,621.9 | 2,351.7 | 973.1 | 4,946.8 | 24,556.2 | 2,477.0 | 27,033.3 | 22,086.5 |

**IRR= 22.44%**

# Table F.3.11 Economic Internal Rate of Return for the Project

EIRR at Basic Conditions (Unit: Rs X1,000)

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 0 | 1997 | 0.0 | | | 0.0 | | | | 0.0 |
| 1 | 1998 | 454,900.7 | 0.0 | 0.0 | 454,900.7 | 0.0 | 0.0 | 0.0 | -454,900.7 |
| 2 | 1999 | 454,900.7 | 22,745.0 | 0.0 | 477,645.7 | 27,461.2 | 3,063.2 | 30,524.4 | -447,121.3 |
| 3 | 2000 | 454,900.7 | 45,490.1 | 0.0 | 500,390.7 | 82,383.5 | 9,189.6 | 91,573.1 | -408,817.6 |
| 4 | 2001 | 454,900.7 | 68,235.1 | 0.0 | 523,135.8 | 164,767.0 | 18,379.2 | 183,146.3 | -339,989.5 |
| 5 | 2002 | 1,089,858.0 | 90,980.1 | 0.0 | 1,180,838.2 | 274,611.7 | 30,632.0 | 305,243.8 | -875,594.4 |
| 6 | 2003 | 634,957.4 | 145,473.0 | 0.0 | 780,430.4 | 450,248.3 | 50,223.7 | 500,472.1 | -279,958.3 |
| 7 | 2004 | 634,957.4 | 177,220.9 | 0.0 | 812,178.3 | 636,754.5 | 71,027.9 | 707,782.4 | -104,395.9 |
| 8 | 2005 | 634,957.4 | 208,968.8 | 0.0 | 843,926.1 | 834,130.2 | 93,044.5 | 927,174.7 | 83,248.6 |
| 9 | 2006 | 930,444.0 | 240,716.6 | 0.0 | 1,181,160.7 | 1,042,375.5 | 116,273.6 | 1,158,649.1 | -22,511.6 |
| 10 | 2007 | 305,486.7 | 287,738.8 | 0.0 | 593,225.5 | 1,269,062.2 | 141,559.8 | 1,410,622.0 | 817,396.5 |
| 11 | 2008 | 305,486.7 | 303,013.2 | 0.0 | 608,499.8 | 1,470,137.5 | 163,989.1 | 1,634,126.6 | 1,025,626.8 |
| 12 | 2009 | 305,486.7 | 318,287.5 | 0.0 | 623,774.2 | 1,640,454.0 | 182,987.3 | 1,823,441.4 | 1,199,667.2 |
| 13 | 2010 | 305,486.7 | 333,561.8 | 0.0 | 639,048.5 | 1,790,881.3 | 199,767.0 | 1,990,648.2 | 1,351,599.8 |
| 14 | 2011 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,902,977.7 | 212,271.0 | 2,115,248.7 | 1,766,412.6 |
| 15 | 2012 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,958,302.0 | 218,442.2 | 2,176,744.3 | 1,827,908.1 |
| 16 | 2013 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,995,184.9 | 222,556.4 | 2,217,741.3 | 1,868,905.2 |
| 17 | 2014 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 18 | 2015 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 19 | 2016 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 20 | 2017 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,233,498.8 |
| 21 | 2018 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,233,498.8 |
| 22 | 2019 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 23 | 2020 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 24 | 2021 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 973,881.6 |
| 25 | 2022 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 973,881.6 |
| 26 | 2023 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 27 | 2024 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,448,933.5 |
| 28 | 2025 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,448,933.5 |
| 29 | 2026 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 30 | 2027 | 0.0 | 348,836.2 | | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,889,403.7 |
| 31 | 2028 | 0.0 | 235,111.0 | | 235,111.0 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,240,019.4 |
| 32 | 2029 | 0.0 | 235,111.0 | | 235,111.0 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,240,019.4 |
| 33 | 2030 | 0.0 | 235,111.0 | | 235,111.0 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,240,019.4 |
| 34 | 2031 | 0.0 | 235,111.0 | | 235,111.0 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,240,019.4 |
| 35 | 2032 | 0.0 | 76,371.7 | | 76,371.7 | 368,828.7 | 41,141.7 | 409,970.4 | 333,598.7 |
| 36 | 2033 | 0.0 | 76,371.7 | | 76,371.7 | 368,828.7 | 41,141.7 | 409,970.4 | 333,598.7 |
| 37 | 2034 | 0.0 | 76,371.7 | | 76,371.7 | 368,828.7 | 41,141.7 | 409,970.4 | 333,598.7 |
| 38 | 2035 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 368,828.7 | 41,141.7 | 409,970.4 | 333,598.7 |
| Total | | 6,976,723.5 | 9,418,576.7 | 4,023,794.1 | 20,419,094.3 | 50,514,203.8 | 5,634,695.5 | 56,148,899.3 | 35,729,805.0 |

| IRR= | 18.449% |
|---|---|

Case-1: EIRR at 10% Increase of Cost (Unit: Rs X1,000)

| | | Cost | Adm and OM | Replacement | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | 5% | 60% | Total | Crop | Value added | Total | Flow |
| 0 | 1997 | 0.0 | 0.0 | 0.0 | 1.0 | | | | |
| 1 | 1998 | 500,390.7 | 0.0 | 0.0 | 500,390.7 | 0.0 | 0.0 | 0.0 | -500,390.7 |
| 2 | 1999 | 500,390.7 | 25,019.5 | 0.0 | 525,410.3 | 27,461.2 | 3,063.2 | 30,524.4 | -494,885.9 |
| 3 | 2000 | 500,390.7 | 50,039.1 | 0.0 | 550,429.8 | 82,383.5 | 9,189.6 | 91,573.1 | -458,856.7 |
| 4 | 2001 | 500,390.7 | 75,058.6 | 0.0 | 575,449.4 | 164,767.0 | 18,379.2 | 183,146.3 | -392,303.1 |
| 5 | 2002 | 1,198,843.8 | 100,078.1 | 0.0 | 1,298,922.0 | 274,611.7 | 30,632.0 | 305,243.8 | -993,678.2 |
| 6 | 2003 | 698,453.1 | 160,020.3 | 0.0 | 858,473.4 | 450,248.3 | 50,223.7 | 500,472.1 | -358,001.4 |
| 7 | 2004 | 698,453.1 | 194,943.0 | 0.0 | 893,396.1 | 636,754.5 | 71,027.9 | 707,782.4 | -185,613.7 |
| 8 | 2005 | 698,453.1 | 229,865.7 | 0.0 | 928,318.8 | 834,130.2 | 93,044.5 | 927,174.7 | -1,144.0 |
| 9 | 2006 | 1,034,488.4 | 264,788.3 | 0.0 | 1,299,276.7 | 1,042,375.5 | 116,273.6 | 1,158,649.1 | -140,627.6 |
| 10 | 2007 | 336,035.3 | 316,512.7 | 0.0 | 652,548.0 | 1,269,062.2 | 141,559.8 | 1,410,622.0 | 758,073.9 |
| 11 | 2008 | 336,035.3 | 333,314.5 | 0.0 | 669,349.8 | 1,470,137.5 | 163,989.1 | 1,634,126.6 | 964,776.8 |
| 12 | 2009 | 336,035.3 | 350,116.3 | 0.0 | 686,151.6 | 1,640,454.0 | 182,987.3 | 1,823,441.4 | 1,137,289.8 |
| 13 | 2010 | 336,035.3 | 366,918.0 | 0.0 | 702,953.3 | 1,790,881.3 | 199,767.0 | 1,990,648.2 | 1,287,694.9 |
| 14 | 2011 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 1,902,977.7 | 212,271.0 | 2,115,248.7 | 1,731,528.9 |
| 15 | 2012 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 1,958,302.0 | 218,442.2 | 2,176,744.3 | 1,793,024.5 |
| 16 | 2013 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 1,995,184.9 | 222,556.4 | 2,217,741.3 | 1,834,021.5 |
| 17 | 2014 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 18 | 2015 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 19 | 2016 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 20 | 2017 | 0.0 | 383,719.8 | 721,495.3 | 1,105,215.1 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,133,024.7 |
| 21 | 2018 | 0.0 | 383,719.8 | 721,495.3 | 1,105,215.1 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,133,024.7 |
| 22 | 2019 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 23 | 2020 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 24 | 2021 | 0.0 | 383,719.8 | 1,007,074.3 | 1,390,794.1 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 847,445.8 |
| 25 | 2022 | 0.0 | 383,719.8 | 1,007,074.3 | 1,390,794.1 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 847,445.8 |
| 26 | 2023 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 27 | 2024 | 0.0 | 383,719.8 | 484,517.2 | 868,237.0 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,370,002.9 |
| 28 | 2025 | 0.0 | 383,719.8 | 484,517.2 | 868,237.0 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,370,002.9 |
| 29 | 2026 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 30 | 2027 | 0.0 | 383,719.8 | 0.0 | 383,719.8 | 2,013,626.4 | 224,613.5 | 2,238,239.8 | 1,854,520.1 |
| 31 | 2028 | 0.0 | 258,622.1 | 0.0 | 258,622.1 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,216,508.3 |
| 32 | 2029 | 0.0 | 258,622.1 | 0.0 | 258,622.1 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,216,508.3 |
| 33 | 2030 | 0.0 | 258,622.1 | 0.0 | 258,622.1 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,216,508.3 |
| 34 | 2031 | 0.0 | 258,622.1 | 0.0 | 258,622.1 | 1,327,097.0 | 148,033.4 | 1,475,130.4 | 1,216,508.3 |
| 35 | 2032 | 0.0 | 84,008.8 | 0.0 | 84,008.8 | 368,828.7 | 41,141.7 | 409,970.4 | 325,961.6 |
| 36 | 2033 | 0.0 | 84,008.8 | 0.0 | 84,008.8 | 368,828.7 | 41,141.7 | 409,970.4 | 325,961.6 |
| 37 | 2034 | 0.0 | 84,008.8 | 0.0 | 84,008.8 | 368,828.7 | 41,141.7 | 409,970.4 | 325,961.6 |
| 38 | 2035 | 0.0 | 84,008.8 | 0.0 | 84,008.8 | 368,828.7 | 41,141.7 | 409,970.4 | 325,961.6 |
| Total | | 7,874,395.8 | 10,360,434.4 | 4,426,173.5 | 22,451,003.8 | 50,514,203.8 | 5,634,695.5 | 56,148,899.3 | 33,687,895.6 |

| IRR= | 16.589% |
|---|---|

Case-2 EIRR at 10% Decrease of Benefit

(Unit: Rs X1,000)

| | | Cost | | | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM 5% | Replacement 60% | Total | Crop | Value added | Total | Flow |
| 0 | 1997 | 0.0 | 0.0 | 0.0 | | 0 | 0 | 0 | |
| 1 | 1998 | 454,900.7 | 0.0 | 0.0 | 454,900.7 | 0 | 0 | 0 | -454,900.7 |
| 2 | 1999 | 454,900.7 | 22,745.0 | 0.0 | 477,645.7 | 24,715 | 2,757 | 27,472 | -450,173.8 |
| 3 | 2000 | 454,900.7 | 45,490.1 | 0.0 | 500,390.7 | 74,145 | 8,271 | 82,416 | -417,974.9 |
| 4 | 2001 | 454,900.7 | 68,235.1 | 0.0 | 523,135.8 | 148,290 | 16,541 | 164,832 | -358,304.1 |
| 5 | 2002 | 1,089,858.0 | 90,980.1 | 0.0 | 1,180,838.2 | 247,151 | 27,569 | 274,719 | -906,118.8 |
| 6 | 2003 | 634,957.4 | 145,473.0 | 0.0 | 780,430.4 | 405,224 | 45,201 | 450,425 | -330,005.5 |
| 7 | 2004 | 634,957.4 | 177,220.9 | 0.0 | 812,178.3 | 573,079 | 63,925 | 637,004 | -175,174.1 |
| 8 | 2005 | 634,957.4 | 208,968.8 | 0.0 | 843,926.1 | 750,717 | 83,740 | 834,457 | -9,468.9 |
| 9 | 2006 | 940,444.0 | 240,716.6 | 0.0 | 1,181,160.7 | 938,138 | 104,646 | 1,042,784 | -138,376.5 |
| 10 | 2007 | 305,486.7 | 287,738.8 | 0.0 | 593,225.5 | 1,142,156 | 127,404 | 1,269,560 | 676,334.3 |
| 11 | 2008 | 305,486.7 | 303,013.2 | 0.0 | 608,499.8 | 1,323,174 | 147,590 | 1,470,714 | 862,214.1 |
| 12 | 2009 | 305,486.7 | 318,287.5 | 0.0 | 623,774.2 | 1,476,409 | 164,689 | 1,641,097 | 1,017,323.1 |
| 13 | 2010 | 305,486.7 | 333,561.8 | 0.0 | 639,048.5 | 1,611,793 | 179,790 | 1,791,583 | 1,152,534.9 |
| 14 | 2011 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,712,680 | 191,044 | 1,903,724 | 1,554,887.7 |
| 15 | 2012 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,762,472 | 196,598 | 1,959,070 | 1,610,233.7 |
| 16 | 2013 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,795,666 | 200,301 | 1,995,967 | 1,647,131.0 |
| 17 | 2014 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 18 | 2015 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 19 | 2016 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 20 | 2017 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 1,812,264 | 202,152 | 2,014,416 | 1,009,674.9 |
| 21 | 2018 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 1,812,264 | 202,152 | 2,014,416 | 1,009,674.9 |
| 22 | 2019 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 23 | 2020 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 24 | 2021 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 1,812,264 | 202,152 | 2,014,416 | 750,057.6 |
| 25 | 2022 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 1,812,264 | 202,152 | 2,014,416 | 750,057.6 |
| 26 | 2023 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 27 | 2024 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 1,812,264 | 202,152 | 2,014,416 | 1,225,109.5 |
| 28 | 2025 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 1,812,264 | 202,152 | 2,014,416 | 1,225,109.5 |
| 29 | 2026 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 30 | 2027 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,812,264 | 202,152 | 2,014,416 | 1,665,579.7 |
| 31 | 2028 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 1,194,387 | 133,230 | 1,327,617 | 1,092,506.3 |
| 32 | 2029 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 1,194,387 | 133,230 | 1,327,617 | 1,092,506.3 |
| 33 | 2030 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 1,194,387 | 133,230 | 1,327,617 | 1,092,506.3 |
| 34 | 2031 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 1,194,387 | 133,230 | 1,327,617 | 1,092,506.3 |
| 35 | 2032 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 331,946 | 37,027 | 368,973 | 292,601.7 |
| 36 | 2033 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 331,946 | 37,027 | 368,973 | 292,601.7 |
| 37 | 2034 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 331,946 | 37,027 | 368,973 | 292,601.7 |
| 38 | 2035 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 331,946 | 37,027 | 368,973 | 292,601.7 |
| Total | | 6,976,723.5 | 9,418,576.7 | 4,023,794.1 | 20,419,094.3 | 45,462,783.4 | 5,071,226.0 | 50,534,009.4 | 30,114,915.1 |

IRR= 16.397%

Case-3 EIRR at 3 year delay of Benefit

(Unit: Rs X1,000)

| | | Cost | | | Cost | Benefit | | | Cash |
|---|---|---|---|---|---|---|---|---|---|
| | | Initial | Adm and OM 5% | Replacement 60% | Total | Crop | Value added | Total | Flow |
| 0 | 1997 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| 1 | 1998 | 454,900.7 | 0.0 | 0.0 | 454,900.7 | 0 | 0 | 0 | -454,901 |
| 2 | 1999 | 454,900.7 | 22,745.0 | 0.0 | 477,645.7 | 0 | 0 | 0 | -477,646 |
| 3 | 2000 | 454,900.7 | 45,490.1 | 0.0 | 500,390.7 | 0 | 0 | 0 | -500,391 |
| 4 | 2001 | 454,900.7 | 68,235.1 | 0.0 | 523,135.8 | 0 | 0 | 0 | -523,136 |
| 5 | 2002 | 1,089,858.0 | 90,980.1 | 0.0 | 1,180,838.2 | 27,461.2 | 3,063.2 | 30,524 | -1,150,314 |
| 6 | 2003 | 634,957.4 | 145,473.0 | 0.0 | 780,430.4 | 82,383.5 | 9,189.6 | 91,573 | -688,857 |
| 7 | 2004 | 634,957.4 | 177,220.9 | 0.0 | 812,178.3 | 164,767.0 | 18,379.2 | 183,146 | -629,032 |
| 8 | 2005 | 634,957.4 | 208,968.8 | 0.0 | 843,926.1 | 274,611.7 | 30,632.0 | 305,244 | -538,682 |
| 9 | 2006 | 940,444.0 | 240,716.6 | 0.0 | 1,181,160.7 | 450,248.3 | 50,223.7 | 500,472 | -680,689 |
| 10 | 2007 | 305,486.7 | 287,738.8 | 0.0 | 593,225.5 | 636,754.5 | 71,027.9 | 707,782 | 114,557 |
| 11 | 2008 | 305,486.7 | 303,013.2 | 0.0 | 608,499.8 | 834,130.2 | 93,044.5 | 927,175 | 318,675 |
| 12 | 2009 | 305,486.7 | 318,287.5 | 0.0 | 623,774.2 | 1,042,375.5 | 116,273.6 | 1,158,649 | 534,875 |
| 13 | 2010 | 305,486.7 | 333,561.8 | 0.0 | 639,048.5 | 1,269,062.2 | 141,559.8 | 1,410,622 | 771,573 |
| 14 | 2011 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,470,137.5 | 163,989.1 | 1,634,127 | 1,285,290 |
| 15 | 2012 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,640,454.0 | 182,987.3 | 1,823,441 | 1,474,605 |
| 16 | 2013 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,790,881.3 | 199,767.0 | 1,990,648 | 1,641,812 |
| 17 | 2014 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,902,977.7 | 212,271.0 | 2,115,249 | 1,766,413 |
| 18 | 2015 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,958,302.0 | 218,442.2 | 2,176,744 | 1,827,908 |
| 19 | 2016 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 1,995,184.9 | 222,556.4 | 2,217,741 | 1,868,905 |
| 20 | 2017 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,233,499 |
| 21 | 2018 | 0.0 | 348,836.2 | 655,904.8 | 1,004,741.0 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,233,499 |
| 22 | 2,019 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,889,404 |
| 23 | 2,020 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,889,404 |
| 24 | 2,021 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 973,882 |
| 25 | 2,022 | 0.0 | 348,836.2 | 915,522.1 | 1,264,358.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 973,882 |
| 26 | 2,023 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,889,404 |
| 27 | 2,024 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,448,934 |
| 28 | 2,025 | 0.0 | 348,836.2 | 440,470.2 | 789,306.3 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,448,934 |
| 29 | 2,026 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,889,404 |
| 30 | 2,027 | 0.0 | 348,836.2 | 0.0 | 348,836.2 | 2,013,626.4 | 224,613.5 | 2,238,240 | 1,889,404 |
| 31 | 2,028 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 2,013,626.4 | 224,613.5 | 2,238,240 | 2,003,129 |
| 32 | 2,029 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 2,013,626.4 | 224,613.5 | 2,238,240 | 2,003,129 |
| 33 | 2,030 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 2,013,626.4 | 224,613.5 | 2,238,240 | 2,003,129 |
| 34 | 2,031 | 0.0 | 235,111.0 | 0.0 | 235,111.0 | 1,327,097.0 | 148,033.4 | 1,475,130 | 1,240,019 |
| 35 | 2,032 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 1,327,097.0 | 148,033.4 | 1,475,130 | 1,398,759 |
| 36 | 2,033 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 1,327,097.0 | 148,033.4 | 1,475,130 | 1,398,759 |
| 37 | 2,034 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 1,327,097.0 | 148,033.4 | 1,475,130 | 1,398,759 |
| 38 | 2,035 | 0.0 | 76,371.7 | 0.0 | 76,371.7 | 368,828.7 | 41,141.7 | 409,970 | 333,599 |
| Total | | 6,976,723.5 | 9,418,576.7 | 4,023,794.1 | 20,419,094.3 | 49,407,717.6 | 5,511,270.6 | 54,918,988.2 | 34,499,893.8 |

IRR= 12.030%

# G TOPOGRAPHIC SURVEY

## Table of Contents

# G TOPOGRAPHIC SURVEY

## G.1 General

During the field survey period, the following topographic survey works were conducted by the Study team.

