

GROUND WATER POLLUTION BY TANNERIES IN TAMIL NADU (INDIA)

R. KRISHNASWAMY AND G. HARIDASS

TAMIL NADU WATER SUPPLY AND DRAINAGE BOARD, MADRAS (INDIA)

ABSTRACT

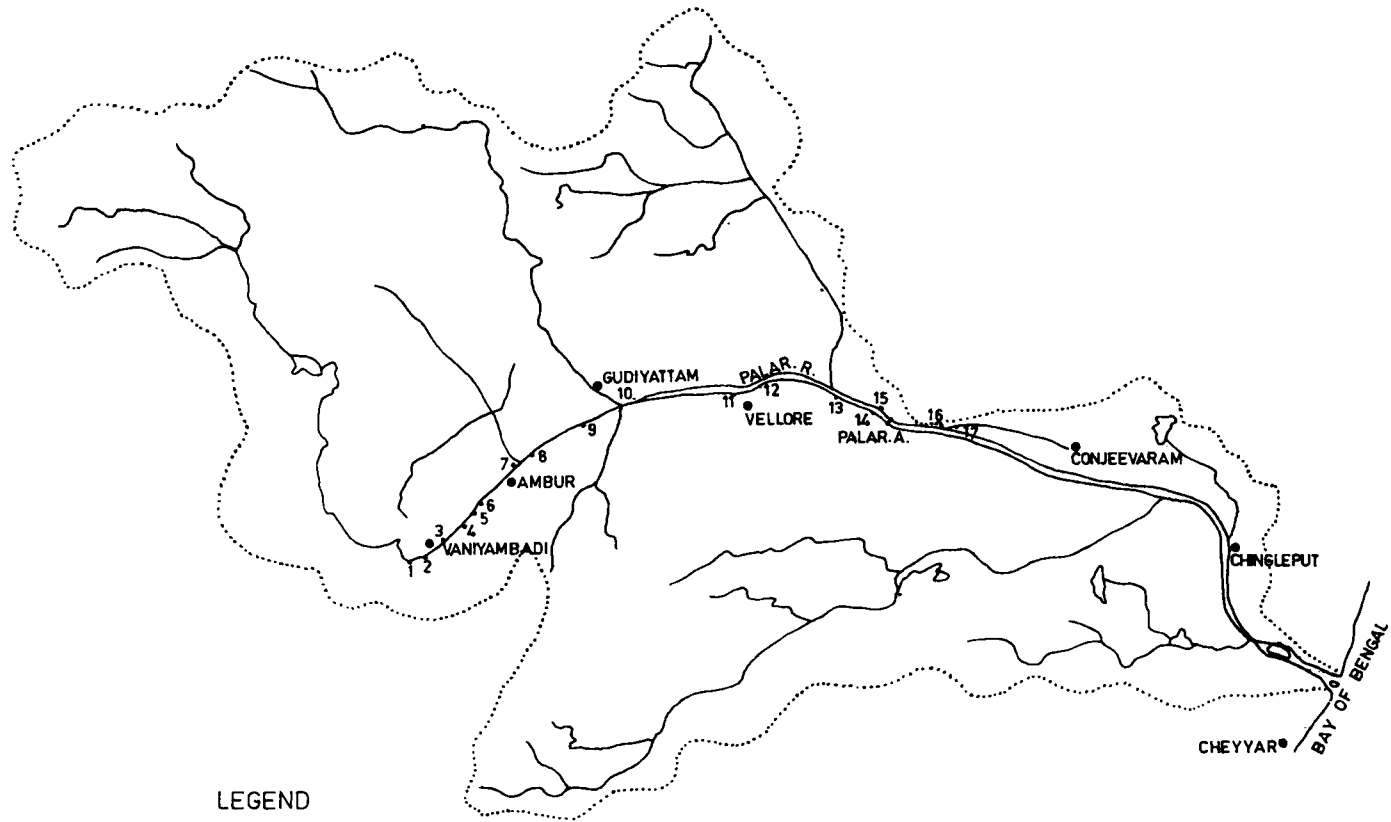
Ground water pollution by large industries pose a serious environmental threat especially due to soluble inorganic matter, if the industries are located at the upper reaches of the water courses or in uplands. A large number of tanneries are located on the banks of the Palar river (India). This river is feeding 30 municipal towns and innumerable villages for drinking water supplies in addition to irrigation. The river has seasonal flows and in the past 30 years surface flow occurred for a few days only. The aforesaid tanneries have no proper treatment units and discharge their effluents containing both organic and inorganic matter. Although organic pollution is limited to the vicinity of the source of pollution, dissolved inorganic matter travels for a longer distance and thereby increases the area of pollution.

Studies conducted along the river course and nearby wells show significant travel of pollution in the form of total dissolved solids, salinity and hardness. Dilution along the river through ground water recharge has been the major factor for lowering the intensity of pollution downstream. It is feared that in the event of increase in the number of tanneries or their production, dilution may become insignificant and concentration of dissolved solids, salinity and hardness may rise above the excessive limits.

INTRODUCTION

The Palar river basin has a catchment area of 17480 Sq km with rainfall varying from 75-115 cm increasing towards the tail end. The length of the main river is 272 km and is dry almost the year round. However, there is sufficient ground water movement along the Course of the river to feed a large number of municipal water supplies and for agricultural and industrial activities.

