Web Based Information System for Thematic Monitoring in Sri Lanka

Faculty of Applied Sciences
Sabaragamuwa University of Sri Lanka

PETENCE ONLY

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A project report submitted in full fulfillment of the Requirement for the Degree of Bachelor of Science
In physical Sciences, Faculty of Applied Sciences, Sabraragamuwa University of Srilanka

Declaration

I certify that this dissertation does not in corporate without acknowledgement of any material previously submitted for the degree or diploma in any university. To best of my knowledge and believe, this doesn't contain any material previously published.

Written orally communicated by another person where due references made in the text.

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Abstract

Nowadays, Web based system getting more popular among all private and government firm all over the island as it is easier and can be easily and efficiently accessible by everyone in any corner of the world. Likewise, I was allocated as a member of a web implementing project team from the beginning to end of this project.

The United Nation (UN) has been launching a program Called Millennium Development Goals, with the support of the Ministry of Policy Development and Implementation (MPDI). MDGs (Millennium Development Goals) tends to out put the evaluation and comparison of social status such as total number of deaths/due to Malaria, Tuberculosis, number of labour force divisionally, according to goals and targets (as in Millennium Declaration) and indicators for monitoring progress.

The existing web based system of the MPDI, called as Divisional Monitoring System (DMS) gives only an evaluation of the social status. In addition to that, the UN needs information to monitor issues of a multidimensional nature such as poverty, privatization, foreign direct investments, exports, macro economic performance and reforms. Further, UN needs to compare these factors among divisions as well as between years. The comparison is required in the form of graphs and numerical values. Currently this process is done manually. It is relatively less efficient and less accuracy than computer base system. Therefore the UN faces grate amount of difficulties in monitoring these issues and this courses delaying lunching the social development programs in right time in Sri Lanka.

We developed a web based user-friendly Information system to meet the above requirements. It will be able to execute input data, which is given through graphical interfaces, and give output as graphs and numerical values among divisions as well as between years accordingly.

User interfaces were created using Hyper Text Markup Language (HTML), Active Server Page (ASP), Visual Basic Script (Vb Script) and CSS. Database was created using Structured Query Language (SQL).

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1.0 Introduction

1.1 PricewaterhouseCoopers Lanka (Pvt) Ltd.

1.1.1 Background

The PricewatrehouseCoopers Lanka Ltd. (PWC) is a largest professional services firm in the world, was formed as a result of merging between the former Pricewaterhouse and Coopers & Lybrand. In 1998, due to some certain regularity and ownership issues, the firm separated two distinct units in Sri Lanka. PricewatrehouseCoopers Lanka Ltd is responsible for Audit, Tax and Financial services.

Later, it is responsible for management Consulting services (MCS) in Sri Lanka, Focusing Primarily on the Information Technology Consultancy and software developing. Since 1995, the main objectives is developing IT in Sri Lanka.

PWC's software product and solutions provided to both private and public sector in Sri Lanka which demonstrate the quality and professionalism of their services. PWC's IT consulting services include the full range of activities from strategic IT planning to implementation, package software and custom developed software. System development and integration has also been undertaken in response to specialized requirements.

The company has two divisions, the Consulting division and the Technology solution division. PWC's provides solutions with comprehensive packaging that covers complete user manuals, installation guides, standard reports, a limited number of customized reports and training with competitive pricing.

1.1.2 Services

PricewaterhouseCoopers Lanka (Pvt) Ltd has built its own reputation in Sri Lanka by addressing their issues. The PricewaterhouseCoopers Lanka (Pvt) Ltd aiming to develop quality software and delivers to International level at local cost. Quality of the software is assured by adopting the methodologies, practices and by recruiting highly qualified professional staff. Cost are kept low by using the firm's excellent training resources to build on the strengths on the local graduates of high potential rather than relying on international resources wherever possible.