- Collection of basic topographic data and information on the selected pilot tank areas
- Grid survey of the water spread area of tank
- Longitudinal profile and cross-section survey of the existing bund
- Longitudinal profile and cross-section survey of the existing irrigation canals
- Spot elevation survey in the command areas

The works were conducted in the following ten (10) village areas selected for the feasibility study.

Pilot Tanks for Topographic Survey Works

| Name of Tank | District | Taluk | Water Spread Area ($km^2$) | Irrigation Canal (km) | Existing Bund (km) | Ayacut Area (ha) |
|---|---|---|---|---|---|---|
| | | Northern Study Area* | | | | |
| Echur | Kanchipuram | Thirukalukundram | 0.25 | 2.7 | 1.2 | 54 |
| Cherukkanur Big | Tiruvallur | Tiruthani | 0.35 | 4.6 | 1.9 | 91 |
| Polambakkam | Kanchipuram | Madurantakam | 0.63 | 4.7 | 1.3 | 95 |
| Enadur Big | Kanchipuram | Kanchipuram | 0.73 | 28.7 | 2.1 | 575 |
| Vadakkupattu | Kanchipuram | Sriperumbudur | 1.00 | 20.9 | 1.4 | 417 |
| | | Southern Study Area* | | | | |
| Siruvalai | Sivaganga | Sivaganga | 0.45 | 2.7 | 2.3 | 49 |
| Kurumbi | Sivaganga | Karaikudi | 0.35 | 2.6 | 0.9 | 53 |
| A. Ramalingapuram | Virudunagar | Sattur | 0.13 | 2.9 | 3.0 | 57 |
| Sengangulam | Sivaganga | Manamadurai | 0.85 | 5.0 | 4.2 | 99 |
| Pandikanmoi | Ramanathapuram | Paramakudi | 0.45 | 2.1 | 3.0 | 42 |

Note: Northern Study Area consists of Tiruvallur and Kanchipuram districts, and Southern Study Area consists of Virudunagar, Sivaganga and Ramanathapuram districts.

## G.2 Topographic Data Collection

### G.2.1 Topographic Map

Topographic maps of the scale 1:50,000 and 1:250,000, prepared by the Survey of India were collected. The maps collected cover all of the Study areas.

### G.2.2 Taluk and Village Maps

To facilitate the topographic survey, the taluk maps and the village maps were also

collected covering all the Study areas including the selected pilot tank areas.

## G.3 Field Survey

### G.3.1 Establishment of Bench Marks

Temporary benchmarks were established by the Survey Team prior to the commencement of the survey works in each survey site, and the locations of the established benchmarks were clearly indicated on the 1:5,000 scale village maps with photographs. The benchmarks established are made of concrete so as to enable to be referred in the future. The elevations of the benchmarks are set in such a way that those elevations, which were used for the existing structures as much as possible referring to the available as-built drawings etc.

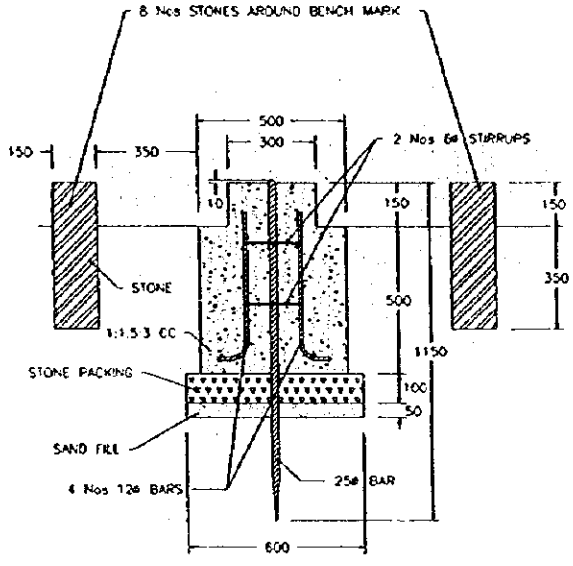
The established benchmarks are as listed below.

List of Established Benchmarks

| Northern Study Area* | | Southern Study Area* | |
|---|---|---|---|
| Name of Tank | Established Elevation | Name of Tank | Established Elevation |
| Echur | 21.668 m | Siruvalai | 108.827 m |
| Cherukkanur Big | 107.797 m | Kurumbi | 34.185 m |
| Polambakkam | 43.980 m | A. Ramalingapuram | 62.978 m |
| Enadur Big | 85.915 m | Sengangulam | 30.674 m |
| Vadakkupattu | 47.292 m | Pandikanmoi | 7.132 m |

The elevation of each benchmark is set referring to the elevations of tank structures such as weirs and sluices mentioned in the Inventory Lists prepared by the PWD in order to avoid such discrepancies between elevations of this Study and the previous design made by the PWD.

The figure shows a typical benchmark pillar installed in each benchmark site. The pillar is made of Reinforced Cement Concrete and is installed at the exact point of the benchmark. The pillar is protected by the rubble stones placed surrounding it. The locations of the installed benchmarks are presented in Benchmark Location Maps compiled in Volume VI: Data Book.




INSTALLED BENCHMARK PILLAR

### G.3.2 Grid Survey of the Waterspread Area of Tank

Spot elevations were measured in the water spread areas of the existing tanks with 50 m grid intervals and 50 cm interval of contour lines were drawn based on the measured grid elevations. The prepared maps of 1:5,000 scale with the contour lines were used for calculating the existing tank capacity.

### G.3.3 Longitudinal Profile and Cross-section Survey of the Existing Bund

Longitudinal profile and cross-section survey was carried out along the existing bund. The interval of the cross-section was 50 m and all the points which are considered important in preparing the rehabilitation plans of bund were taken. The longitudinal profile with 1:100 and 1:2,000 of vertical and horizontal scales, and the cross-section of 1:100 scale were prepared after the survey works are completed.

### G.3.4 Longitudinal Profile and Cross-section Survey of Existing Irrigation Canals

Longitudinal profiles and cross-section surveys were carried out along the existing irrigation canals extending from the irrigation tank to the command area. The interval of each cross-section was 50 m and all the points which are considered necessary for preparing the facility plan were measured. The elevation of related irrigation structures such as culverts, drops, division boxes, foot paths, etc. were also measured and their locations were mentioned on the profile prepared by the Surveyor. The longitudinal profile with 1:100 and 1:2,000 of vertical and horizontal scales, and the cross-section of 1:100 scale were prepared after the survey works are completed.

### G.3.5 Spot Elevation Survey in the Command Areas

Spot elevations in the command areas were measured. The locations of spots of which elevations were measured were indicated on the 1:5,000 scale of maps, and measured spot elevations were also clearly mentioned in the same maps.

## G.4 Prepared Drawings

The following drawings were prepared to facilitate the preliminary design for the feasibility study.

Number of Topographic Drawings Prepared

| Name of Tank / Drawings | Echur | Cherukkanur Big | Polambakkam | Enadur Big | Vadakkupattu | Siruvalai | A. Ramalingapuram | Pandikanmoi | Sengangulam | Kurumbi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spot Elev. in Ayacut | 1 | 1 | 1 | 3 | 4 | 1 | 1 | 1 | 2 | 1 | 16 |
| Canal Align. & Contour in W/S Area | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 12 |
| Profile of Tank Bund | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Cross-section of Tank Band | 8 | 5 | 8 | 8 | 5 | 11 | 4 | 7 | 11 | 9 | 76 |
| Profile of Irri. Canal | 2 | 6 | 5 | 12 | 9 | 6 | 3 | 4 | 9 | 3 | 59 |
| Cross-section of Irri. Canal | 7 | 20 | 8 | 16 | 50 | 11 | 6 | 9 | 24 | 8 | 159 |
| Inventory of Existing Stru. | 4 | 5 | 4 | 5 | 5 | 12 | 5 | 5 | 5 | 3 | 53 |
| Benchmark Location | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Photographs | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Total | 26 | 41 | 30 | 49 | 78 | 45 | 23 | 30 | 55 | 28 | 405 |

The total number of the prepared topographic drawings is 405 sheets, and they are used for the feasibility design. The prepared drawings are compiled in Volume VI: Data Book.

# H. TEST BORING AND HYDROGEOLOGICAL INVESTIGATION

## Table of Contents



## List of Tables



## List of Figures

# H TEST BORING AND HYDROGEOLOGICAL INVESTIGATION

## H.1 General

This section deals with all the results of the geological and hydrological investigations which have been conducted during the Study period including geological and hydrogeological conditions of Study Area as well as the selected ten (10) pilot tanks.

In order to grasp the hydrogeological parameters and conditions in the selected areas, test boring and pumping tests including in-situ permeability tests are also conducted in the field during the Study period. The details of procedures, methods and results of analyses , etc. are also presented.

The conclusions and recommendations which are derived from these studies, field investigations, etc. are presented in the last section with the estimated groundwater potential and present draft of each pilot tank area.

## H.2 Hydrogeological Field Survey and Investigation in Pilot Tank Areas

The groundwater and hydrogeological survey was carried out in the selected ten (10) tanks, five (5) in the Northern Study Area and five (5) in the Southern Study Area. A detailed geological and hydrogeological survey was carried out in all these tanks using the existing open wells. This survey includes the study of lithology, structure, intensity of weathering, well particulars, and measurement of Electrical Conductivity (EC) and pH of groundwater.

Based on the results of this detailed survey, the following four (4) tank areas are selected for boring tests.

- Northern Study Area: Cherukkanur Big Tank area
  Vadakkupattu Tank area
- Southern Study Area: Sengangulam Tank area
  Pandikanmoi Tank area

The boring test comprise of lithological sampling, permeability tests and pumping tests. The details of the above geological and hydrogeological survey are discussed below.

The locations of the ten (10) Pilot Tanks and the tanks selected for the test boring are indicated in Fig. H.2.2.

### H.2.1 Test Boring

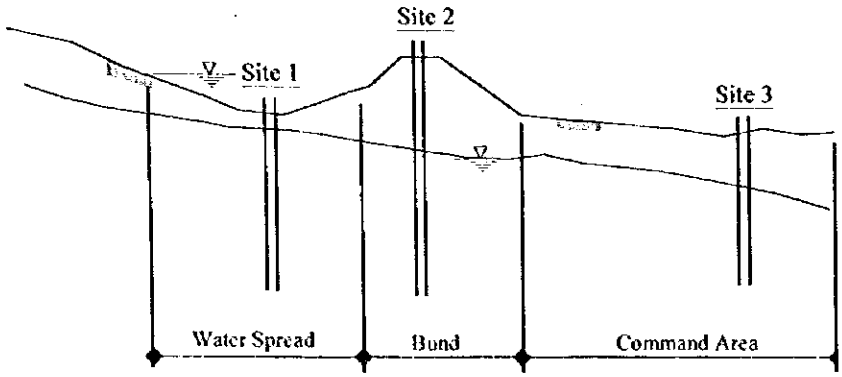
(1) Boring Sites

The selected four (4) tanks their geological formations are given below.

Tanks for Detailed Hydrogeological Surveys

| Study Area | Name of Tank | Geology |
|---|---|---|
| Northern Study Area | 1. Cherukkanur Big<br>2. Vadukkupattu | Arechean basement at 3 - 4 m<br>Sedimentary (Shales) |
| Southern Study Area | 3. Sengangulam<br>4. Pandikanmoi | Arechean basement at 20 - 24 m<br>Sedimentary (Alluvium) |

Drilling is carried out in water spread area (Site 1), on bund (Site 2) and in command area (Site 3) of these tanks as shown in the following figure.




LOCATION OF TEST BORING

The purpose of drilling in each site are as follows:

- Site 1 in the tank area: Lithological sampling, confirmation of groundwater level
- Site 2 on the tank bund: Lithological sampling, permeability tests for bund materials and foundation
- Site 3 in the ayacut: Lithological sampling, confirmation of groundwater level, pumping tests

The locations of the above Sites are indicated for each tank area in Fig. H.2.2 and Fig. H.2.3. During drilling, lithological samples were collected and the subsurface geology was studied.

(2) Drilling and Testing Procedures

1) Drilling

The boreholes were drilled by rotary drilling method with a direct mud circulation system or by the hammer rig system depending on the geological condition. Lithological samples are also obtained frequently in the course of drilling. These samples are considered essential for drilling operation, especially in a well for hydrogeological study purpose.

Drilling and testing operations are carried out in accordance with the standard method of well construction as stated below.

Drilling and Testing Procedures

| Step No. | Work Description | Site 1 | Site 2 | Site 3 |
|---|---|---|---|---|
| 1. | Drill a conductor hole | ★ | ★ | ★ |
| 2. | Install a conductor pipe to the drilled depth | ★ | ★ | ★ |
| 3. | Seal the annular space between the wall of a drilled bore and the conductor pipe by cementing | ★ | ★ | ★ |
| 4. | Drilling of the borehole or pilot hole to the required depth | ★ | ★ | ★ |
| 5. | Ream the bore hole to the required depth | | | ★ |
| 6. | Determine the position(s) of screen pipes | | ★ | ★ |
| 7. | Install casing, screens and piezometer pipe as determined | | ★ | ★ |
| 8. | Make gravel-packing for the annular space between the bore hole and casing/screen pipe | | ★ | ★ |
| 9. | Make clay-packing for the annular space of the upper part of gravel-packing | | ★ | ★ |
| 10. | Cementation for the annular space above the clay-packing | | | ★ |
| 11. | Perform the development of a well by air-lifting and/or surging, bailing etc. | | | ★ |
| 12. | Carry out the pumping test by submersible pump | | | ★ |
| 13. | Carry out the permeability test | | ★ | |
| 14. | Dismantle all the materials and fill up the well | ★ | ★ | |
| 15. | Install sanitary seal and construct well head | | | ★ |
| 16. | Shift to the next drill site and clean the completed drilling site | ★ | ★ | ★ |

The sizes of drilling holes and pipes installed were determined to fulfill the following requirements.

Required Sizes of Boreholes and Pipes

| Site | Minimum Size | |
|---|---|---|
| | Hole | Casing & Screen |
| Site 1: Water Spread Area | 4" | - |
| Site 2: Bund | 6" | - |
| Site 3: Command Area | 8" | 6" |

The structures of the constructed boreholes are presented in Fig. H.2.4 to Fig. H.2.7, and the depths of the drilled boreholes are as follows:

Depths of Drilled Boreholes

| Name of Tank | Site 1 | Site 2 | Site 3 |
|---|---|---|---|
| 1. Cherukkanur Big | 17 m | 28.9 m | 37.0 m |
| 2. Vadukkupattu | 30.0 m | 22.5 m & 6.0 m | 50.0 m |
| 3. Sengangulam | 22.0 m | 15.1 m & 3.2 m | 69.0 m |
| 4. Pandikanmoi | 24.0 m | 21.3 m & 2.0 m | 60.0 m |

2) Pump Test

Three (3) different kinds of pumping tests i.e. step drawdown test, constant discharge test and recovery test were conducted after completion of drilling works, and air lifting is carried out in the boreholes drilled in the ayacut (Site 3). The pumps are installed in casting pipes with a setting depth of 30 to 50 m below ground level (BGL) through rising main and delivery pipes. A valve and flow meter are also installed in the delivery pipe..

The tests are carried out basically based on the following standard method.

- Step drawdown test: 3 to 5 steps are carried out and the duration of each step is 120 minutes.
- Constant discharge test: 24 hours or more measurement is conducted as soon as the water level in the well has recovered its static water level after completion of the step drawdown test.
- Recovery test: The test starts immediately after completion of the constant discharge test and continues until water level in the well recovers its static water level.

The static water level in the well is measured just before any pumping test commences. Throughout the duration of each test, the water level in the borehole was measured and recorded following the time schedule listed in the following table.

Time Interval of Observation

| Time from start of pumping or increase of pumping rate (min) | Time interval between observation (min) |
|---|---|
| 1 - 5 | 1/2 |
| 0 - 10 | 1 |
| 10 - 20 | 2 |
| 20 - 60 | 5 |
| 60 - 120 | 10 |
| 120 - 180 | 15 |
| 180 - 240 | 20 |
| 240 - 300 | 30 |
| 300 and longer | 60 |

The flow of all water pumped from the well during pumping test is measured by a flow meter in the delivery pipe works and triangular weir. Discharge rate is recorded during the pumping test at intervals corresponding to those for water level measurement.

However, in order to meet the specific hydrogeological conditions at each

well, discharge rate, test duration, number of step and time intervals were altered.

### H.2.2 Results of Test Boring

(1) Pumping Test

1) Method of Analyses

- Aquifer Constant

Major aquifer constants necessary for aquifer evaluation are transmissibility, storage coefficient and permeability. These aquifer constants were estimated using the results of the constant rate and time recovery tests. The Thesis and Jacob methods are applied to work out these aquifer constants. The aquifer constants are given by the following formula.

Thesis Method

$$T = Q \times W(u) / 4\pi \times s$$

Where $T$ = transmissivity
$Q$ = pumping rate ($m^3$/day)
$W(u)$ = well function of u
$s$ = drawdown (m) at matching point

$$K = T / L$$

Where $T$ = transmissibility ($m^3$/day)
$K$ = permeability (m/day)
$L$ = thickness of aquifer (total length of screen pipes)

The well function, $W(u)$ is considered as a function of $u$, as plotted in Fig. H.2.8.

Jacob Method

$$T = 0.183 \times Q / \Delta s$$

Where $T$ = transmissivity ($m^2$/day)
$Q$ = pumping rate ($m^3$/day)
$Ds$ = drawdown on the log cycle

$$K = T / L$$

Where, $T$ = transmissibility ($m^2$/day)
$K$ = permeability (m/day)
$L$ = thickness of aquifer (total length of screen pipes)

Well efficiency and Area of Influence

In order to evaluate the capacity of the well and recommendable operation yield., well efficiency is calculated by the data of step drawdown test. The following formula is applied to calculate the well efficiency.

$$Ew = BQ/(BQ+CQ^2)$$

Where, $Ew$ = well efficiency (%)
$B$ = aquifer loss coefficient
$C$ = well loss coefficient
$Q$ = discharge rates (l/s)

Estimation of Well Capacity

In order to determine the capacity of each well, two (2) different yield of maximum yield, and critical yield are estimated based on the pumping test results.

The maximum yield is defined as a maximum pumping rate available in the well without any consideration for a risk of large drawdown and availability of pump head. Thus, it is considered as an unrealistic rate for the actual operation. On the other hand, critical yield is a maximum rate within the actual rate of the pumping house of the well. Therefore, this yield is considered to be defined as the maximum rate for a realistic drawdown of pumping. The critical yield is obtained by the maximum yield as stated below.

