

**Report on the ‘Soil Pipe’ beneath the house of
Mr. T.S Bhasi, Survey No. 352/4, Pambavalley, Kollamula, Ranni,
Pathanamthitta District**

(Reference: 34758/K1/2012/DMD dated 15-06-2012)

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Introduction

Mr. T.S Bhasi constructed a new house in survey no. 352/4 in Kollamula village, Ranni Taluk, Pathanamthitta district. As he dug a well he encountered a large cavity and it was found that the cavity extended below his newly constructed house (Figure 1). The entity was noticed first on 6 April 2011. He reported the event to the concerned village officer and to the District Collector. The Collector in turn informed the Addl. Chief Secretary, Revenue and Disaster Management with a proposal for



Figure 1: Cavity leading to the soil pipe near the house of Mr. Bhasi

a cost of Rs. 10.8 lakhs from the Ranni Block Panchayath Asst. Executive Engineer for filling up the cavity. The Government examined the matter and issued administrative sanction for the work as per GO (Rt). No. 2037/2012/DMD dated 03-03-2012.

However, the Asst. Executive Engineer, in a meeting with concerned parties held on 04-05-2012 observed that ‘the soil below the property of Mr. Bhasi and adjoining five more houses are situated on silty soil and hence even if it is filled up land subsidence may occur, damaging the houses in future’ (Ref: DM 1-1094/2011 dated 22-05-2012; Letter from District Collector to Addl. Chief Secretary, R & DM). Considering this opinion the Collector requested for a scientific study to be conducted on the matter. The Government through letter 34758/K1/2012/DMD dated 15/06/2012 instructed HVRA Cell to undertake a study on the matter in collaboration with CESS.

Based on this instruction, Shri. G. Sankar, Principal Investigator, HVRA Cell & Scientist F, CESS, Prof. Dr. Keshav Mohan, Director, ILDM, Dr. Sekhar L. Kuriakose, Head (Scientist), HVRA Cell and Shri. Sreekumar, Section Assistant, Revenue (K) Section, Dept. of Revenue and Disaster Management, Government Secretariat visited the property of Mr. Bhasi and adjoining houses suspected to be affected by the pipe, on 10 July 2012.

Field work observations

Mr. Bhasi’s house is located in a $>25^\circ$ slope. The house is constructed on a terraced platform cut out of the natural hill slope. The soil in general was reddish and showed indications of laterization. The house itself is a reasonably well constructed concrete structure (cf. Figure 1). About 300 meters from Mr. Bhasi’s house, a soil piping incident was reported about 25 years ago in the plot of Mr. Gopi

(House No. 54, ward 8, Perinadu). Similarly, a piping event occurred in 2006 adjacent to the house of Mr. V.M Abraham (House No. 25, ward 8, Perinadu). This pipe was filled with 10 tipper loads of weathered rock. Both these houses adjoining to the house of Mr. Bhasi. Land subsidence was also noticed adjacent to the property of Mr. Bhasi in survey number 351/4 of Kollamula village too.



Figure 2: Inside the pipe in Mr. Bhasi's property

The team conducted an investigation inside the pipe (Figure 2). The loose material inside was clayey loam. Sodium molting was observed along the roof of the pipe.

Conclusions and recommendations

Based on the above stated facts, the following conclusions and recommendation are made by the expert team which visited this village:

1. The terrace in which the houses of Mr. Gopi, Mr. Bhasi and Mr. Abraham are constructed is prone to soil piping
2. The sink hole formed may be filled up and the land may be reclaimed
3. The filling shall happen in the months of March and April 2013 and should be completed before 15 May 2013 considering the possibility of early monsoon showers
4. A method of filling up the sink hole is illustrated in figure 3 which may be used by the PWD Executive Engineer concerned as a guide
5. Loose debris inside the sink hole must be removed before filling up the sink hole
6. After removal of the debris from the sink hole, three to four sacks of lime (kummayam) shall be applied inside the sink hole
7. Stone paving must be made on the floor with large size rock fragments and soil from outside Kollamula village must be spread over these rock fragments by a thickness of about 0.5 m
8. Atop this a layer of fine meshed coir geotextile must be laid. Ensure that this geotextile covers the 'point beyond which the pipe is inaccessible and the water flows further underground'