PricewaterhouseCoopers Lanka (Pvt) Ltd. has built up specialist software development and integration skills. Largely motivated by the difficulties encountered in obtaining quality service from local firms. A small but specialized team trained in networks technologies has undertaken several recent projects, those cover network design. Security, management, as well as implementation large scale network. As a part of system implementation work, the firm also supplies services to restructure and modernize clients IT management functions to support the demands of new system

The client list of PWC mainly consist of top level Sri Lanka multi-nationals companies such as shell and various government organizations such as Ministry of finance

1.1.3 Skills Profile

PricewaterhouseCoopers Lanka (Pvt) Ltd has a human resource strategy focus on training and development staff with good educational qualifications. Most staff has degree in science, engineering or Commerce from both local and foreign universities.

The software development division has many staff with over five years experience in project management system analysis, design, and implementation. The Programming software used are Java, Visual Basic, Vb Script, Java Script and Active Server Page(ASP). Database involved are *DB2*, *SQL sever*, *Oracle*, *Access*. The network team is trained in *Windows NT*, *UNIX*, *Linux* operating systems and Cisco network hardware.

1.2 General Introduction

Millennium Development Goals (MDGs) tends to out put the evaluation and comparison of social status according to goals and targets (as in Millennium Declaration) and indicators for monitoring progress. The existing web based system of the MPDI, called as Divisional Monitoring System (DMS) gives only an evaluation of the social status. In addition to that, the UN needs information to monitor issues of a multidimensional nature such as poverty, privatization, foreign direct investments, exports, macro economic performance and reforms. Further UN needs to compare these factors among divisions as well as between years. The comparison is required in the form of graphs and numerical values. Currently this process is done manually. It is relatively less efficient and accuracy than computer base system. Therefore the UN faces great amount of difficulties in monitoring these issues and this courses delaying lunching the social development programs in right time in Sri Lanka.

1.2.1 Objectives

Developing a web based user-friendly Information system to meet the above requirements. It will be able to execute input data, which is given through graphical interfaces, and give output as graphs and numerical values among divisions as well as between years accordingly.

2.0 Theoretical Background

2.1 Software design

Software design is the process of deriving solutions that satisfies the software. The "Solution" means modeling or describing the problem with sufficient details. So that the process will be easy to implement.

The following topics are consider when designing a software

- 1) Typical design stages '
- 2) Common design Phases
- 3) Top down or Bottom up design
- 4) Design strategies
- 5) Design quality
- 6) Architectural design
- 7) Design methodology

2.2 Design methodology

The three main forms of design are

- 1) Function oriented design
- 2) Data oriented design
- 3) Object oriented design

Function oriented design

The system mainly focuses on functions. The main disadvantage is some functions can change values of shared data in a manner not expected by other functions. This problem can be reduced by minimizing sharing of data, restricting the impact of a function to the data pass to it by the calling function. Generally function oriented process has the following stages.

- a) Identify the data transformation and high-level functions
- b) Decompose the high-level functions in to hierarchy of sub functions
- c) Describe the operation and interface of each system entity

2.3 Theory behind the graphical user interfaces

The goal interface designs are to define general principle and consider the factors which influence how information should be presented and supported to the customers. Users often judge the system by its user interface. Poorly designed user interfaces can make catastrophic errors and let to reject the system. User interface design must take in to account the needs, experience and capabilities of potential system users. The interfaces should be based on user-oriented concept rather than computer oriented concept.

Factors that has to be considered when designing a graphical user interfaces are,

a) System should display an appropriate level of consistency

b) System should not surprise the user. The effect of an action should

predictable as possible

c) The system should provide some rapid recovery to the errors

Example: - understandable error messages

Type of user interfaces

1. Graphical user interfaces

Graphical User Interfaces are completely different from just replacing the text/command base system. Graphical User Interfaces are the most common and useful interface today. Windows, Icons, Dropdown list, pull down menus, dialogue boxes, use of mouse are all examples of graphical User interfaces.

Advantages:

- a) Easy to learn and use
- b) Facilitate switching between tasks and user interfaces
- c) Full screen interaction

2. Command languages

These types of interfaces used on cheaper hardware and faster than graphical user interfaces for experts.