Maximum Yield (by Sichardt Formula)

$$Q\max = 2 \cdot \pi \cdot r \cdot h\sqrt{\frac{K}{15}}$$

where $Qmax$ = maximum yield (l/s)
$r$ = radius of casing pipe
$h$ = length of aquifer (screen pipe)
$K$ = permeability of aquifer

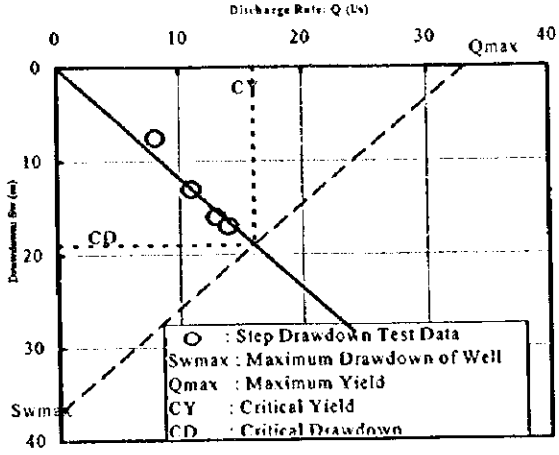
Critical Yield

$$CY = \frac{mSw \cdot Q\max}{(Q\max/ave \cdot Q/Sw) + mSw}$$

Where $CY$ = critical yield (l/s)
$mSw$ = max. drawdown available (depth of pump house -

pump clearance) (m)
*Qmax* = maximum yield (l/s)
*Ave.Q/Sw* = average specific yield of each step (lit./s/m)

The following chart shows the theory of above formula.




CALCULATION OF CRITICAL YIELD

Safe Yield and Operation Yield

The critical yield obtained as explained in the above section is considered to be the actual capacity of the well. However, considering environmental impacts to the surrounding existing well and to avoid the risks of a decreasing of yield by over-pumping, the safe and the operational yields are estimated. The safe yield is estimated by evaluating two (2) factors; the well efficiency and Q vs Sw log - log chart.

The well which has the following character, 80 % rate of Critical Yield was adopted as safe yield.

- Inclination of Q-Sw log - log chart is exceeding more than 45 %.
- Well efficiency ratio is less than 80 % at the critical yield rate.

The well which has a following character, 100 % rate of critical yield was adopted as safe yield.

- Inclination of Q- Sw log - log chart is exceeding more than 45 %.
- Well efficiency ratio is more than 80 % at the critical yield rate.

Actually, the well capacity should be determined depending on the drawdown depth of groundwater level. The critical yield is already estimated within the acceptable allowance of the maximum drawdown. However, considering the safe

operation of the source, the estimated safe yield should be kept as maximum operation rate.

ii) Results of Pumping Test

The results of the pumping tests conducted are illustrated in Fig. H.2.9 to Fig. H.2.11 for each tank area. In the Cherukkanur Big Tank area, the pumping tests are not carried out because the groundwater potential is considered quite poor in the hydrogeological viewpoint and the groundwater level is drawn immediately after commencing pump-up operation.

Consequently, the pumping tests are conducted in the Vadakkupattu, the Sengangulam and the Pandikanmoi Tank areas. The results of the pumping tests are presented and discussed below.

Aquifer Constants

The aquifer constants such as transmissivity, storage coefficient and permeability are calculated based on the results of the constant discharge test and the recovery test. The calculated aquifer constants are tabulated below.

Results of Pumping Test (Aquifer Constants)

| Name of Tank | Test | Transmissivity ($m^2$/day) | Storage Coeff. | Permeability (cm/sec) |
|---|---|---|---|---|
| Cherukkanur Big* | - | - | - | - |
| Vadakkupattu | Constant, Theis | 0.482 | 0.76 | $1.4 \times 10^{-3}$ |
| | Constant, Jacob | 0.982 | 1.63 | $2.9 \times 10^{-3}$ |
| | Recovery | 0.395 | - | $1.2 \times 10^{-3}$ |
| | Average | 0.620 | 1.20 | $1.8 \times 10^{-3}$ |
| Sengangulam | Constant, Theis | 5.76 | 0.220 | $1.4 \times 10^{-4}$ |
| | Constant, Jacob | 14.83 | 0.012 | $3.5 \times 10^{-4}$ |
| | Recovery | 2.88 | - | $6.9 \times 10^{-5}$ |
| | Average | 7.82 | 0.116 | $1.9 \times 10^{-4}$ |
| Pandikanmoi | Constant, Theis | 12.96 | 0.057 | $6.3 \times 10^{-4}$ |
| | Constant, Jacob | 20.16 | 0.004 | $9.7 \times 10^{-4}$ |
| | Recovery | 21.60 | - | $1.0 \times 10^{-3}$ |
| | Average | 18.24 | 0.031 | $8.8 \times 10^{-4}$ |

Note *: The pumping tests were not carried out because the potential of groundwater was quite poor.

As shown in the above table, the estimated aquifer constants vary widely even in the same tank area depending on calculation and test methods applied. The average values are taken in each tank area, and the calculated averages indicate rather low values suggesting that the abundant potential of groundwater might not be expected in all the areas. Generally, the tanks in the Southern Study Area may be more potential than those in the Northern Study Area.

Yield Potential

The calculated maximum and the critical yields are presented in the following table.

Results of Pumping Tests (Yield Potential)

| Name of Tank | Maximum Yield (l/sec) | Critical Yield (l/sec) | Safe Yield (l/sec) |
|---|---|---|---|
| Cherukkanur Big* | - | - | - |
| Vadakkupattu | 157 | 0.2 | 0.2 |
| Sengangulam | 816 | 4.8 | 1.5 |
| Pandikanmoi | 889 | 1.9 | 4.8 |

Note *:The pumping tests were not carried out because the groundwater potential was quite poor.

The yields in the Sengangulam and the Pandikanmoi tank areas indicate larger values of more than 800 l/sec of yield, while those of the Vadakkupattu are as small as 150 l/sec only. The safe yields are estimated area by area as summarized below.

- Vadakkupattu Tank:

As shown in Fig. H.2.9, the inclination of Discharge - Drawdown curve exceeds 45°, but the well efficiency at the critical discharge of 0.21 l/sec is calculated to be only 13 %. Therefore, the safe yield of this tank area is taken as 100 % of the critical yield.

- Sengangulam Tank:

As shown in Fig. H.2.10, until the third stage of the step drawdown, the Discharge - Drawdown curve follows the inclination of 45°. However, at the critical discharge rates of 1.9 l/sec, the well efficiency is calculated to be 14 % only. Then, 80 % of the critical discharge is taken as the safe discharge, and calculated to be 1.5 l/sec.

- Pandikanmoi Tank:

As shown in Fig. H.2.11, the inclination of the Discharge - Drawdown curve shows less than 45° throughout the steps of step drawdown test. The critical yield is calculated as high as 4.8 l/sec, far exceeding the tested ranges of discharge, but the well efficiency at the critical discharge of 4.8 l/sec is calculated to be 73 %. Therefore, 100 % of critical yield is taken as the safe discharge.

Groundwater Level

The table shows the groundwater level observed in each drilled hole. The groundwater levels in the Northern Study Area are generally shallow ranging from 2.1 m to 4.7 m only, while those in the Southern Study Area vary from 12.0 m to 13.0 m.

Results of Pumping Tests
(Groundwater Level)

| Name of Tank | | Groundwater Level (m) |
|---|---|---|
| Cherukkanur Big | Site 1 | 3.0 |
| | Site 2 | 4.7 |
| | Site 3 | 3.0 |
| Vadakkupattu | Site 1 | 2.1 |
| Sengangulam | Site 3 | 13.0 |
| Pandikanmoi | Site 2 | 12.0 |
| | Site 3 | 12.2 |

b) Permeability Test

i) Method of Analyses

The permeability is calculated employing the following formula.

- In case there is no water in the well, a slug test is carried out.

$$K = \frac{r_1^2}{2A\Delta t}\left[\frac{\sinh^{-1}\frac{A}{r_e}}{2}\ln\left(\frac{2H_1 - A}{2H_2 - A}\right) - \ln\left(\frac{2H_1H_2 - AH_2}{2H_1H_2 - AH_1}\right)\right]$$

Where K: permeability
A: length of test section
$r_1$: inside radius of pipe
$r_e$: radius of hole
$\Delta t$: time intervals ($t_1$-$t_0$, $t_2$-$t_1$)
H: length of water column from bottom of test interval to water surface in pipe ($H_0$, $H_1$, $H_2$ length at times $t_0$, $t_1$, $t_2$ ·····)

- In case there is water in the well, a bail test is carried out.

$$K = \frac{r^2 \ln(L/R)}{2LT_0}$$

Where K: permeability
r: radius of pipe
L: length of open area
R: radius of test section $= \frac{H - h}{H - H_0}$

$T_0$:time taken from graph for at 0.37

ii) Results of Permeability Test

The permeability of the materials of existing bunds and their foundation are measured in each tank area by slugging or bailing water in the drilled holes. The observed groundwater levels are plotted in Fig. H.3.12, and the calculated values of permeability are tabulated below.

Measured Permeability of Bunds and Foundation

(Unit: cm/sec)

| Name of Tank | Bund | Foundation |
|---|---|---|
| Cherukkanur Big | $6.7 \times 10^{-3}$ | $1.6 \times 10^{-3}$ |
| Vadakkupattu | $3.5 \times 10^{-4}$ | $1.0 \times 10^{-4}$ |
| Sengangulam | $1.5 \times 10^{-4}$ | $8.6 \times 10^{-2}$ |
| Pandikanmoi | $2.6 \times 10^{-5}$ | $3.6 \times 10^{-5}$ |

The permeability of the bunds are measured within a range from $2.6 \times 10^{-5}$ to $6.7 \times 10^{-3}$. The permeability of the Cherukkanur Big Tank is considered rather low, but the others are acceptable as a bund material.

The permeability of the Vadakkupattu and the Pandikanmoi Tanks are considered impermeable. The permeability of the Cherukkanur Big and the Sengangulam Tanks indicates rather low values suggesting that the recharge from the tank would be enough.

### H.2.3 Geological Profiles of Tank Areas

The geological formation of each pilot tank area is different at different depths as illustrated in Fig. H.2.13 and H.2.14. The principal characteristics of geology is summarized below.

a) Cherukkanur Big Tank Area

The geology of the Cherukkanur Big Tank area is considered simple consisting of three (3) strata; about three (3) to five (5) m of clayey top soil, about ten (10) m thick weathered or disintegrated granite below the top soil, and granite as a hard and compact basement with fractured granite. The groundwater is expected mainly in the top soil and the fractured and weathered granite.

b) Vadakkupattu Tank Area

The geological conditions in the tank area is considered quite different from that in the ayacut. It is composed of the sandy clay strata on the top and the crystalline rock of basement consisting of chornockite. The crystalline rock disappear in the ayacut area, and shale becomes predominant instead in the ayacut. This shale layer may continues more than 50 m deep consisting of weathered, compact and fractured shale. The water bearing layer is expected in

the top soil and the fractured shale deeper than 35 m.

c) Sengangulam Tank Area

The geology of this tank area is characterized by about ten (10) m of sendimentary rocks covered by the black clay top soil of which thickness is about three (3) m. The sedimentary materials are mainly composed of fine to medium coarse sand. Under the sedimentary stratum, weathered and fractured crystalline rock continues till the depth of about 70 m, and the massive rock appears below this crystalline rock. The groundwater is expected mainly in the sedimentary strata and thick fractured and weathered rock zone.

d) Pandikanmoi Tank Area

This area is covered by a quite thick sedimentary stratum. It consists of mainly two (2) layers; the sedimentary consisting of fine sand with clay to the depth of about five (5) to nine (9) m, and medium to coarse sand layer to the depth more than 60 m. The groundwater is expected in all the layers.

### H.2.4 Results of Inventory Survey of Existing Wells

The geological and hydrogeological surveys are carried out for the existing open and tubewells in the ayacut. The survey covers all of the tank area of the selected ten (10) pilot tanks. The following table shows the number of wells surveyed in each pilot tank area.

Number of Existing Tanks Surveyed

| Northern Study Area | | Southern Study Area | |
|---|---|---|---|
| Echur | 21 | Siruvalai | 12 |
| Cherukkanur Big | 14 | Kurumbi | 20 |
| Polambakkam | 30 | A. Ramalingapuram | 6 |
| Enadur Big | 13 | Sengangulam | 13 |
| Vadakkupattu | 21 | Pandikanmoi | 4 |
| Total | 99 | Total | 55 |

The total number of the surveyed wells is 154 consisting of 99 wells in the Northern Study Area and 55 wells in the Southern Study Areas.

The survey includes the observation and measuring of depth of well, water level, recharge source, electric conductivity, pH, etc. The results of the survey are summarized in Table H.2.1 and Table H.2.2, and the average values are tabulated below.

Summary of the Inventory Survey Results

| | Name of the Tank | Depth to Water Table During the Study (m) | PH | EC (μS/cm) |
|---|---|---|---|---|
| Northern Study Area | Echur Tank | 1.5 - 4.2 | 7.1 - 8.5 | 400 - 575 |
| | Cherukkanur Big Tank | 1 - 4.5 | 6.5 - 8.0 | 400 - 850 |
| | Polambakkam Tank | 2 - 3 | 6.8 - 7.9 | 300 - 500 |
| | Enadur Big Tank | 3 - 7 | 7 - 7.8 | 270 - 520 |
| | Vadakkupattu Tank | 2 - 6 | 6.5 - 7.5 | 475 - 845 |
| Southern Study Area | Siruvalai Tank | 3.6 - 14.0 | 6.9 - 8.1 | 540 - 3,000 |
| | Kurumbi Tank | 4.5 - 8.0 | 6.0 - 7.8 | 320 - 1,200 |
| | A. Ramalingapuram | 3 - 4 | 7.4 - 8.2 | 4,000 - 6,700 |
| | Sengangulam Tank | 13 - 21 | 6.8 - 8.1 | 1,050 - 2,500 |
| | Pandikanmoi Tank | 19 - 24 | 7.0 - 7.5 | 2,800 - 5,000 |

Generally, the depths of wells in the Northern Study Area are considered deeper than those in the Southern Study Area, while the electric conductivity values in Northern Study Area are lower than those in the Southern Study Area. Especially, in the A. Ramalingapuram, the Sengangulam and the Pandikanmoi Tank areas, EC values are considered quite higher. As for the pH, in the most of the tank areas the similar values are measured within a range from 6.5 to 8.5. The values in the A. Ramalingapuram, the Sengangulam and the Pandikanmoi Tank areas are considered higher suggesting that some saline water may exist in these tank areas. The EC contour maps of some selected tank areas are presented in Fig. H.2.15 for reference.

## H.3 Conclusions and Recommendations

From the results of various studies and analyses, and field surveys and investigations discussed above, the following conclusions and recommendations are derived.

(1) Cherukkanur Big Tank Area

The study results reveals that the groundwater level is observed to be shallow, but the groundwater potential in the command area of the Cherukkanur Big Tank area is very poor, where only 30 minutes of pumping could be carried out due to very low recharge. It is then difficult to use the groundwater as a continuous water source, but the intermittent use with some days interval may be possible as a supplemental or urgent water source. For this purpose, tubewell type is not recommendable in view of the recharge expected. An open well will be applicable for this purpose with a large diameter to facilitate the recharge and to increase the storage capacity of the well.

The groundwater potential is estimated as 4,920,000 $m^3$ but its exploitable volume is 1,723,000 $m^3$ only. The water quality of this tank area is considered suitable in view of the EC and pH values observed during the study period.

(2) Vadakkupattu Tank Area

The well drilled at the command area of the Vadakkupattu tank area also gave a very poor yield. However, the groundwater level is shallow and it is observed from two (2) to six (6) m below ground level in this area. It is, therefore, recommended to use the groundwater in this tank area for supplemental or urgent irrigation water sources only. The tubewell type is not recommendable for the irrigation purpose, but for supplying drinking water.

The groundwater potential is estimated as 8,340,000 $m^3$ and the exploitable volume is 6,672,000 $m^3$. The water quality of this tank area is considered suitable in view of the EC and pH values observed during the study period.

(3) Sengangulam Tank Area

Comparing with the Northern Study Area, the groundwater potential is higher according to the results of the test boring and the inventory survey of the existing wells. The safe discharge of 1.5 l/sec is estimated for the tubewell constructed for pumping tests in this tank area. However, this discharge is not considered sufficient for constant irrigation taking into account of the irrigable areas and estimated drawdown. It is, therefore, recommended to use the groundwater for supplemental or urgent irrigation water sources to the limited areas. The groundwater level is observed deeper than the Northern Study Area.

In this tank area, 8,210,000 $m^3$ is estimated as the exploitable volume out of the total potential of 8,720,000 $m^3$. As for the water quality of the groundwater in this tank area, the electric conductivity is observed as 1.0 to 2.5 dS/m, which suggests that the water may cause trouble in cultivation though these values are within the allowable range of the FAO guidelines.

(4) Pandikanmoi Tank

The groundwater level in this tank area is observed 19 - 20 m below the ground surface. However, the safe yield is estimated as 4.8 l/sec which is considered to be the largest in the pilot tanks for test boring. This groundwater may be able to use for the irrigation purpose in view of the available yield, but the electric conductivity is observed from 2.8 to 5.0 dS/m, which is considered higher than the allowable range of the FAO guidelines. Therefore, it is recommended to pay careful attention to the water quality when it is used for the irrigation purpose.

The groundwater potential and the exploitable volume of the groundwater area are also evaluated. In the Northern Study Area, the Enadur Big Tank is considered to have the most potential in groundwater, but 53 % has been already drafted. The Sengangulam Tank is considered to have the most potential in the Southern Study Area, and the draft remains only six (6) %. Generally speaking the potential in the Northern Study Area is

larger comparing with the Southern Study Area. However, the draft is larger in the Northern Study Area than in the Southern Study Area.

As for the potential per ha, the Enadur Big Tank is the smallest in the pilot tanks, and the Echur Tank is considered the largest. Generally the unit potential per ha is larger in the Southern Study Area comparing with the Northern Study Area.

In the context described above, it is concluded that the exploitable groundwater is expected in the Southern Study Area than in the Northern Study Area considering the per-ha potential and the extent of the draft. However, in the Southern Study Area, the observed EC values sometimes indicate high salinity especially in the southern part of this study area such as the A. Ramalingapuram, the Sengangulam and the Pandikanmoi Tanks. It is confirmed that the black soils exist in these areas. Therefore, it is recommended that careful attention need to be paid to the water quality in case the groundwater development is planned in these areas.

In addition, the Gondwana formation exists in the Study Area, which belongs to the Lower Cretaceous geologically. Since this formation is generally considered as the formation bearing quite less groundwater, it is recommended to seek the other water sources in the areas having this formation.

