

Chapter 7

Pest Management System

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Pest Management System

7.1 Introduction

Pest management is a major part in tea industry. Intensive management of pests and diseases is required particularly during the formative years for early establishment. In mature tea also some pests cause a great deal of crop loss. In this paper, a GIS based pest management system for tea garden has been proposed [1, 41]. The system takes data related to ongoing practice of tea gardens on different types of pests and diseases, store these data to a database and helps the management to take decision to use appropriate pesticides with correct doses using GIS approach.

The proposed technique is a GIS based database management system with the special focus on pest control.

7.2 The Scheme

The proposed system is divided into different phases

Step-1

Tea garden maps are collected and scanned first. Then digitized the raster image/map on section layer. Figure 7.1 illustrates this process.

In this chapter, a scanned map of Phuguri Tea Estate, Mirik, Darjeeling has been considered and processed as mentioned. Figure 7.2 gives the context diagram of the pest management system.

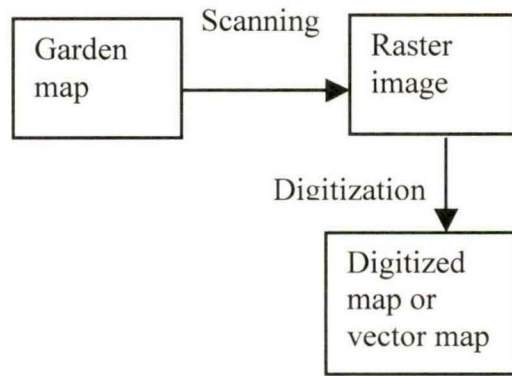


Figure 7.1: Conversion of garden paper map to digitized format

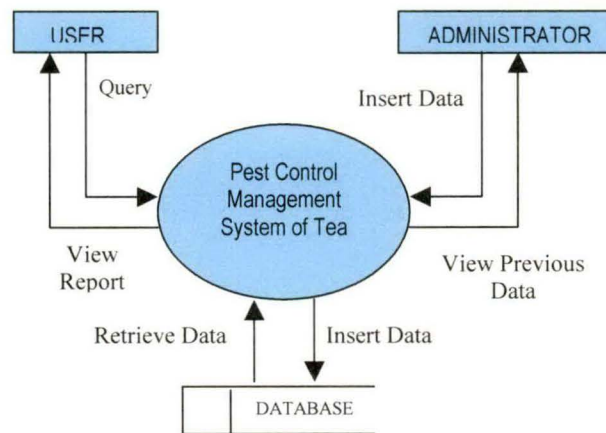


Figure 7.2: Context diagram of the System.

Step-2

Create an Oracle database to store the data of different pests, diseases and approved pesticides, fungicides from the tea garden.

Step-3

Design forms using java swing to input/ output data into the database.

Step-4

Make a relation between the digitized map on section layer and the database in such a way that a GUI based software is created and one can get previous information or any other information on pest attack by clicking on any section of the digitized garden map and it may be used as a decision making tool for a tea garden.

7.3 Results

Figure 7.3 shows the input form for the insertion of the records related to the pest management. The form gives the image of the section along with its area and section code. It also gives the details of the last spraying done for that particular section, that is, the date of the last spraying, the pest found and the pesticides used along with the quantity of the pesticides used for that section. This portion of the form chooses the details of all pests for which spraying was done on that particular day. The names of all the pests are selected into a combo box and then depending on the pest selected from the combo box the details of the spraying done to control that pest is shown in the respective fields.

The lower portion of the form provides the user with the option to enter the details of the current spraying session for the particular section. Figure 7.4 shows the details of the sprayings done, for all the sections in the garden throughout the entire year, in the form of a report, that is it gives the segment (section) code, the segment (section) area, the date of spraying, the pests found and the pesticides used along with the quantities used per x litres of water and lastly the number of workers who were engaged in spraying for that section on that given date.

Spraying Records

Section Details

Segment Code: pug1

Segment Area: 4.90

Segment-->1

Last Spraying Details

DATE	PESTS	PESTICIDES USED	QUANTITY
10-DEC-2006	Red Spider(Mite)	Profenphos	5
		Dicofol	8
		Ethion	6

Current Records

DATE	PESTS	REQUIRED PESTICIDE	QUANTITY
11 JAN 2007	Chewing Insects		
	Red Spider(Mite)		
	Chewing Insects		
	Sucking Insects		

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Figure 7.3: Insertion form for Spraying Data with previous data of last spraying date

Payment Report

TOTAL SPRAYING DETAILS

Segment Code	Segment Area(in hc.)	Date	Pest	Pesticide Used	Amount(gm/x ltrs)	No. Of Workers
pug1	4.90	10-DEC-2006	Red Spider(Mite)	Profenphos	5	3
pug1	4.90	10-DEC-2006	Red Spider(Mite)	Dicofol	8	7
pug1	4.90	10-DEC-2006	Red Spider(Mite)	Ethion	6	5

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Figure 7.4: Total Report form for Spraying Data

Figure 7.3 shows the input form of pest management in which we can see if we want to apply some pesticides in some section of the tea garden then the system automatically display the previously used pesticides with date and quantity. Since the same pesticides should not be used again and again in the same section so the management can take decision from here to apply new pesticides with proper quantity. The figure 7.4 gives the total used pesticides in detail and from here the management can also take the overall decision to apply pesticides.

A database management system with GIS technique for pest management in tea garden is presented here. The GIS technique will help the management to see the view of the affected section of the garden by the pest attack. So this system is much beneficial than any manual system where the previous records have to be searched from old paper files.