Disadvantages:

- a) Commands must be learned and remembered
- b) Need more error detection and recovery
- c) Typing ability is required

3. Direct manipulation interfaces

One way to make a system reasonable, user concepts is to directly model with familiar objects and actions direct manipulation interfaces the user with a model of their information space that is modified by direct action.

Example: - Documents moved in to folders directly using mouse.

Advantages:

- a) User feels more in control
- b) Learning time is relatively slow
- c) Users feels more in control
- d) Mistakes can be avoided

Disadvantages:

- a) Finding an appropriate model can be difficult
- b) Facilitate to navigating around large information space can be risky

2.3.1 Successful user interface models

Desktops: It is a Users screen which represent desktop entities as icons.

Menu system: Gives user a choice from a list of option. Menus can be graphical user interface or text base.

Control panels: Consist of icon representing things like buttons, switches.

Advantages:

- a) User doesn't need remember specific command names.
- b) Typing effect is minimal
- c) Context dependent helps make more sense
- d) Can restrict the availability of some menus according to user

Disadvantages:

- a) Experience users find the menus slower than command languages
- b) Combined actions are hard to represent
- c) There a large numbers of choices to select.

3. 0 TMS for Ministry of Policy Development and Implementation

3.1 Project Plan

3.1.1 System Development Life Cycle

The following project life cycle shows the tasks involved in the development of the TMS. The cycle indicates steps involved in the project, the responsibilities of MPDI and PWC, deliverable and approval points during the project.

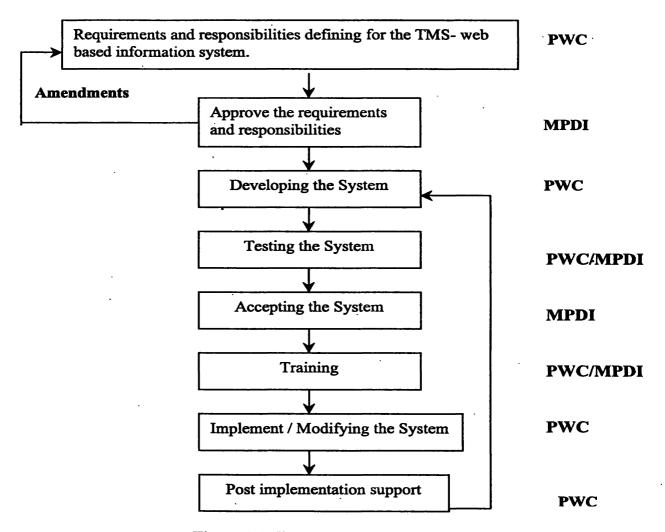


Figure 3.1:TMS development life cycle

3.2 Development

3.2.1 Material used

The system was a 3-Tier Client-Server application, which was developed using HTML, CSS and ASP as front-end development tools and VBS as backend development tool.

HTML was used to create the user-interfaces (forms)

CSS was used to design the web pages

ASP was used to validate the fields in the forms

VBS was used to write the data to the database, to catch some errors like whether the entering data is duplicate or out of range and to generate message boxes with information to the user

The database was created using Microsoft SQL Server

3.2.2 Development Procedure

Development of the system was carried out as mentioned in the following steps.

- 1) All the user interfaces & process flow diagram was created
- Since the access for the pages are granted only for specific people User
 Names and Passwords were created
- 3) Linking of the sub forms
- 4) Giving validation to each and every field in the form
- 5) Writing the data to the database
- 6) Retrieving the previous years data
- 7) Retrieving current data if it has already been entered
- 8) Editing the current year data
- 9) Testing the whole system

3.2.2.1 User interface creation

Firstly, the front end of Livestock form was created using HTML, CSS, Java script and VB Script .ASP used to connect the form with data base. Following sample code will illustrate the coding that used to build up this page.