## Table H.2.1 Results of Inventory Survey of the Existing Wells In Northern Study Area (1/3)

(Northern Study Area)

| Well No. | Well Type | Top Soil thickness (m) | Weathered Zone thick (m) | Jointed Zone thick | Rock Type | Total Depth (m) | Side Bore well(m) | Water Level (m) | Well Shape | Mode of Extraction | Delivery Pipe Size (Inches) | Suction Tube | Recharge Sources | EC (µS/cm) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Echur Tank | | | | | | | | | | | | | | | |
| 1 | D | 2 | 4 | | Crystalline -Chanokite | 6.5 | | 2.25 | R | E | 2.25 | 2.5 | Tank | 500 | 7.7 |
| 2 | D | 3 | 4 | | " | 6.5 | | 2.25 | R | E | 2 | 2.5 | Tank | 450 | 7.7 |
| 3 | D | 3 | 4 | | " | 6 | | 2.5 | R | E | 2.5 | 3 | Tank | 400 | 7.2 |
| 4 | D | | | | " | 7.5 | | 2.5 | R | E | 2.5 | 2.5 | Tank | 425 | 7.2 |
| 5 | D | 2.5 | 4.6 | | " | 8.5 | 20 | 2.5 | R | E | 2.5 | 2.5 | Tank | 400 | 7.7 |
| 6 | D | | | | " | 7.2 | | 2.3 | R | E | 2.5 | 2.5 | Tank | 400 | 7.3 |
| 7 | D | 2 | | | " | 7.7 | | 2.5 | R | E | 2 | 2.5 | Tank | 425 | 7.4 |
| 8 | D | | | | " | 6.5 | | 1.5 | R | E | 3 | 3 | Tank | 425 | 7.7 |
| 9 | D | 3 | 4 | | " | 7.2 | | 2.5 | R | E | 2.5 | 2.5 | Rainfall | 500 | 7.6 |
| 10 | D | | | | " | 11.5 | | 2.5 | R | E | 2.5 | 2.5 | Rainfall | 425 | 7.5 |
| 11 | D | | | | " | 8.5 | | 2 | R | E | 2.5 | 2.5 | Rainfall | 475 | 7.6 |
| 12 | D | | | | " | 8 | | 2 | R | E | 2.5 | 2.5 | Rainfall | 450 | 7.3 |
| 13 | D | | | | " | 9 | | 2.25 | R | E | 1.5 | 2.5 | Rainfall | 525 | 8.5 |
| 14 | D | | | | " | 7.3 | | 2.5 | R | E | 2.5 | 4.5 | R ainfall | 475 | 7.4 |
| 15 | D | | | | " | 7 | | 3.5 | R | E | 2 | 2.5 | Rainfall | 485 | 7.2 |
| 16 | D | 1.35 | 3 | | " | 6 | | 4.5 | R | E | 2.5 | 3 | Tank | 500 | 7 |
| 17 | D | 1.75 | | | " | 7.3 | | 6.3 | R | E | 3 | 3.5 | Tank | 475 | 7.1 |
| 18 | D | 3 | 5 | | " | 7.5 | | 2.7 | R | E | 2.5 | 3 | Tank | 485 | 7.3 |
| 19 | D | 1.8 | | | " | 7.2 | | 3.5 | R | D | 2.5 | 3 | Stream | 465 | 7 |
| 20 | D | 2.4 | | | " | 7.2 | | 4.2 | R | D | 3 | 3 | Stream | 525 | 7.2 |
| 21 | D | 1.8 | | | " | 7.5 | | 3.25 | R | A | | | Stream | 575 | 7.3 |
| 2. Cherukkanur Big Tank | | | | | | | | | | | | | | | |
| 1 | D&B | 1 | 10 | | Crystalline-Chanockite /Gneiss | 30 | 15 | 3.3 | R | E | 2.5 | 3 | Stream | 325 | 6.5 |
| 2 | D | | 10 | | " | 30 | | 2 | S | E | 2.2 | 3 | Stream | 570 | 7 |
| 3 | D | 1 | 5.5 | | " | 7.5 | | 1 | R | E | 3 | 3 | Stream | 400 | 7.7 |
| 4 | B | 1 | 4 | 10 | " | 20 | | 1.5 | R | E | 2.5 | 2.5 | Stream | 460 | 8.0 |
| 5 | D | | | | " | 20 | | 1.5 | R | | | | Tank | 340 | 7.9 |
| 6 | D | | 3 | | " | 10 | | 1.5 | R | | | | River | 460 | 7.6 |
| 7 | D&B | 1 | 3 | | " | 9.5 | | 5 | R | E | 3 | 3.5 | River | 670 | 7.4 |
| 8 | D&B | | | | | 9.5 | | 3 | R | E | 2.5 | 2.5 | River | 850 | 7.9 |
| 9 | D&B | 1.6 | | | " | | | | R | E | 3 | 3.5 | River | 620 | 8.0 |
| 10 | D | | 3 | | " | 10.5 | | 3 | R | E | 3.5 | 4 | River | 580 | 7.6 |
| 11 | D | | 1.5 | | " | 11 | | 4.5 | R | E | 2.5 | 3 | River | 540 | 7.8 |
| 12 | D&B | | | | " | | | 4.5 | R | E | 2.5 | 3.5 | River | 600 | 7.5 |
| 13 | D&B | 1.4 | 5 | | " | 9 | | 5 | R | E | 2 | 2.5 | River | 485 | 7.4 |
| 14 | D&B | | | | " | | | | | | | | | | |
| 3. Polambakkam Tank | | | | | | | | | | | | | | | |
| 1 | D | 2 | 1.75 | | Chano-ckite | | | 3.75 | R | E | 2.5 | 2.5 | Tank | 400 | 7.2 |
| 2 | D | 3 | | | " | | | 2.75 | R | E | 3 | 3 | | 450 | 7.1 |
| 3 | D | 1.5 | 1.25 | | " | | | 2.8 | R | E | 2.5 | 2.5 | Rainfall | 500 | 7.3 |
| 4 | D | 2.4 | | 3 | " | | | 5.4 | R | E | 2.5 | 2.5 | Rainfall | 520 | 7.5 |
| 5 | D | 1.8 | | | " | | | 2.7 | S | E | 2.5 | 2.5 | Tank | 400 | 7.3 |
| 6 | D | 3.4 | | | " | | | 2.4 | R | E | 3 | 3 | Tank | 450 | 7.2 |
| 7 | D | 1 | 1.5 | | " | | | 2.7 | R | E | 2.5 | 2.5 | Tank | 500 | 7.6 |

## Table H.2.1 Results of Inventory Survey of the Existing Wells in Northern Study Area (2/3)

(Northern Study Area)

| Well No. | Well Type | Top Soil thickness (m) | Weathered Zone thick (m) | Jointed Zone thick | Rock Type | Total Depth (m) | Side Bore well(m) | Water Level (m) | Well Shape | Mode of Extraction | Delivery Pipe Size (Inches) | Suction Tube | Recharge Sources | EC (µS/cm) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | D | 1.5 | | | " | | | 3 | R | E | 2.5 | 2.5 | Tank | 530 | 7.9 |
| 9 | D | 0.75 | 4 | | " | | | 5.4 | S | E | 2.5 | 2 | Tank | 600 | 8 |
| 10 | D | 1.5 | | | " | | | 4.5 | R | E | 2.5 | 2.5 | Tank | 590 | 7.8 |
| 11 | D | 2.4 | | | " | | | 3.6 | S | E | 2.5 | 2.5 | Rainfall | 300 | 7.8 |
| 12 | D | 3.3 | | | " | 9 | | 6.3 | R | E | 2 | 3 | | 400 | 7.7 |
| 13 | D | 1 | 2.5 | | | 9 | | 6 | R | E | 2.5 | 2.5 | Rainfall | 450 | 7.6 |
| 14 | D | | | | " | 10 | | 2.25 | R | E | 2.5 | 2.5 | Others | 400 | 7.8 |
| 15 | D | 6.5 | 3 | | " | | | 6 | R | E | 3 | 3 | Tank | 480 | 7.7 |
| 16 | D | | | | " | | | 3 | R | E | 3 | 3 | Tank | 300 | 7.9 |
| 17 | D | 3.7 | | | | 5 | | 4 | R | E | 2.5 | 2.5 | Rainfall | 300 | 7.2 |
| 18 | D | 2.25 | | | " | 7.2 | | 4.5 | R | E | 2.5 | 2.5 | | 300 | 7.9 |
| 19 | D | 3 | | | " | 9 | | 5.5 | R | E | 2.5 | 2.5 | | 300 | 7.2 |
| 20 | D | | | | " | 5.75 | | 3 | R | E | 2 | 2.5 | Others | 450 | 7.6 |
| 21 | D | | | | " | 5.75 | | 3.25 | R | D | 2.5 | 2.5 | Rainfall | 500 | 7.2 |
| 22 | D | | | | " | | | 8.5 | R | E | 2 | 2 | Rainfall | 450 | 6.8 |
| 23 | D | 0.5 | 1.5 | | " | 7.2 | | 3.2 | R | D | 2.5 | 3 | Rainfall | 300 | 7 |
| 24 | D | 3 | | | " | 7.25 | | 2.7 | R | E | 2.5 | 2.5 | Rainfall | 450 | 7.2 |
| 25 | D | | | | " | 7.2 | | 2.7 | R | E | 2.5 | 2.5 | | 475 | 7.1 |
| 26 | D | 2.5 | | | " | 7.2 | | 3 | R | E | 2.5 | 2.5 | Tank | 300 | 7.2 |
| 27 | D | 2.5 | | | " | 7.2 | | 3 | R | E | 2.5 | 2.5 | Tank | 350 | 7.2 |
| 28 | D | 2.7 | | | " | 7.3 | | 3 | R | E | 2.5 | 2.5 | Tank | 400 | 7.3 |
| 29 | D | 0.5 | 2 | | " | 7 | | 2.5 | R | A | | | Tank | 450 | 7.2 |
| 30 | D | 3 | | | " | 7.2 | | 3 | R | E | 2.5 | 2.5 | Tank | 300 | 7.7 |
| 4. Enadur Big Tank | | | | | | | | | | | | | | | |
| 1 | D | 10 | | | Sedimentary/ Crystalline rock | 29 | | 5.7 | R | E | 2.5 | 3 | Tank | | 7.4 |
| 2 | D | 14 | | | " | 26 | | 5.2 | R | E | 2.5 | 2 | Tank | | 7.3 |
| 3 | D&B | 15 | | | " | 36 | | 9 | R | E | 2.5 | 2.5 | Tank | | 7 |
| 4 | D&B | | | | " | 36 | | 7 | R | E | 2.5 | 2.5 | Tank | | 7.4 |
| 5 | B | 25 | | | " | 35 | | | R | | 2 | 2 | Tank | | 7.2 |
| 6 | D | | | | " | 26 | | 8 | R | E | 2.5 | 2.5 | Tank | | 7 |
| 7 | D&B | 25 | | | " | 27 | | 8.5 | R | E | 2.5 | 2.5 | Tank | | 7.3 |
| 8 | D | | | | " | | | 1.9 | R | D | 2 | 2 | Tank | | 7.4 |
| 9 | D&B | 19 | | | " | 29 | | 8 | R | E | 2.5 | 3 | Tank | | 7.2 |
| 10 | D&B | | | | " | | | 3.5 | R | E | 3 | 3.5 | Tank | | 7.3 |
| 11 | D&B | 27 | | | " | 27 | | 14.5 | R | E | 2.5 | 2.5 | Tank | | 7.4 |
| 12 | D | | | | " | | | 2.8 | R | E | 2.5 | 2.5 | Pond | | 7.4 |
| 13 | D | | | | " | | | 1.5 | R | E | 2 | 2.5 | Tank | | 7.8 |
| 5. Vadukkupattu Tank | | | | | | | | | | | | | | | |
| 1 | D | 3 | | | Shale | 4.5 | | 2.25 | R | E | 2.5 | 3 | Rainfall | 475 | 7.3 |
| 2 | D | 3.5 | | | " | 5 | | 2.5 | R | E | 2 | 2.5 | Rainfall | 675 | 7.4 |
| 3 | D | 3.5 | 7 | | " | 10 | | 6 | R | D | 2.5 | 3 | Rainfall & others | 845 | 7.5 |
| 4 | B | | 12 | | " | 33 | | | R | A | 2.5 | | Rainfall | 765 | 7 |
| 5 | D | 3.5 | 8 | | " | 10 | | 6.5 | R | A | | | Rainfall | 750 | 7 |
| 6 | B | | 13 | 28-32 | " | 32 | | | R | A | 2.5 | | Rainfall | 560 | 6.8 |
| 7 | B | | 12 | 28-32 | " | 32 | | | R | A | 2.5 | | Rainfall | 600 | 6.9 |
| 8 | D | 4 | | | " | 6 | | 3 | R | E | 2.5 | 2.5 | Rainfall | 750 | 7.1 |
| 9 | D | 4 | | | " | 7.5 | | 3 | R | A | | | Rainfall | 825 | 6.5 |
| 10 | B | | | | " | 8.2 | | 3.5 | R | A | | | Rainfall | 650 | 7 |
| 11 | D | 3.8 | | | " | 7 | | 2 | R | D | 2.5 | 3 | Rainfall | 785 | 7.2 |

## Table H.2.1 Results of Inventory Survey of the Existing Wells in Northern Study Area (3/3)

(Northern Study Area)

| Well No. | Well Type | Top Soil thickness (m) | Weathered Zone thick (m) | Jointed Zone thick | Rock Type | Total Depth (m) | Side Bore well(m) | Water Level (m) | Well Shape | Mode of Extraction | Delivery Pipe Size (Inches) | Suction Tube | Recharge Sources | EC (µS/cm) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | B | | | | " | 7.2 | | 3 | R | A | | | Rainfall | 695 | 7.1 |
| 13 | D | 3.6 | | | " | 8 | | 2 | R | A | | | Tank | 800 | 7.4 |
| 14 | D | 3.7 | | | " | 8 | | 4.5 | R | A | | | Rainfall | 725 | 7.2 |
| 15 | D | 3.4 | | | " | 8.5 | | 6 | R | A | | | Rainfall | 725 | 7.2 |
| 16 | D | | | | " | 8.5 | | 5 | R | A | | | Tank | 800 | 6.9 |
| 17 | D | 4 | | 10 | " | 24 | | 13 | R | E | 2.5 | 2.5 | Tank | 785 | 7.5 |
| 18 | D | | | | " | | | 4.5 | R | E | 2.5 | 3 | Tank | 825 | 7.1 |
| 19 | D | 4 | 2 | 2.5 | " | 9 | | 7 | R | D | 2.5 | 2.5 | Rainfall | 725 | 7.1 |
| 20 | D | | | | " | 8 | | 5 | R | D | 2 | 2.5 | Rainall | 695 | 7.3 |
| 21 | D | 3 | | | " | 6 | | 1.5 | R | D | 2.5 | 2.5 | Rainfall | 725 | 8 |

Note: D: Dug well B: Borewell D&B: Dug cum borewell R: Circular S: Square E: Electric

## Table H.2.2 Results of Inventory Survey of the Existing Wells in Southern Study Area (1/2)

(Southern Study Area)

| Well No. | Well Type | Top Soil thickness (m) | Weathered Zone thick (m) | Jointed Zone thick | Rock Type | Total Depth (m) | Side Bore well(m) | Water Level (m) | Well Shape | Mode of Extraction | Delivery Pipe Size (inches) | Suction Tube | Recharge Sources | EC (μS/cm) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Silvalai Tank | | | | | | | | | | | | | | | |
| 1 | D | 4 | - | - | Sand stone | 10.8 | - | 9.6 | R | E | 2.5 | 3 | Tank | 1820 | 8.1 |
| 2 | B | - | - | - | " | 18.0 | - | 8.5 | - | - | - | - | Tank | 1900 | 8.2 |
| 3 | D&B | 3.7 | - | - | " | 15.0 | - | 9.5 | S | E | 3 | 3 | Rainfall | 2400 | 7.2 |
| 4 | D | 3.6 | - | - | " | 10.5 | 15.5 | 10.0 | S | E | 3 | 3 | Rainfall | 2300 | 7.2 |
| 5 | D | 3.6 | - | - | " | 11.0 | - | 10.5 | R | D | 2.5 | 2.5 | Rainfall | 2500 | 7.5 |
| 6 | D | 2.7 | - | - | " | 10.5 | - | 10.0 | R | D | 3 | 3 | Rainfall | 2400 | 7.6 |
| 7 | D&B | 4.5 | - | - | " | 18.0 | - | 11.0 | S | E | 2.5 | 2.5 | Rainfall | 3000 | 6.9 |
| 8 | D | 4 | - | - | " | 16.0 | - | 14.0 | R | M | - | - | Rainfall | 2800 | 7.5 |
| 9 | D | - | - | - | " | 13.0 | - | 11.0 | R | E | 2 | 2 | Rainfall | 2500 | 7.3 |
| 10 | HP | - | - | - | " | 45.0 | - | - | - | M | 2 | - | Rainfall | 1870 | 7.8 |
| 11 | HP | 6 | - | - | " | 43.0 | - | - | - | M | 2 | - | Rainfall | 2000 | 7.8 |
| 12 | HP | - | - | - | " | 48.0 | - | - | - | M | 2 | - | Rainfall | 540 | 7.8 |
| 2. Kurumbi Tank | | | | | | | | | | | | | | | |
| 1 | B | Laterite 2-4m | | | Sedimen -tary | 50 | - | - | - | D | 2.5 | 3 | Tank | 500 | 7.0 |
| 2 | D&B | " | | | " | 48 | - | 4.5 | R | E | 2 | 3 | Tank | 550 | 7.1 |
| 3 | B | " | | | " | 27 | - | - | - | E | 2 | 2.5 | Tank | 580 | 6.6 |
| 4 | D&B | " | | | " | 43 | - | 4.5 | R | E | 2 | 2.5 | Tank | 580 | 6.9 |
| 5 | B | " | | | " | 45 | - | - | - | E | 2 | 2.5 | Tank | 660 | 7.8 |
| 6 | B | " | | | " | 27 | - | - | - | D | 2 | 2.5 | Tank | 650 | 7.0 |
| 7 | B | " | | | " | 28 | - | - | - | D | 2.5 | 2.5 | Tank | 540 | 6.8 |
| 8 | B | " | | | " | 40 | - | - | - | D | 2 | 2.5 | Tank | 560 | 6.9 |
| 9 | D&B | " | | | " | 46 | - | 4.8 | R | E | 2 | 3 | Tank | 1200 | 6.9 |
| 10 | B | " | | | " | 43 | - | - | - | D | 2 | 2.5 | Tank | 1050 | 6.6 |
| 11 | B | " | | | " | 51 | - | - | - | E | 2 | 2.5 | Tank | 810 | 6.8 |
| 12 | D&B | " | | | " | 43 | - | 7 | R | E | 2 | 3 | Tank | 700 | 7.4 |
| 13 | B | " | | | " | 51 | - | - | - | D | 2.5 | - | Tank | 500 | 7.1 |
| 14 | HP | " | | | " | 45 | - | - | - | M | 2 | 2.5 | Rainfall | 420 | 6.8 |
| 15 | D | " | | | " | 14 | - | 7 | R | D | 2 | 2.5 | Rainfall | 400 | 6.9 |
| 16 | D | " | | | " | 27 | - | 7 | R | M | - | - | Rainfall | 370 | 6.6 |
| 17 | D | " | | | " | 10.5 | - | 8 | R | M | - | - | Rainfall | 320 | 6.6 |
| 18 | B | " | | | " | 45 | - | 9 | - | E | 3/4 | 3/4 | Rainfall | 470 | 6.0 |
| 19 | D | " | | | " | 10.5 | - | 7.5 | R | E | 1 | 1 | Rainfall | 500 | 6.5 |
| 20 | D&B | " | | | " | 41 | - | 8 | R | E | 2.5 | 2 | Rainfall | 480 | 7.0 |
| 3. A. Ramalingapuram Tank | | | | | | | | | | | | | | | |
| 1 | D | 1 | 3 | jointed rocks? | Granite | 10.5 | - | 3.1 | R | D | 2 | 3 | Tank | 6000 | 7.9 |
| 2 | D | 1.2 | 3 | | " | 11 | - | 3.25 | S | A | 2 | 2.5 | Tank | 1600 | 8.2 |
| 3 | HP | - | - | - | " | 65 | - | - | - | M | 2 | - | Tank | 6700 | 7.5 |
| 4 | HP | - | - | - | " | 65 | - | - | - | M | 2 | - | Tank | 4100 | 7.4 |
| 5 | HP | - | - | - | " | 64 | - | - | - | M | 2 | - | Tank | 4800 | 7.6 |
| 6 | HP | - | - | - | " | 63 | - | - | - | M | 2 | - | Tank | 5400 | 7.8 |
| 4. Sengangulam Tank | | | | | | | | | | | | | | | |
| 1 | D | 18 | 4 | | " | 13.8 | - | 12.3 | R | D | 2 | 3 | Tank | 1530 | 6.9 |
| 2 | D&B | 18.5 | 7 | | " | 66.0 | - | 19.5 | R | E | 2 | 2.5 | Tank | 1550 | 7.1 |
| 3 | D&B | 20 | | | " | 57.0 | - | 19 | R | E | 2 | 2.5 | Tank | 1850 | 6.8 |
| 4 | D&B | 18 | 6 | | " | 55.5 | - | 20 | R | E | 2 | 2.5 | Tank | 2000 | 8.1 |
| 5 | D | 21 | | | " | 19.0 | - | 18 | R | E | 2 | 2.5 | Tank | 2200 | 7.9 |
| 6 | D | | | | " | 21.0 | - | 18 | R | E | 2 | 2.5 | Tank | 1050 | 7.0 |