A large number of tanneries were developed over a long period at Vaniyambadi on the banks of the river. Even as early as 1940, there were public complaints on the effluent disposal and the State Water and Sewage Purification Committee brought out a model scheme for treatment of tannery effluent. But the tanners have not



LEGEND
----- DRAINAGE AREA
~~~~~ RIVER  
1,2... SAMPLING POINTS

SCALE  
MILES 16 8 4 0 8 16

FIG.1  
PALAR RIVER BASIN  
INDIA

provided such units. The number of industries and their production have also increased. This study was done to assess the extent of pollution along the river course.

#### GEOLOGY

The reach under study has Arcaean crystalline rocks of a widely varied characteristics, from acidic to ultra basic and metamorphic types predominated by gneiss, granite-gneiss and charkonite. Doleritic dykes and quartz veins are common. Except for hill peaks weathered mantle of coarse sandy and clayey material occur to a depth of 13 to 15 m.

#### RIVER BED

The river has a width ranging from 600 to 1600 metres and alluvial sand deposit varying from 5 to 10 m. The permeability of the river bed is good and at one place it is found to be in the order of 20,000 gpd/ft<sup>2</sup>. However, the quantitative flow of the ground water along the river has not yet been estimated.

#### POLLUTION

It has been reported that nearly 42,000 Tonnes per annum of leather goods are processed in this area of study. At Vaniyambadi alone about 100 tonnes of skins and hides are processed in more than 60 tanneries at peak periods. The study area has 264 tanneries. However, the pollution along the river was mainly from Vaniyambadi and Ambur. It is roughly estimated that nearly 12 tonnes of common salt per day is released from the tanneries at Vaniyambadi. The tanneries use a large number of chemicals like lime, acids, salts etc. The common salt added to the raw skin for preservation is also scraped and dumped in the locality without proper disposal.

#### STUDY

An attempt is made to identify the major pollutants travelling along the course of the river. Samplings are carried out for a length of 100 km with a reference point 3 km upstream of polluting area to downstream. Some of the points are the infiltration works along the river supplying water to the various municipalities and are indicated in FIG 1. COD was found to be below 10 mg/l in most of the sampling points except at Vaniyambadi and Ambur. Chromium was present in traces at the tannery effluent disposal areas only. The TDS, Total Hardness and Chlorides were analysed at monthly interval. The results are represented in FIG. 2.

#### DISCUSSION

From the results it can be seen that dilution has been the major factor in reducing the pollution load. Sampling points 3 and 7 are the major tannery areas and the reach between 11 and 12 are due to municipal discharge of wastes. The

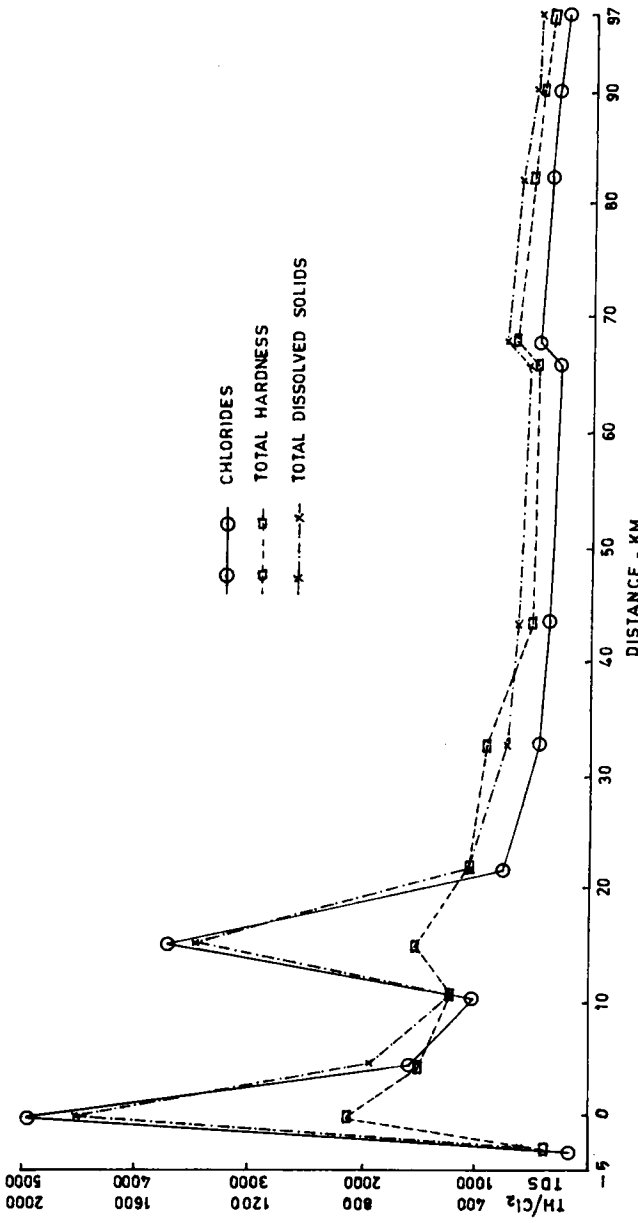


FIG. 2. VARIATION OF CHEMICAL PARAMETERS ALONG THE RIVER

results indicate a trend of lowering of the constituents after the pollution points. Since recharging and discharging occurs along the river a qualitative analysis of pollution load is hard to arrive at. In the event of additional pollution load on the drainage area, a vast area of land may become unproductive and the ground water unpotable. To avoid such a contingency preventive measures should be instituted immediately.