HTML related TAGS

<html></html>
Creates an HTML document
<head></head>
Sets off the title and other information
that isn't displayed on the Web page itself
<body></body>
Sets off the visible portion of the
document

<form></form>
Creates all forms
<select multiple name="NAME" size=?></select>
<option>
<select name="NAME"></select></option>
Create pull down menu for multiple selection
<textarea name="NAME" cols=40 rows=8></textarea>
Creates a text box area, Columns set the width; rows set the height.
<input type="checkbox" name="NAME">
Creates a checkbox,
<input type="radio" name="NAME" value="x">
Creates a radio button.
<input type="submit" value="NAME">
Creates a Submit button
<input type="reset">
Creates a Reset/Refresh button

ASP that used to connect the data base

```
<form action="saveAgriculture.asp" method="post"</pre>
name="myform">
When you click submit button input data goes to saveAgriculture.asp
!--#include file="../include/division.asp"-->
Includes the existing division asp file as a header
<!--#include file="../include/connectstring.asp"-->
Connect the forms with the data base.
              dim Agro_Chemical_Outlets
              dim Govijana
              dim Farmer Compani
                                           %>
Assigns variables to asp file.
<!--#include file="../include/Disconnect.asp"-->
Disconnect the forms from the data base.
<%=server.htmlEncode(request("pro1"))%>
Transfer data from form to next (Saving) page(Pro 1- Id of text field)
<%response.write(PriorityProb1_Current)%>
Write the field name (PriorityProb1_Current)of SQL table on html page
pp1 = trim(request.form("Priority Problem 1"))
Get the data from previous page( Text field name -Priority problem 1)
RS("PriorityProb2") = ppno2
Assign a asp variable to a SQL table field name
Rs.addnew
ASP key word that used to add new data from form to the data base
```

Vb Script that used to validate the page

```
<SCRIPT
LANGUAGE="VBscript"SRC="../include/changeColor.vbs">
</SCRIPT>- change color of a text field which filled incorrectly or left
blank
<SCRIPT
LANGUAGE="VBscript"SRC="../include/doSubmit.vbs">
</SCRIPT>- Validate on submission of the form such as data already
exist or not
<SCRIPT
LANGUAGE="VBscript"SRC="../include/validateField.vbs">
</SCRIPT>- Validate the field type such as numeric or text
```

SQL queries that used to retrieve data from the database

```
Set Rs = Server.CreateObject("ADODB.Recordset")
Set the data base to ADODB

Rs.Open "SELECT * from Agriculture where DivID =" & session("DivID")
Query with conditions
```

The All the user interfaces & process flow diagram method can be explained from a form called Livestock from the system is shown in the Fig.2. The field called Base Line shows the previous years' data. As you can see in the following figure Base Line data for the first 3 values under Question field is set to N/A (Not Applicable) to satisfy the requirement.

The Submit Button was created to submit the data to the database and the Refresh Button was created to delete the values in the fields.

1 main form and some other screen layouts are included out of 20 main forms and 49 sub forms in the *Appendix-A* section of this document.

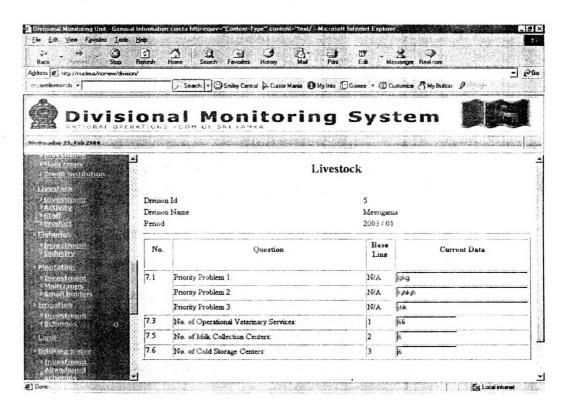


Figure 3.2 Livestock form from TMS

After designing the user-interfaces for livestock form the process flow diagram for livestock form was drawn. It has almost same structure for all unit programs. But the body of the process flow changes according to the fields. As an example the process flow of the **Livestock Form** was given below and the same procedure was repeated to create all the other forms.