## Table H.2.2 Results of Inventory Survey of the Existing Wells in Southern Study Area (2/2)

(Southern Study Area)

| Well No. | Well Type | Top Soil thickness (m) | Weathered Zone thick (m) | Jointed Zone thick | Rock Type | Total Depth (m) | Side Bore well(m) | Water Level (m) | Well Shape | Mode of Extraction | Delivery Pipe Size (Inches) | Suction Tube | Recharge Sources | EC (µS/cm) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | HB | 19 | 8 | | " | 33.0 | | | | A | 2 | | Tank | 1930 | 7.1 |
| 8 | D&B | 22 | 5 | | " | 55.5 | 9 | 20 | R | D | 2 | 2.5 | Tank | 1900 | 7.2 |
| 9 | D | 17 | | | " | 25.0 | 3 | 21 | R | D | 2 | 2.5 | Tank | 2200 | 7.1 |
| 10 | D | 16 | 5 | | " | 25.0 | - | 21 | R | E | 3 | 3.5 | Tank | 2300 | 7.0 |
| 11 | D | 19 | | | " | 23 | - | 20 | R | E | 3.5 | 3 | Tank | 2300 | 7.2 |
| 12 | D&B | | | | " | 18 | - | 15 | R | D | 2.5 | 2 | Tank | 2250 | 7.1 |
| 13 | D | 21 | 6 | | " | 21 | 3 | 17 | R | D | 3 | 2.5 | Tank | 2200 | 7.0 |
| 5. Pondikanmoi Tank | | | | | | | | | | | | | | | |
| 1 | HB | - | - | - | Sedimen -tary | 40 | - | - | | M | 2 | | Tank | 2300 | 7.5 |
| 2 | HB | - | - | - | " | 36 | - | - | | M | 2 | | Tank | 3500 | 7.3 |
| 3 | HB | - | - | - | " | 40 | - | - | | M | 2 | | Tank | 2800 | 7.1 |
| 4 | B | - | - | - | " | 45 | - | | | E | 2 | 2.5 | Tank | 3000 | 7.3 |

Note: D: Dug well B: Borewell D&B: Dug cum borewell R: Circular S: Square E: Electric