9. On top of the this geotextile layer, old scooter-tires must be laid horizontally and soil from outside Kollamula village must be spread over the tires by a thickness of about 0.5 m. Ensure that the space inside the tires are also filled with soil
10. Atop this a layer of fine meshed coir geotextile must be laid
11. Over this geotextile layer, soil from outside Kollamula village mixed with medium size rock fragments must be used for filling up the sink hole up to $\frac{3}{4}$ the depth of the sink hole
12. Atop this layer, soil from outside Kollamula village mixed with 2 sacks of lime (kummayam) must be used for filling up the sink hole to the top
13. The filling must be compacted at all stages
14. After filling up the sink hole, deep rooting Vetiver (Ramacham), Lemon Grass (Inji pullu) or deep rooting and fast growing tress may be planted on top to ensure that the land is stabilized in a fast pace
15. The vegetation cover over the sink hole may be maintained intact and the land must be used only for agricultural purposes
16. The outflow point adjacent to the river where the soil pipe drains into the river must be monitored during the monsoon season following the filling up of the sink hole by the owner of the land
17. In case filling material is seen flowing out, it must be notified to the HVRA Cell

District Collector, District Panchayath and field level officers may take note of the fact that this is the first case of soil piping reported from the southern districts of Kerala. Our inspection has revealed that many previous incidents occurred, but went unnoticed. Considering the serious long term land degradation caused by this natural phenomenon, the district authorities may instruct all Village Officers and Grama Panchayaths concerned to keep themselves aware of this phenomena and any further occurrence is reported to HVRA Cell or CESS.

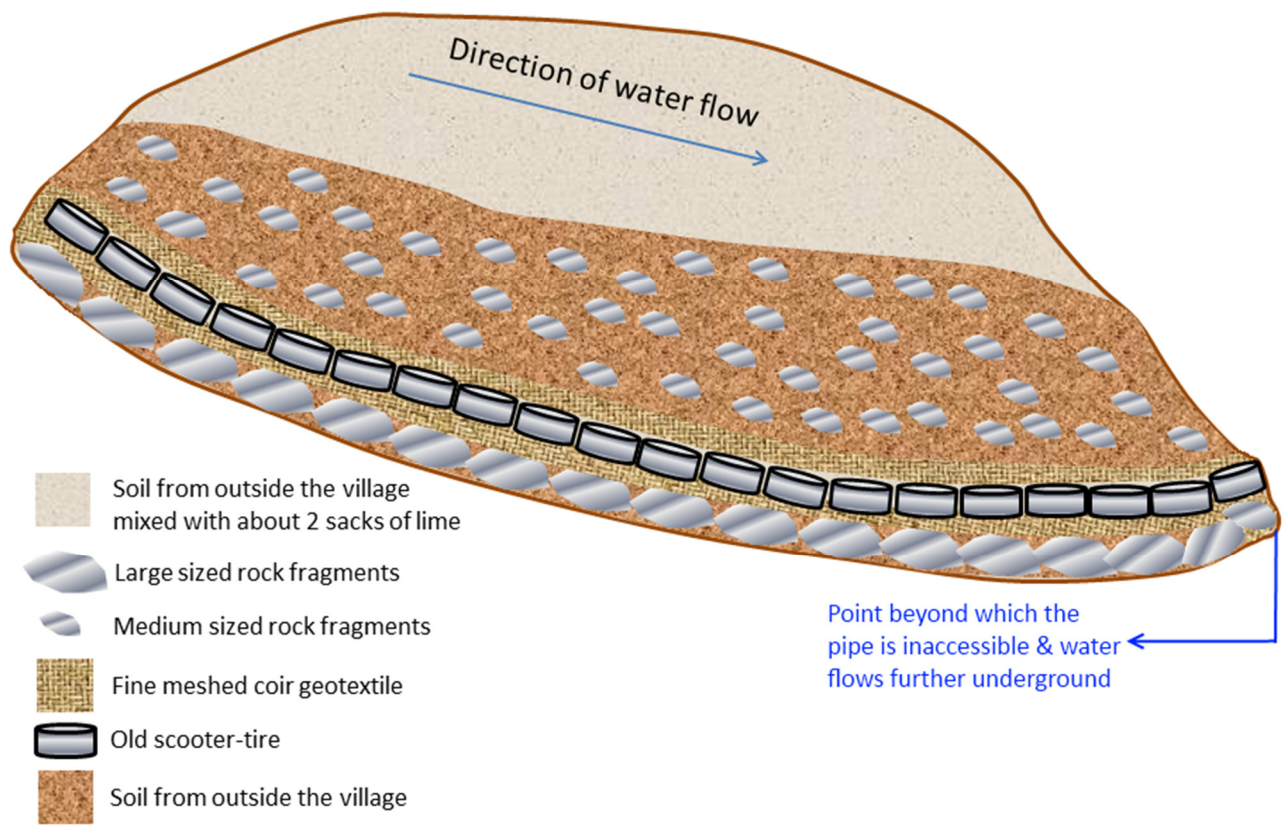


Figure 3: Illustration for filling up the soil pipe