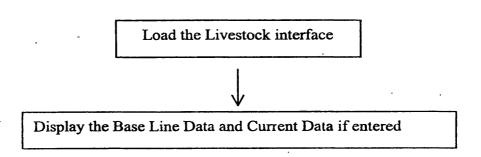


Figure 3.3 Livestock Form flow diagram

3.2.2.2 Unit Test Plan

When developing the test plan the programmer should consider all the possible inputs for every module and the expected output for every form. When developing the TMS, after the every step of the development of a particular form, the out put should be clearly checked and corrected according to the result.

Sample Test:

1. Submit

Here, we use validation rules to identify errors of input data. In our system when the submit button clicked at once, the Validation rules looks for the Duplicate entries, numeric values, Text and blank field. If necessary, display Error message to the user.

The Web Forms framework includes a set of validation server controls that provide an easy-to-use but powerful way to check input forms for errors.

Field	Test description	Test Data	Expected Results
Priority Problem 1	Field with Both text and numbers	Priority Problem 1 = Blank	Priority Problem1 field cannot be blank
No. of Operational Veterinary Services	Field with numbers	No. of Operational Veterinary Services = text	No. of Operational Veterinary Services field must be numeric
Whole Set of Fields Whole Set	Enter the same set for current year Data for this	Enter the same set for current year Data for this	Data is already has been entered Data successfully
of Fields	year	year	entered

Table 3.1 Test Plan for Education

Screen Layouts for the expected results are shown in the in the *Appendix-B* section of this document.

3.2.2.3 Coding

As explained previously, the coding was done using the HTML, CSS, ASP, and VBS syntaxes. At the end of this step the programmer should have a perfectly running program that satisfies the specification.

3.2.2.4 Unit Testing

After every completion of the code, the unit should be checked for validation, expected results that were gathered in the unit test plan. After this step the unit development procedure completes.

3.2.3. System process

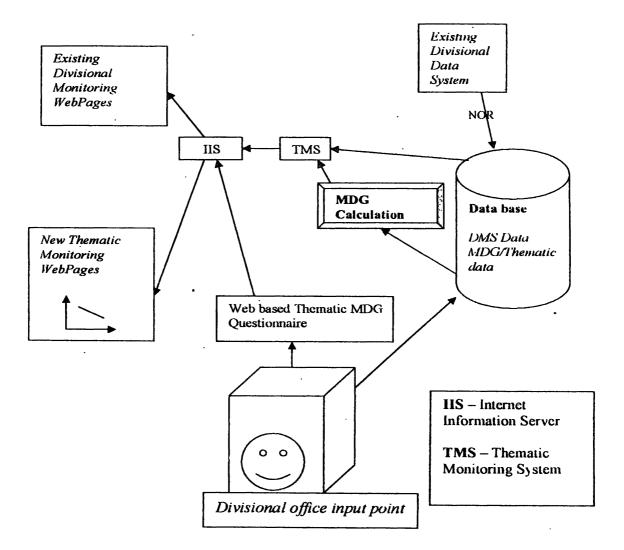


Figure 3.4 System Process flow diagrams

3.2.4 System Features

There's one whole column that includes links to all the Main and sub forms. Once the user comes to the form current year data is displayed, if it is already been entered, and a separate column is used to display the Base Line data.

Apart from that there are only 2 buttons called Submit and Refresh, to maintain records in the TMS. Submit Button is to submit the data to be written to the database with all the validation and avoiding duplicate data entry and Refresh Button to clean all the values in the fields.

After a successful submission of datum, the user is guided to which form he/she should enter next datum.

3.3 Testing

Testing took place in every step of development either by programmers or project manager. System testing and Functional testing were carried out in each step of development and the completion of development to make the software bug-free. Testing were carried out using a number of technical methods.

Ex: Black box testing, White box testing

3.4 Training/Implementation

The system further implemented by listening to the customer requires in every step of software development. The training was held to train people to operate the system properly by the programmers and the project manager.