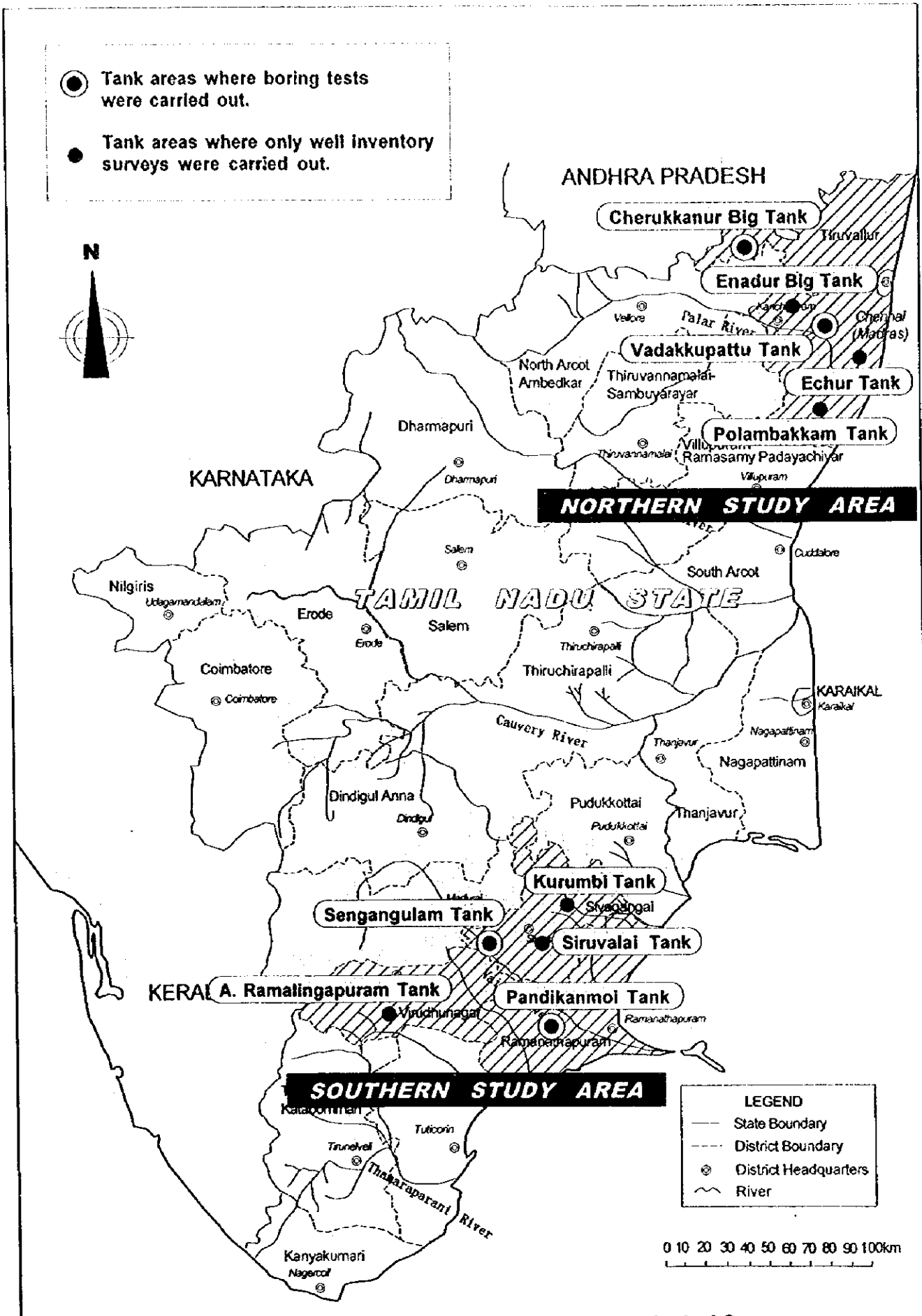



**Fig. H.2.1 Location of the Tank Areas for Hydrogeological Surveys**

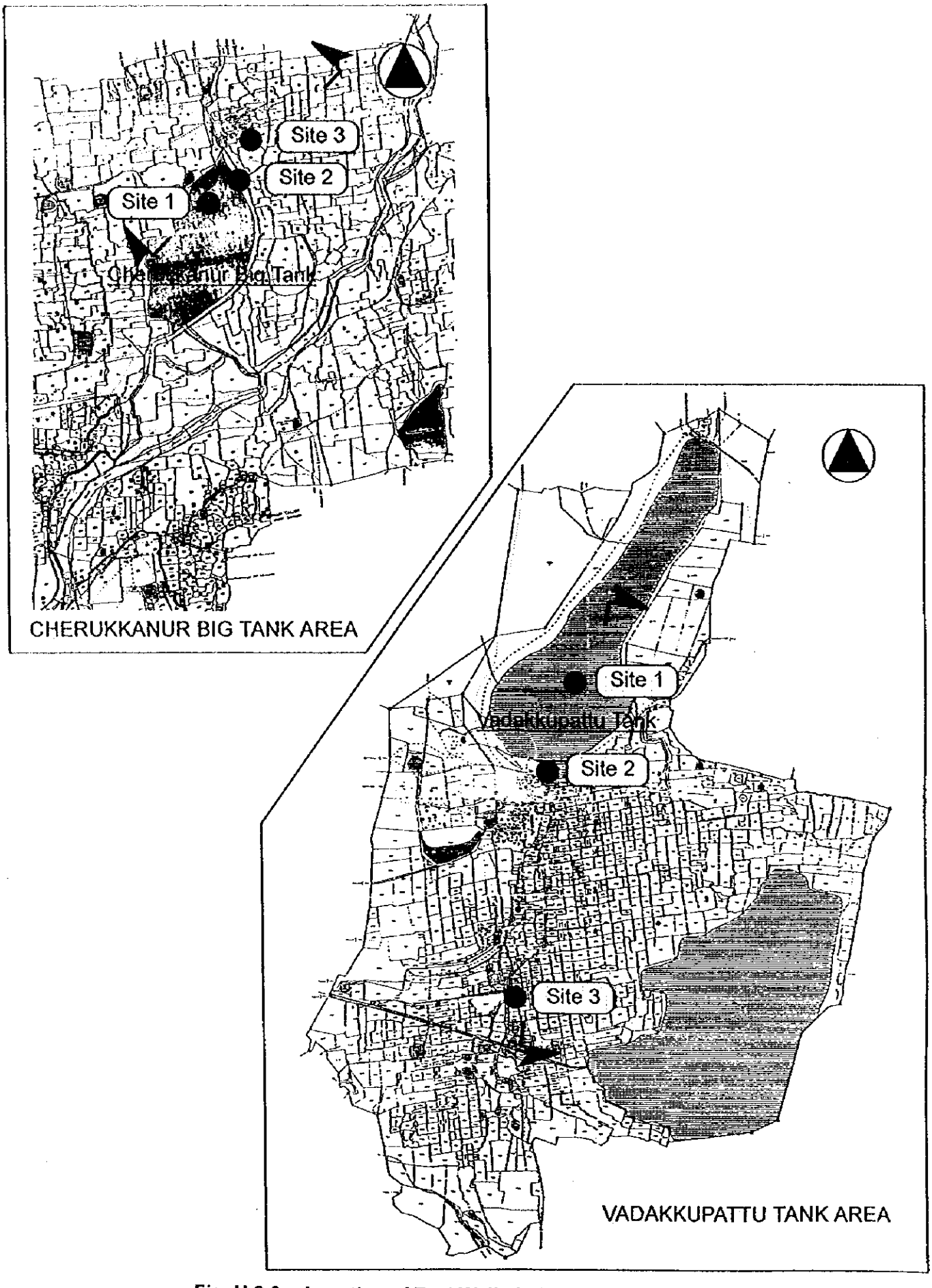



**Fig. H.2.2 Location of Test Wells in Northern Study Area**

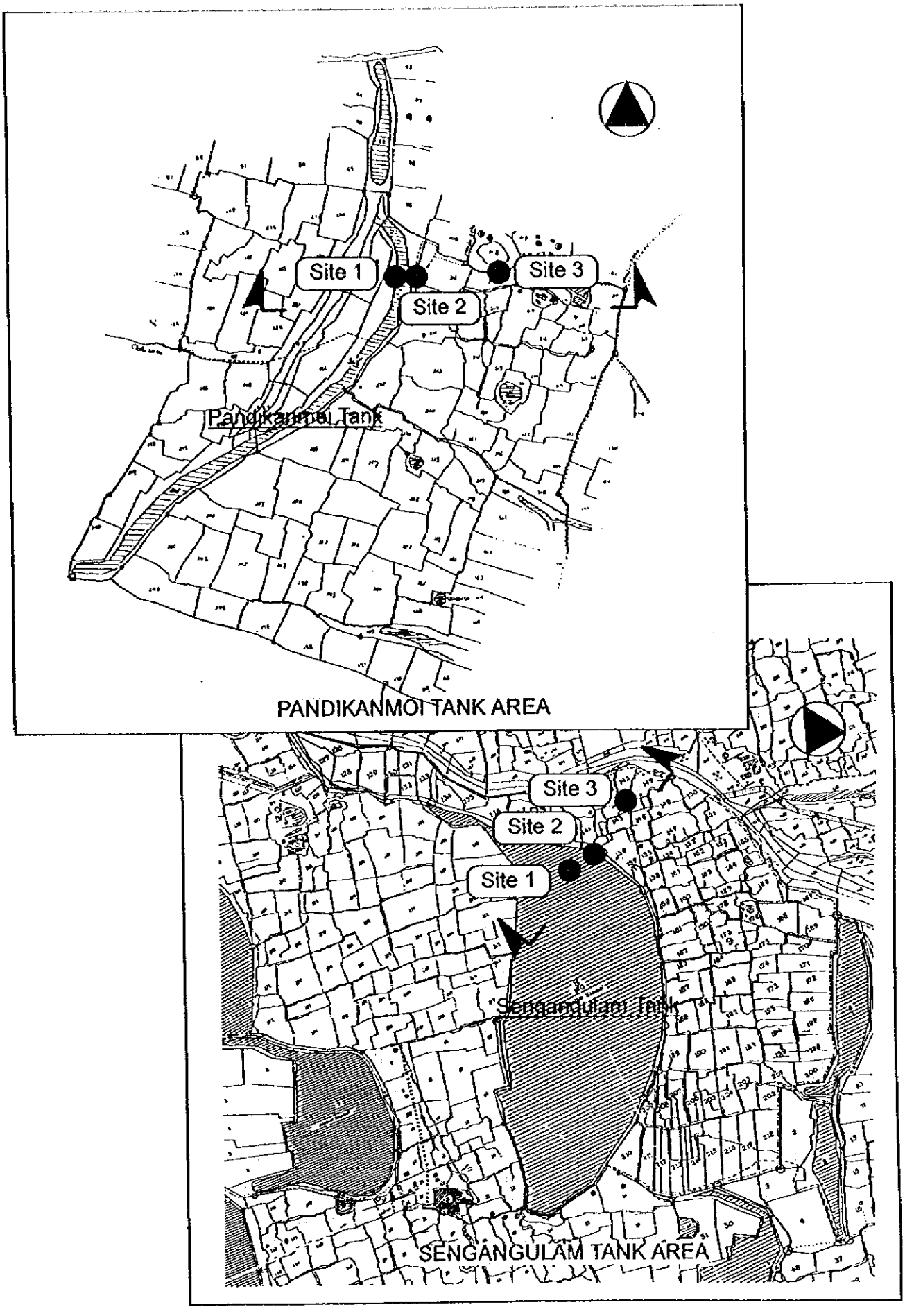



**Fig. H.2.3 Location of Test Wells in southern Study Area**

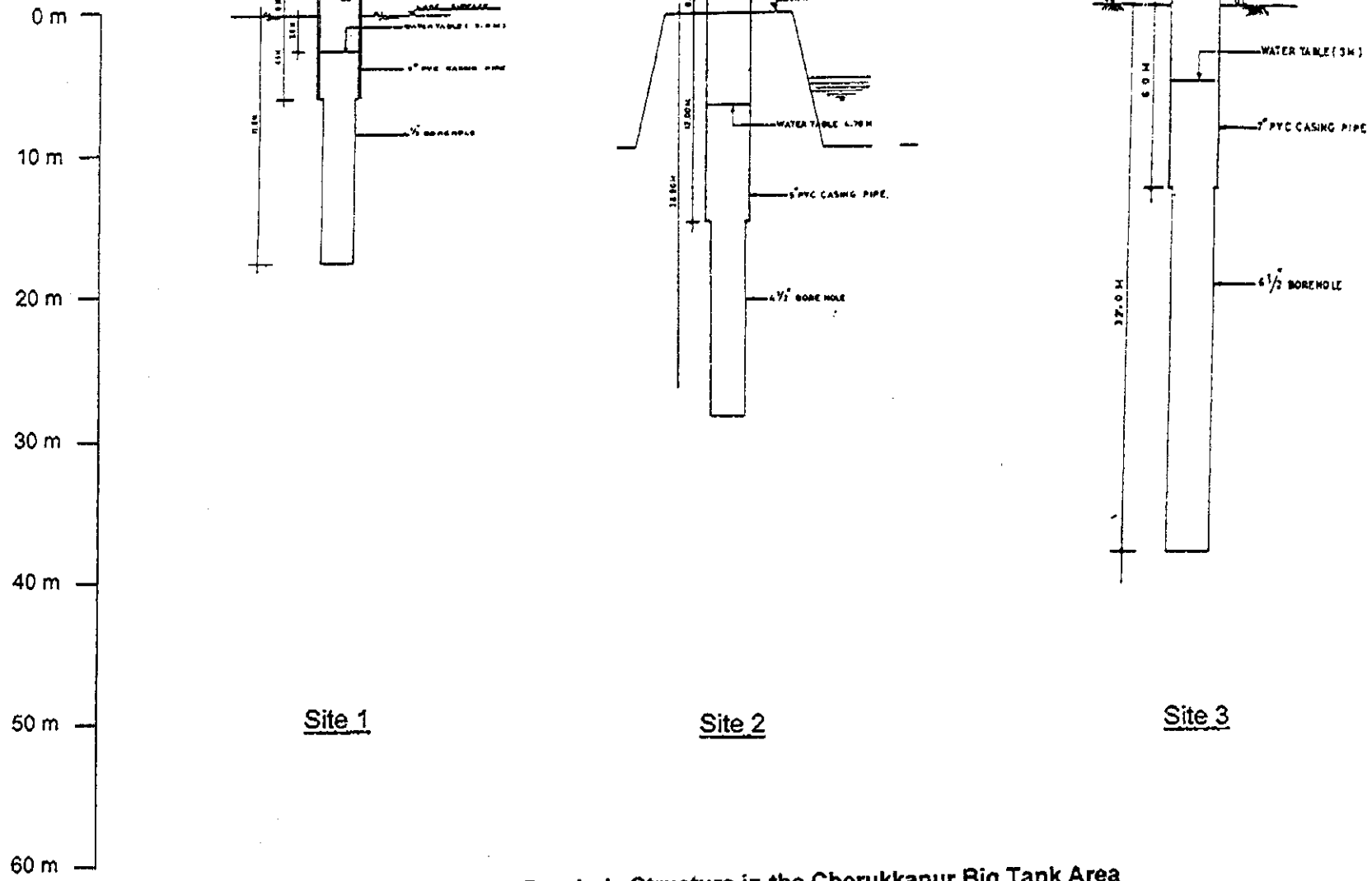



**Fig. H.2.4 Borehole Structure in the Cherukkanur Big Tank Area**

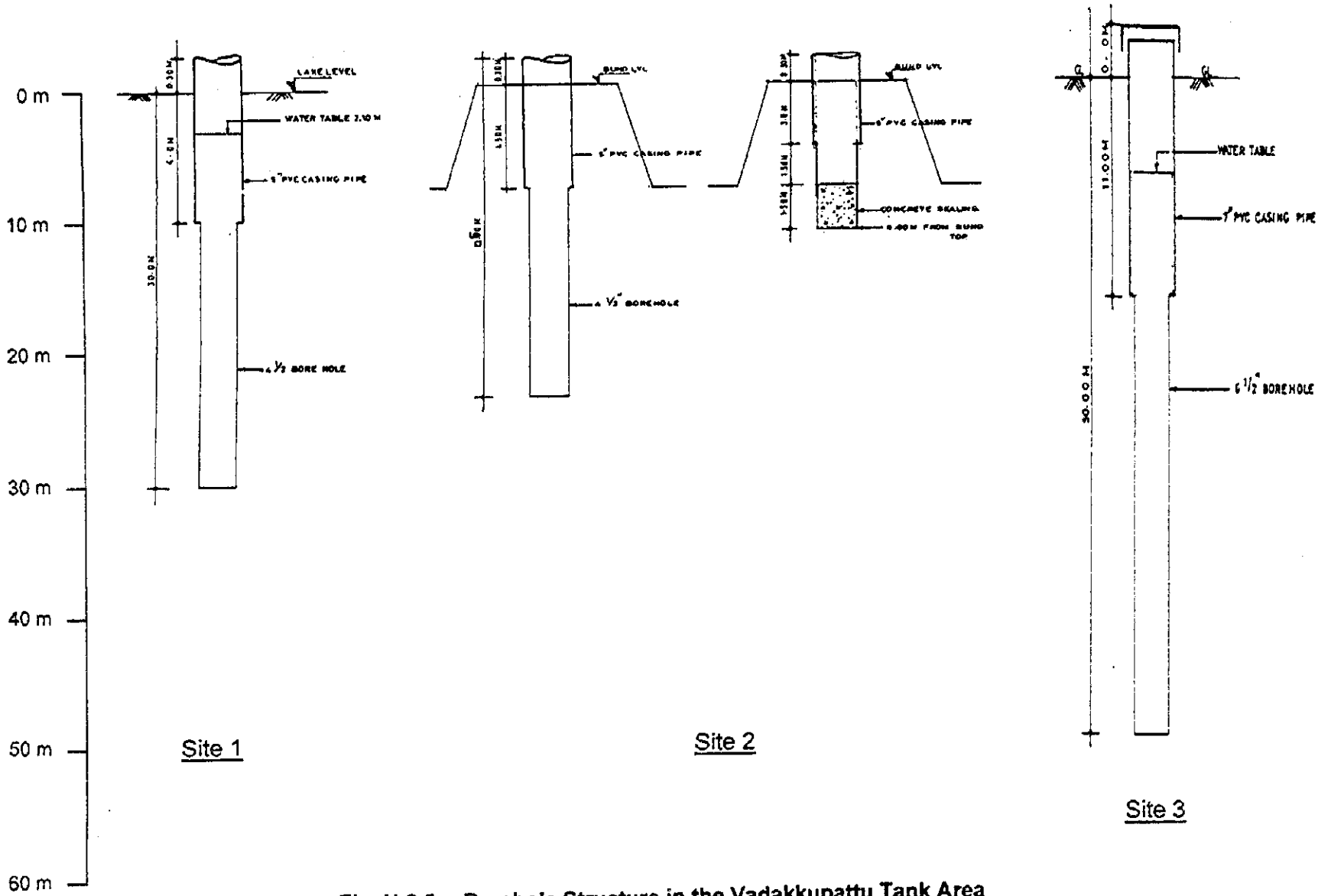



**Fig. H.2.5 Borehole Structure in the Vadakkupattu Tank Area**

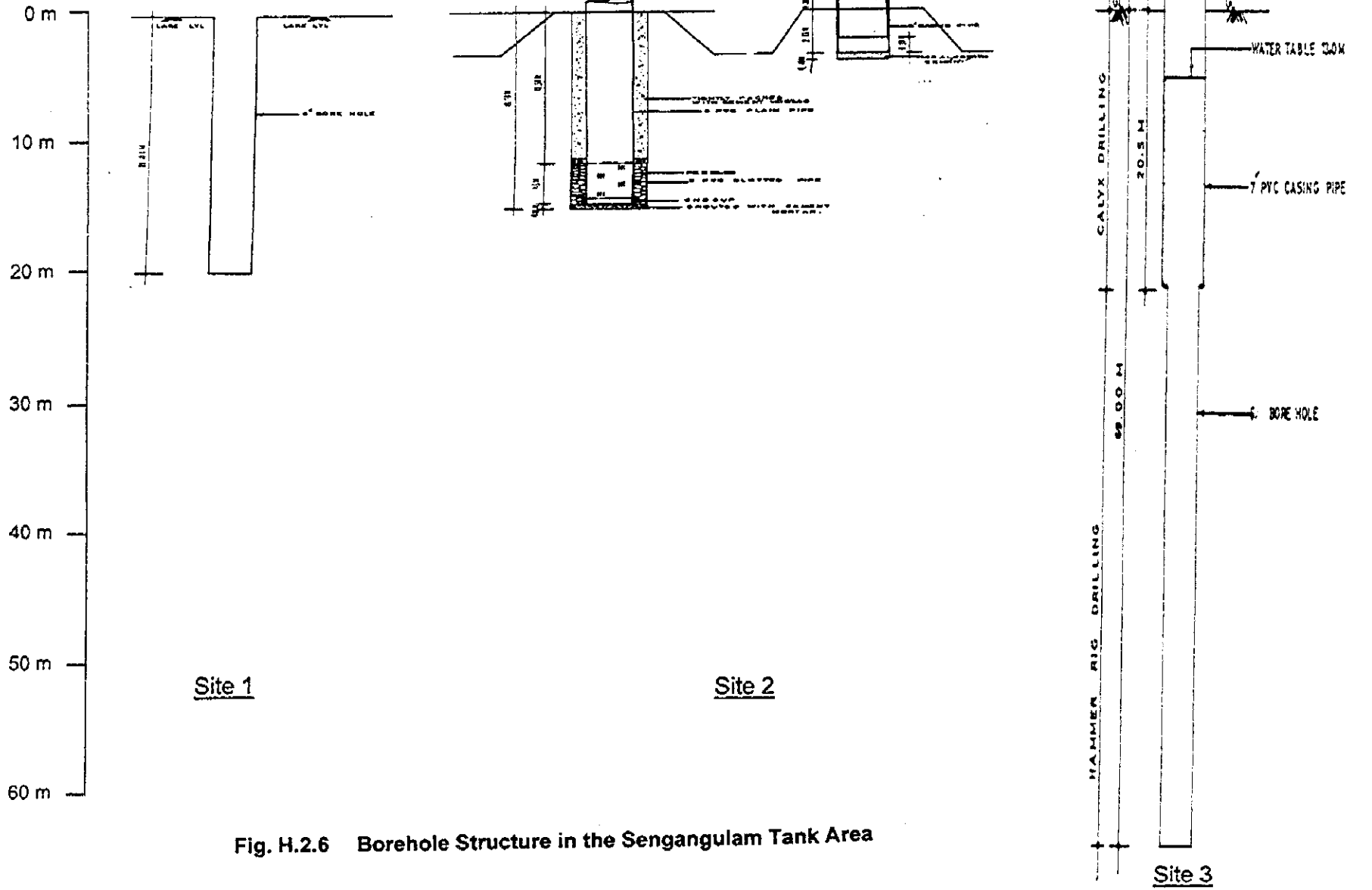



**Fig. H.2.6 Borehole Structure in the Sengangulam Tank Area**

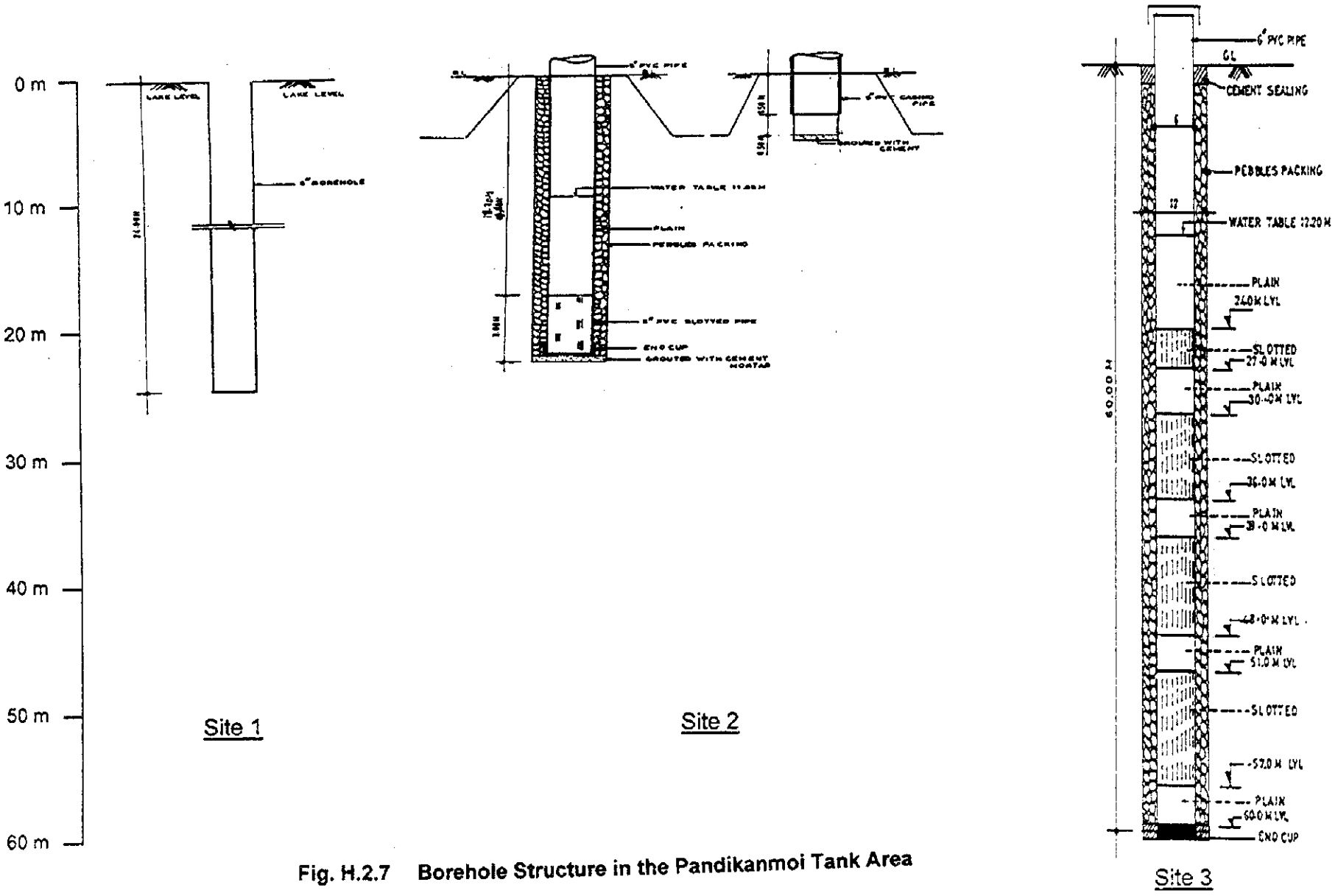



**Fig. H.2.7 Borehole Structure in the Pandikanmoi Tank Area**

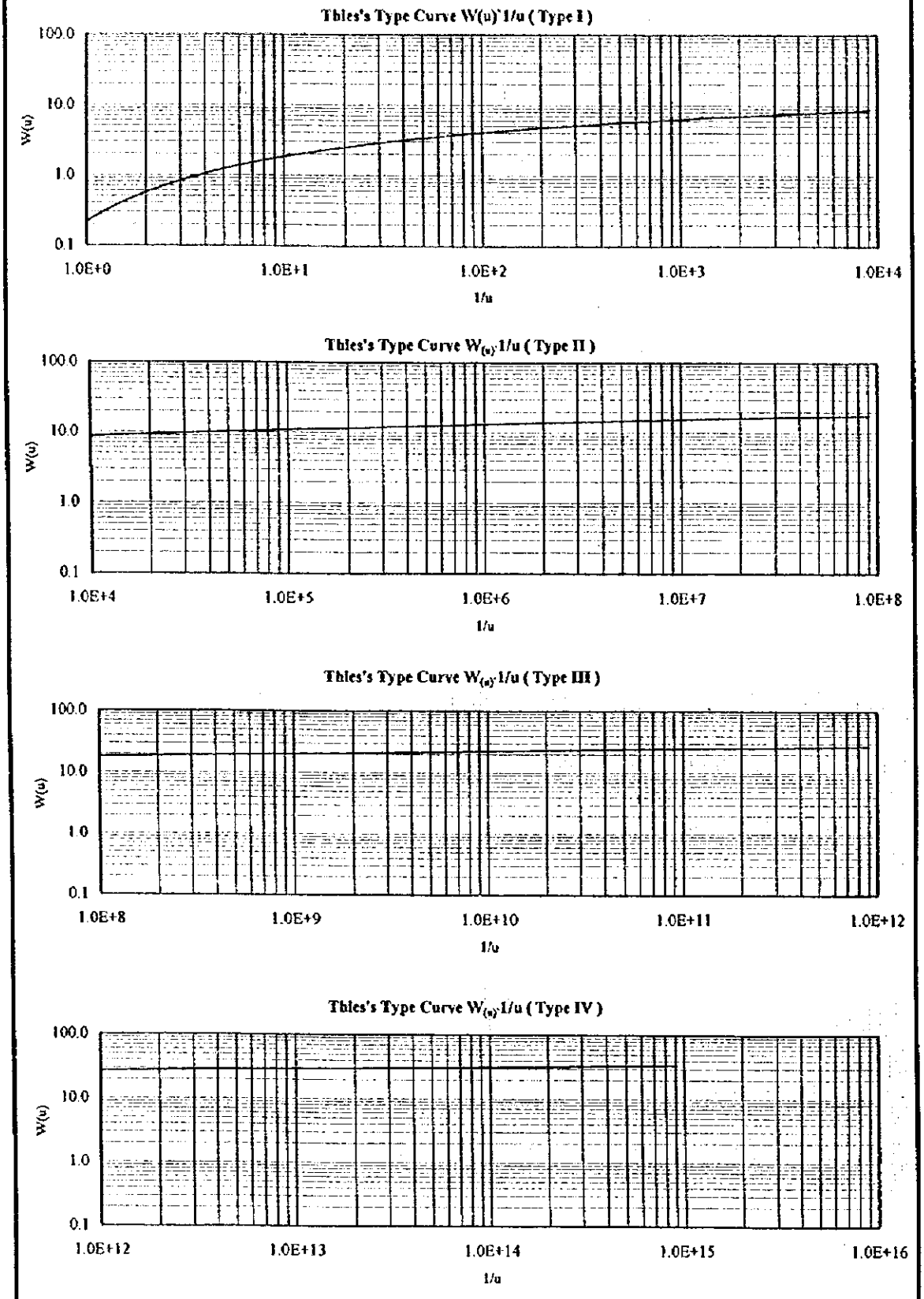



**Fig. H.2.8 Type curve of Theis (Well Function)**

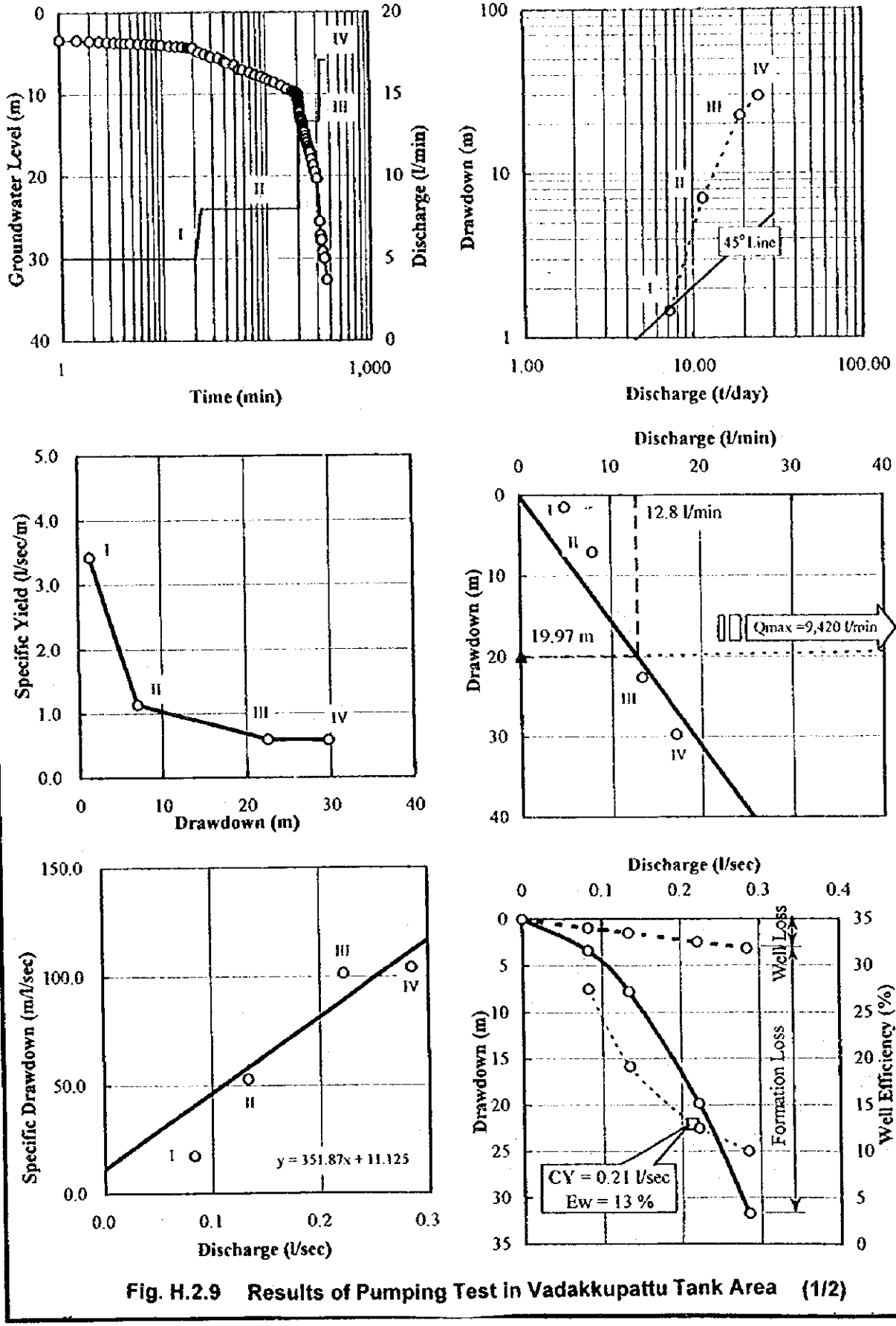
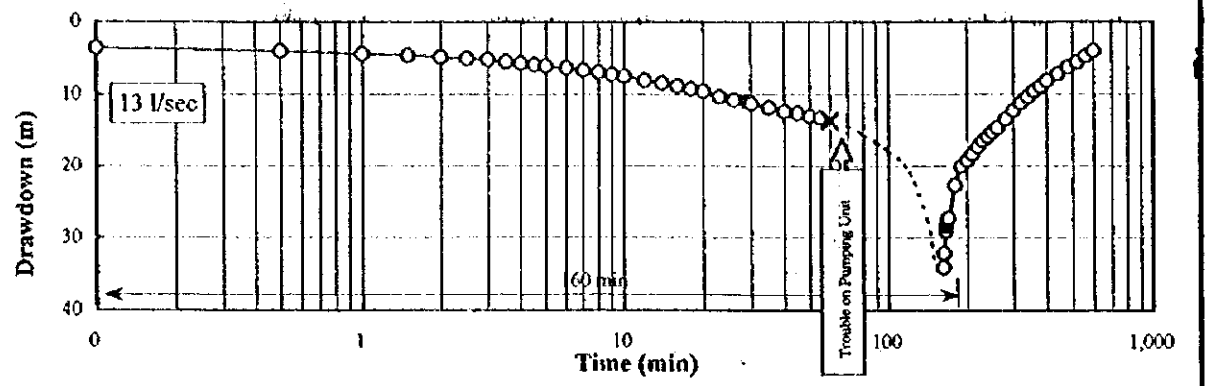
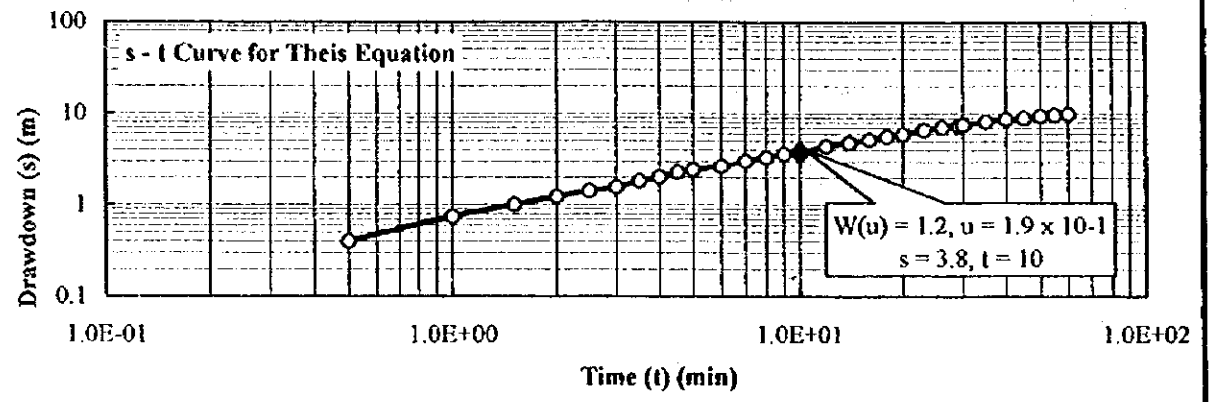
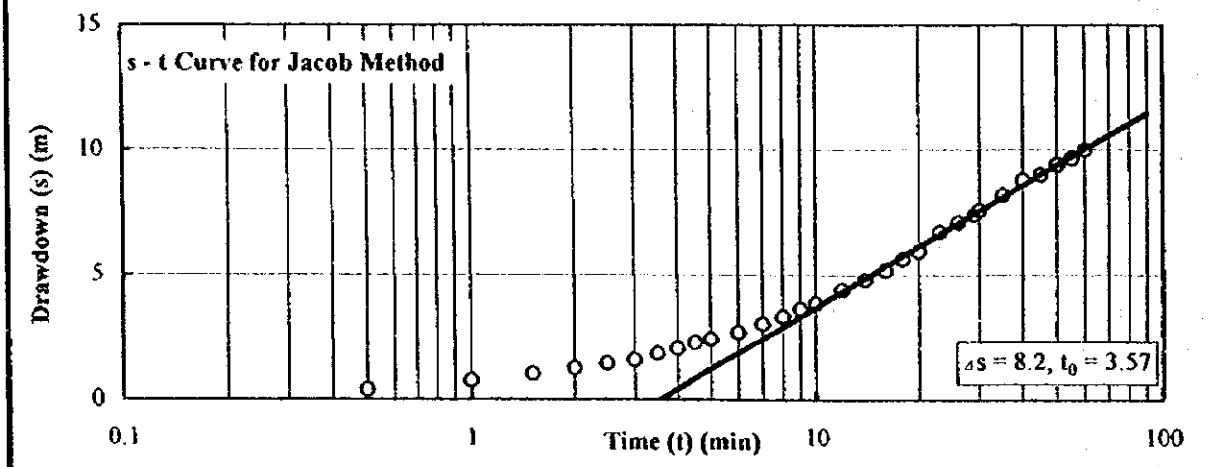



**Fig. H.2.9 Results of Pumping Test in Vadakkupattu Tank Area (1/2)**



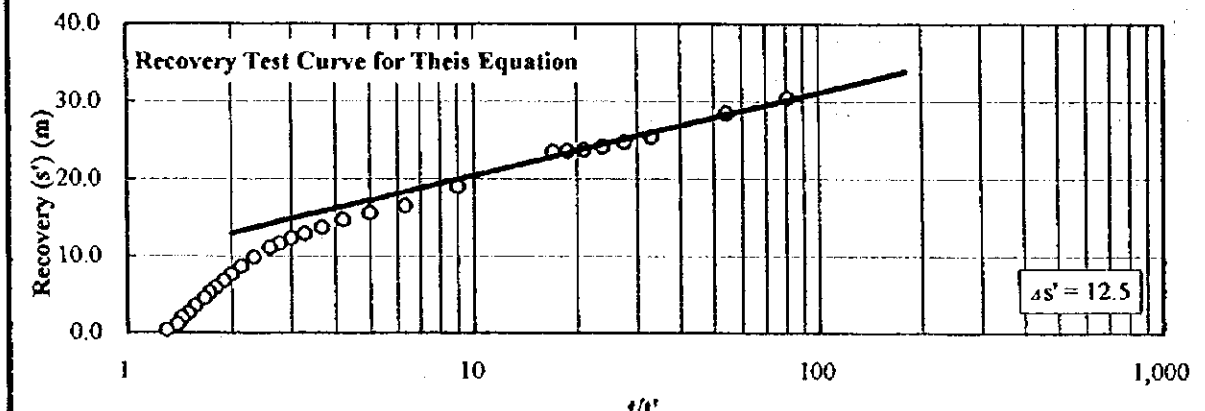




**Fig. H.2.9 Results of Pumping Test in Vadakkupattu Tank Area (2/2)**

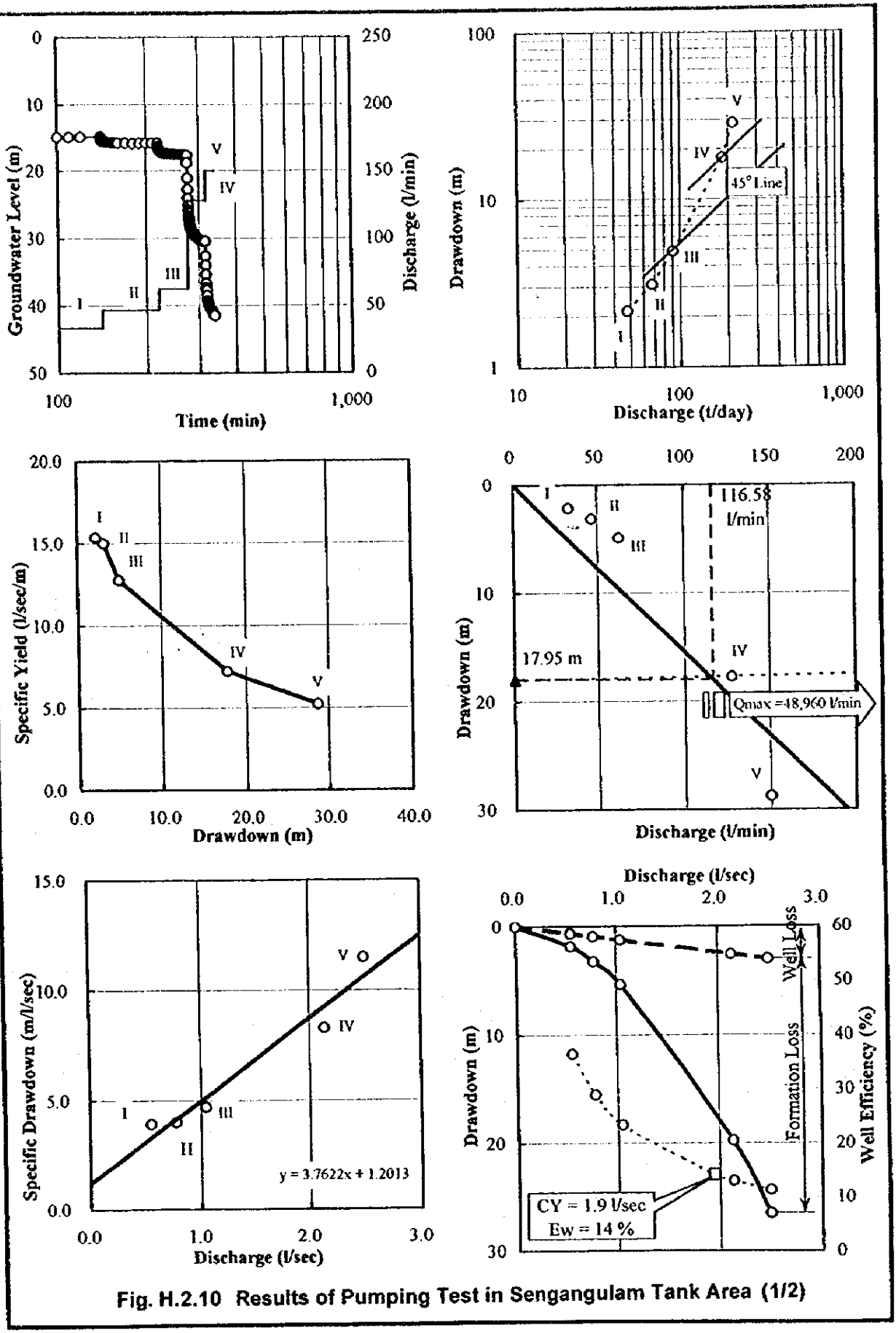



**Fig. H.2.10 Results of Pumping Test in Sengangulam Tank Area (1/2)**

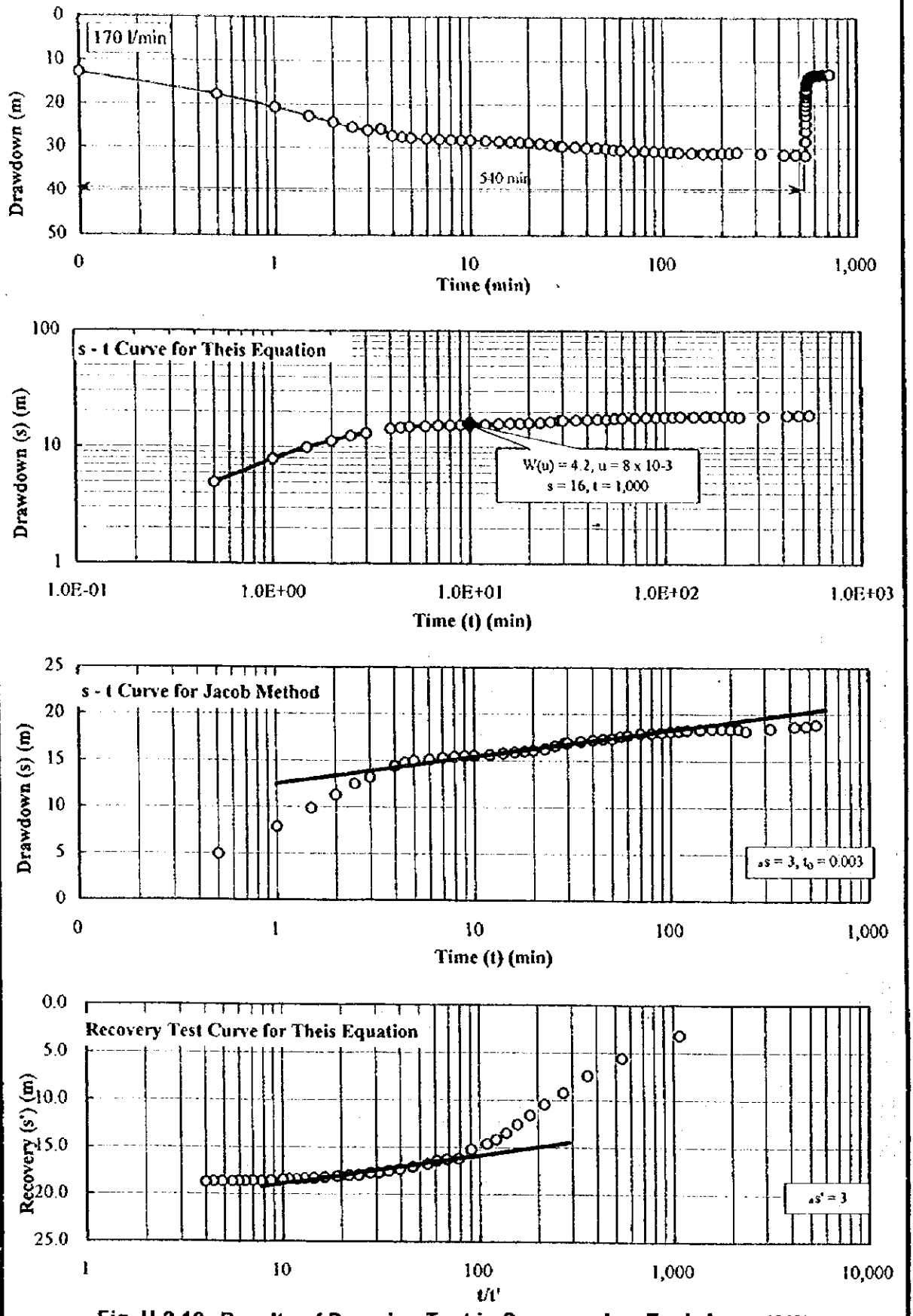
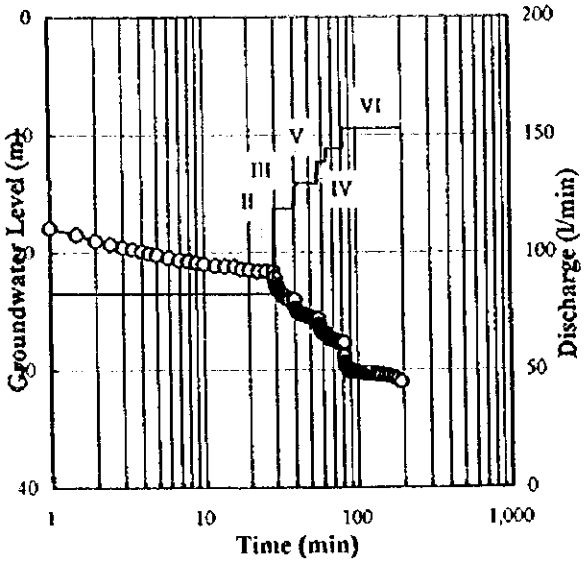
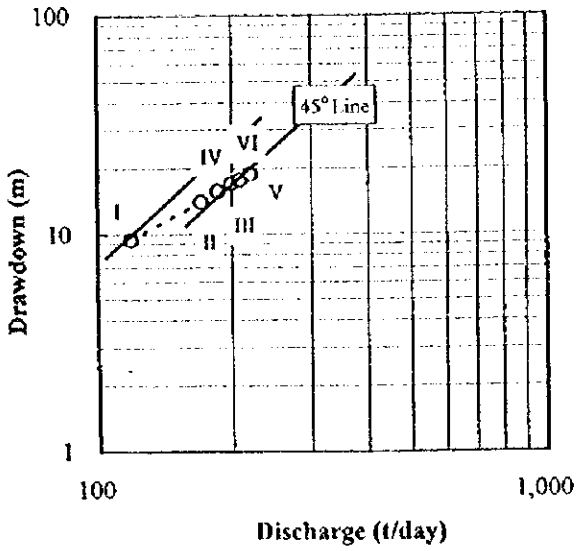
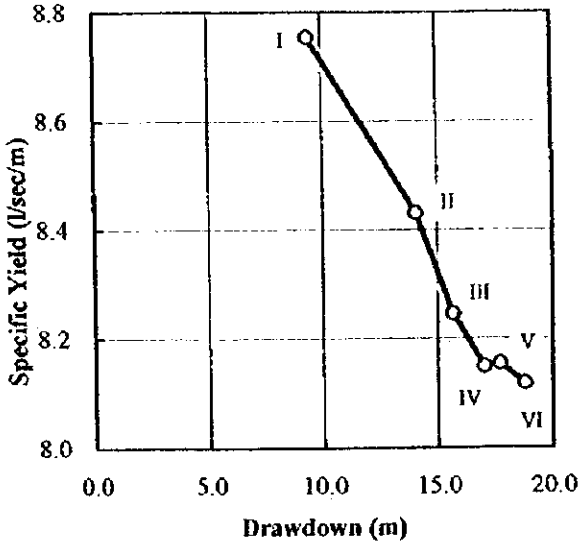
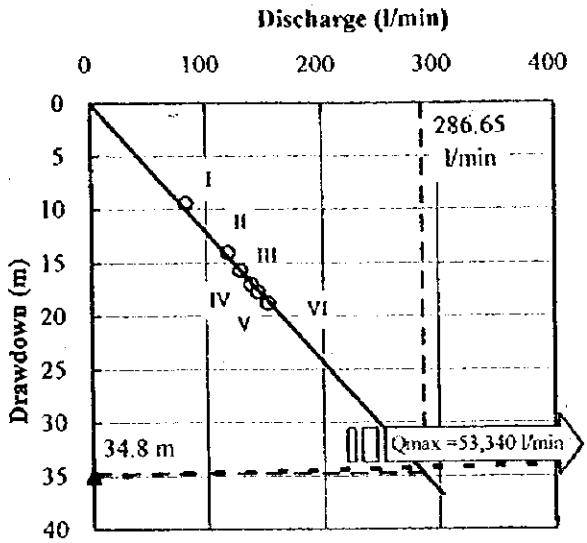


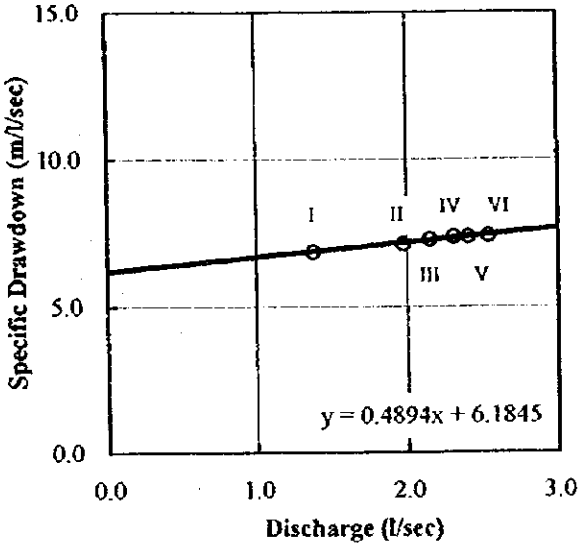

**Fig. H.2.10 Results of Pumping Test in Sengangulam Tank Area (2/2)**



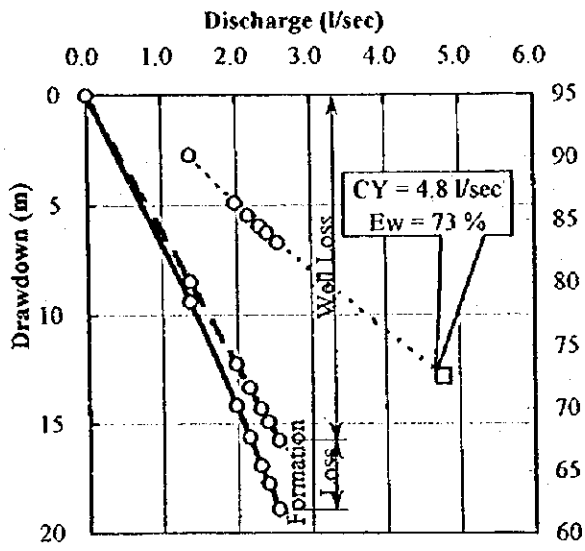




**Fig. H.2.11 Results of Pumping Test in Pandikanmoi Tank Area (1/2)**

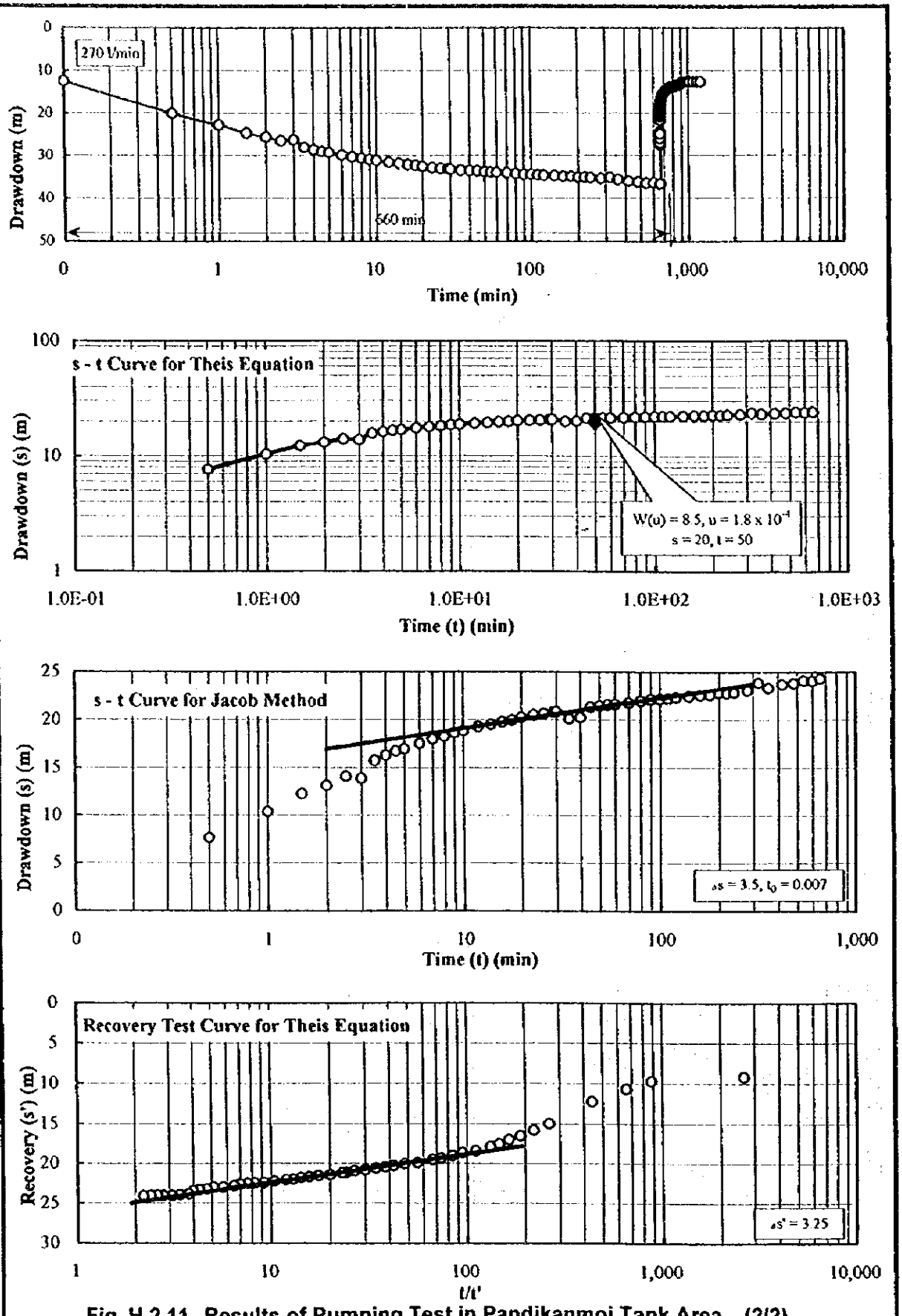



Fig. H.2.11 Results of Pumping Test in Pandikanmoi Tank Area (2/2)