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4.0 Discussion

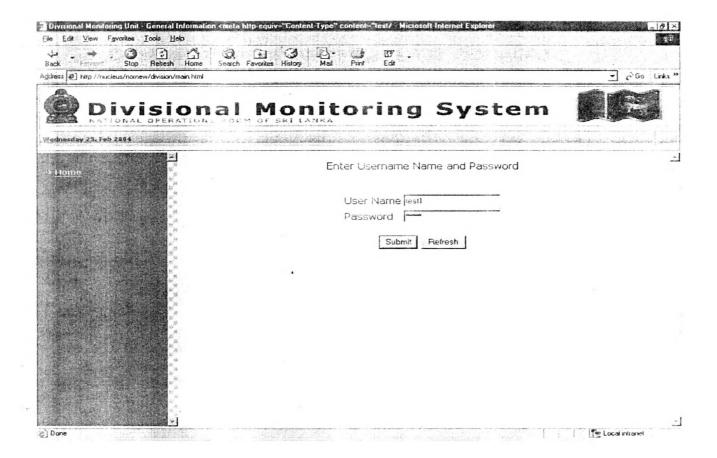
The goal of this project to design a web based information (Themating monitoring system) for NOR. This Programme successfully completed and trained. This is the first time that this system got in web format. It is so user friendly. Some times this web system gave error in loading and displaying forms when we down loading in several of version. This problem over come by identifying each troubling codes and correct them according to errors. Following the correct software development methodologies can solve most of the real world IT problem.

5.0 References

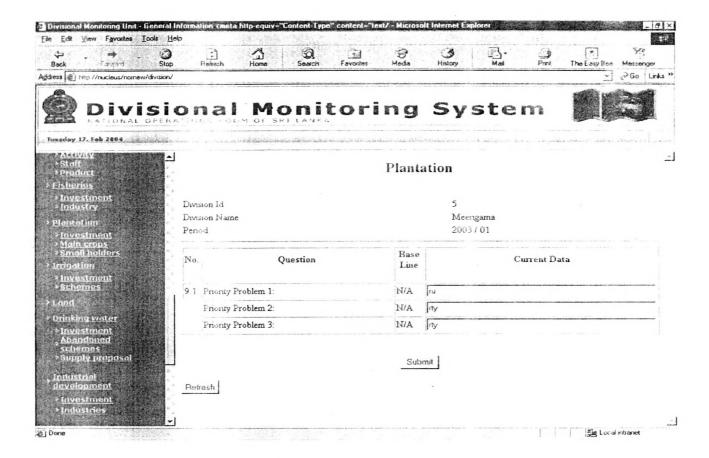
Wille,c,Bersinic,D,Nrad,M and Rob,S,(1999) SQL server 7 Administration,TecMedia,New Delhi, pp 1-672.