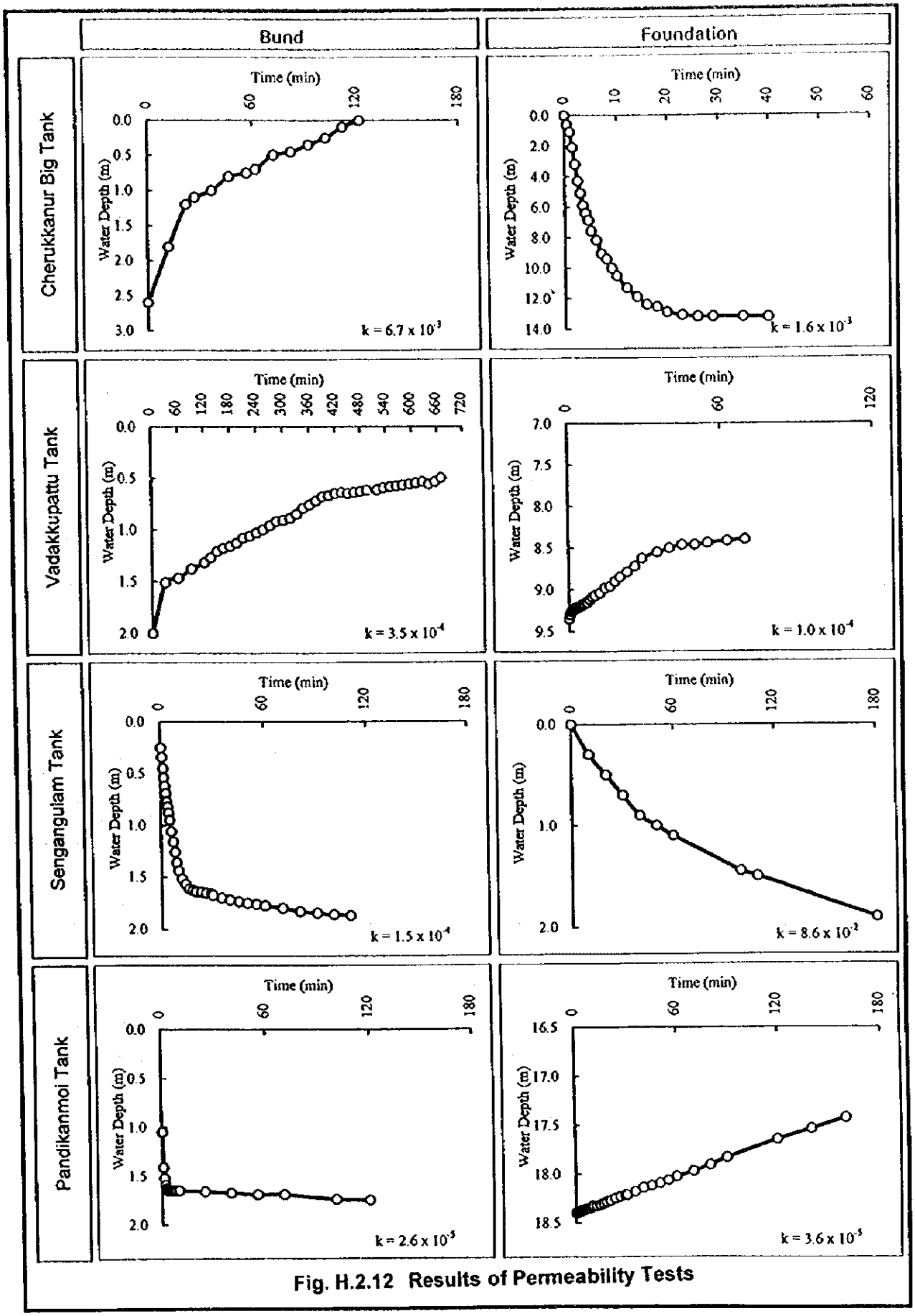



**Fig. H.2.12 Results of Permeability Tests**

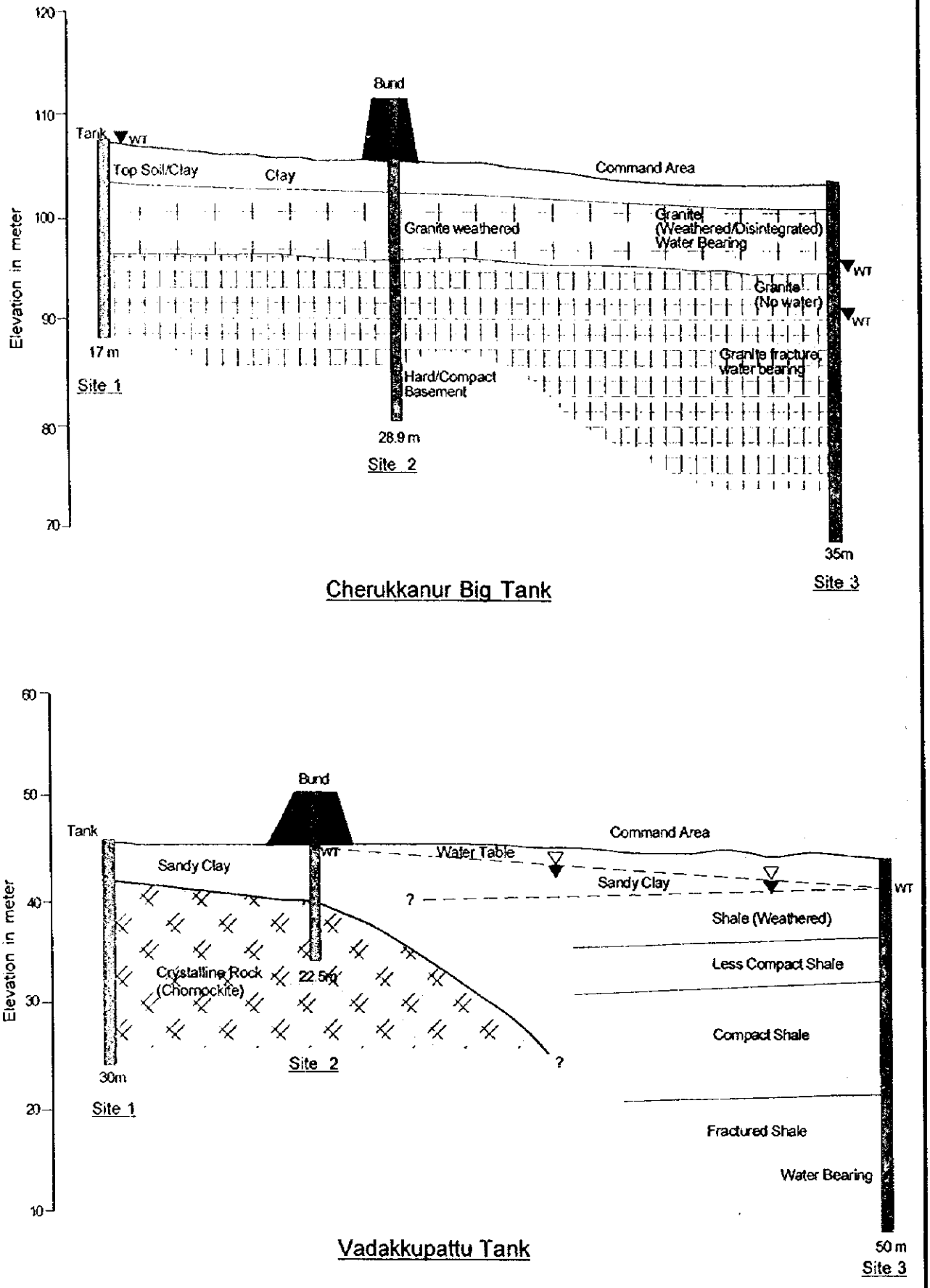
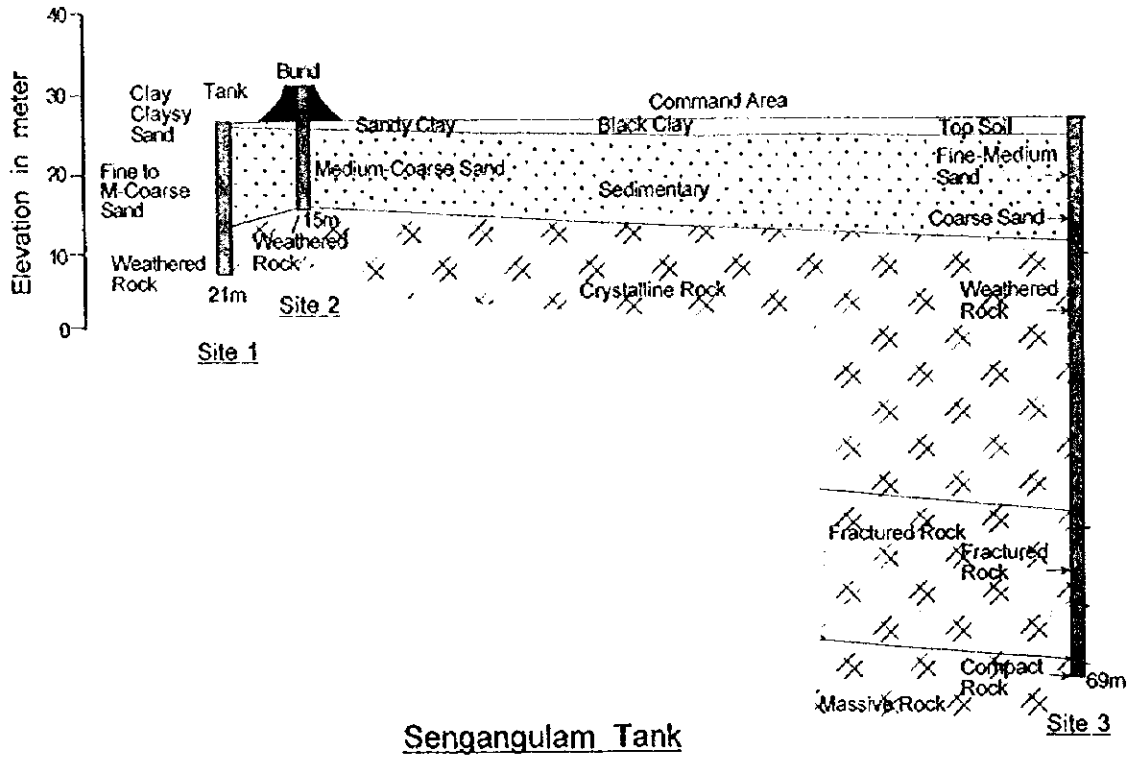
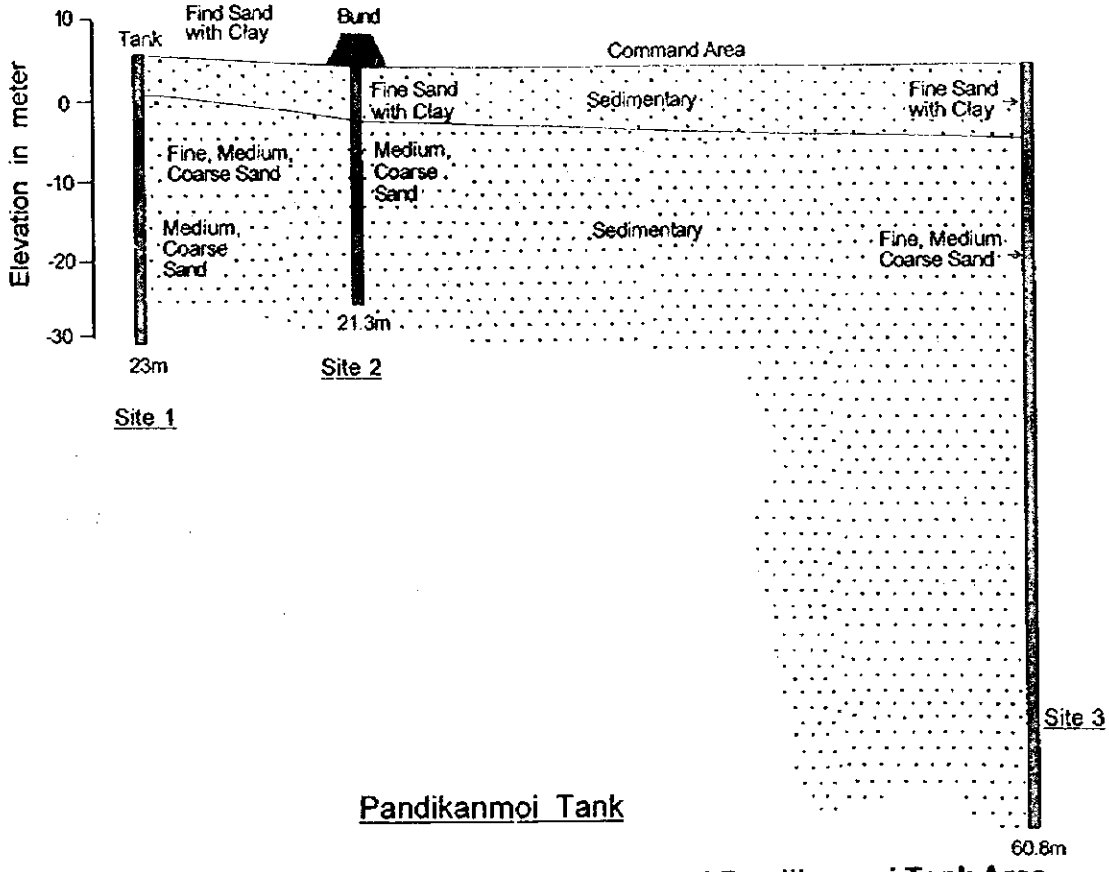



**Fig. H.2.13 Geological Profile of Cherukkanur Vadakkupattu Tank Areas**




Sengangulam Tank




Pandikanmoi Tank

**Fig. H.2.14 Geological Profile of Sengangulam and Pandikanmoi Tank Area**

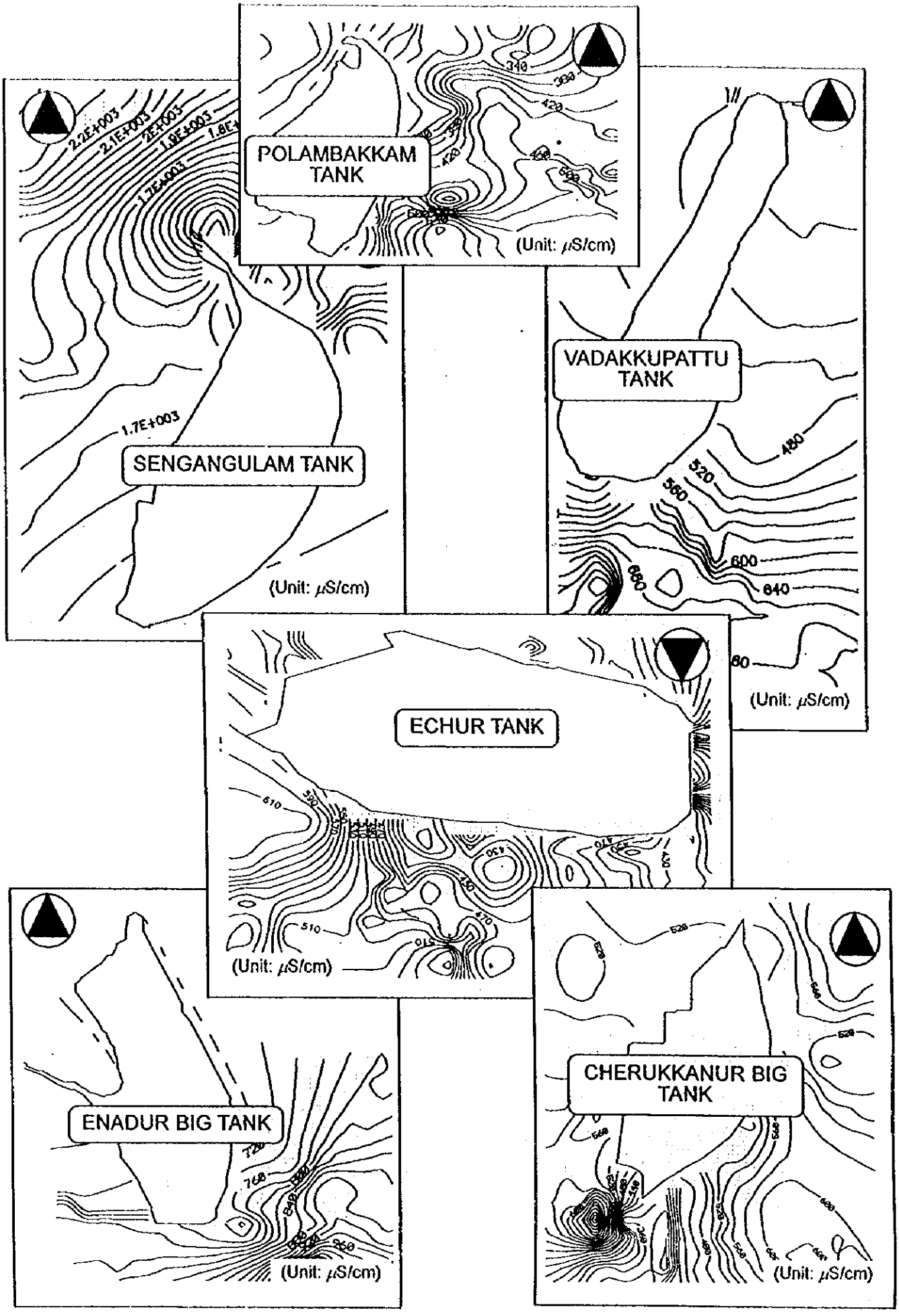



**Fig. H.2.15 Electric Conductivity Contour Map**