Appendix -A

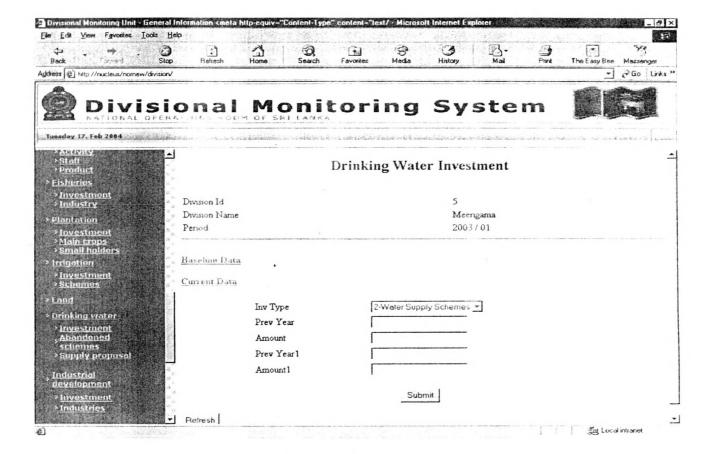
Main log on page of TMS



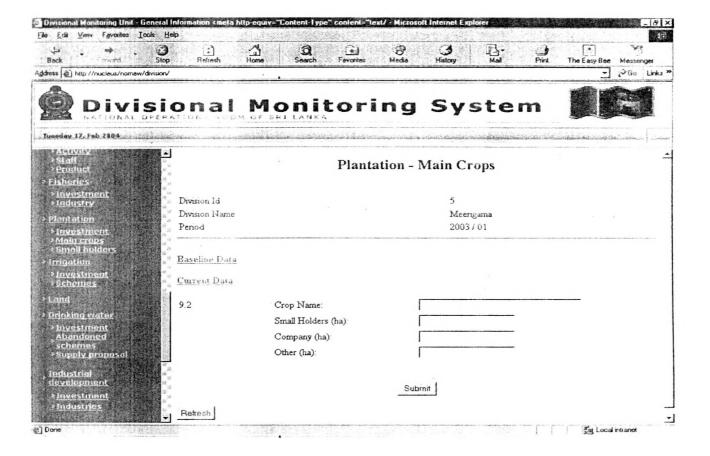
Main form for Plantation



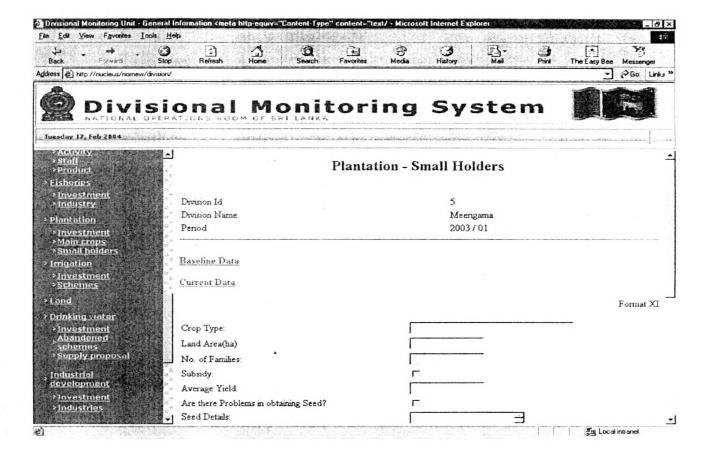
Sub form of Plantation



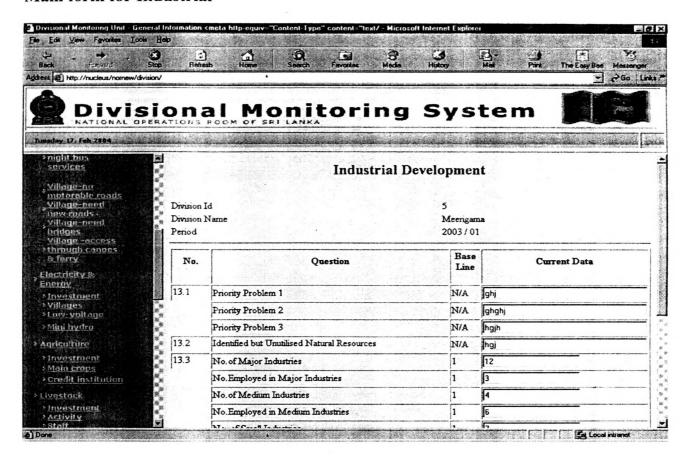
Sub form plantation



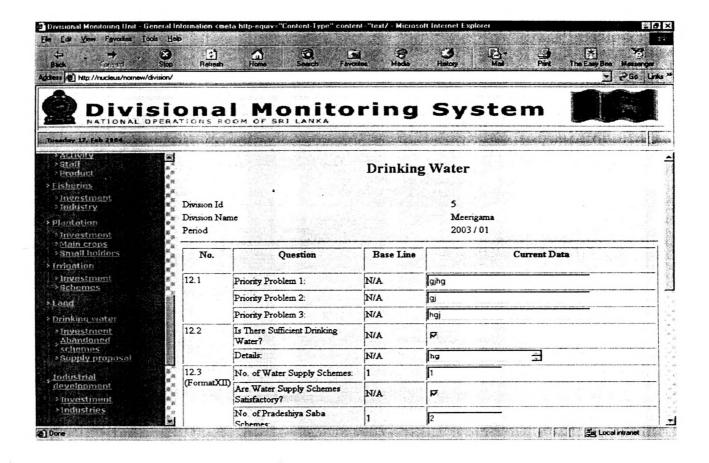
Sub form Plantation



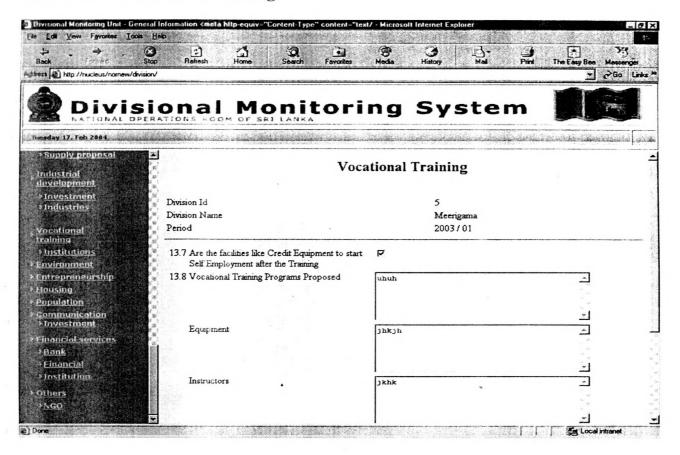
Main form for Industrial



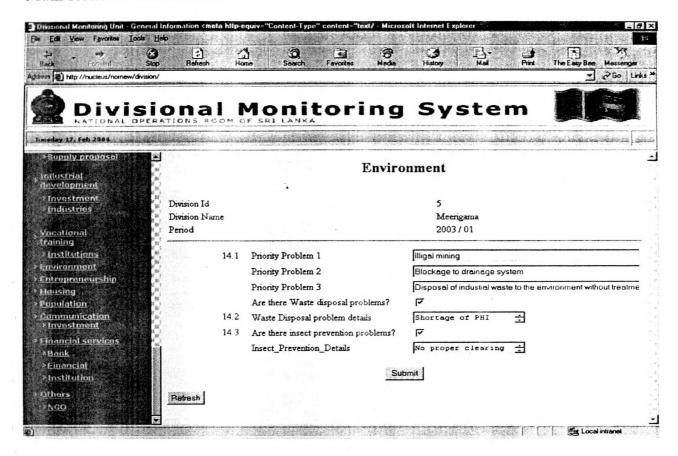
Main form for Drinking water



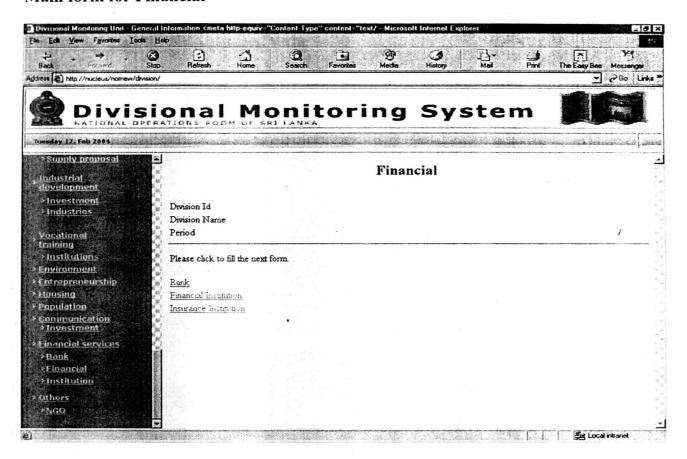
Main form for vocational training



Main form for Environment



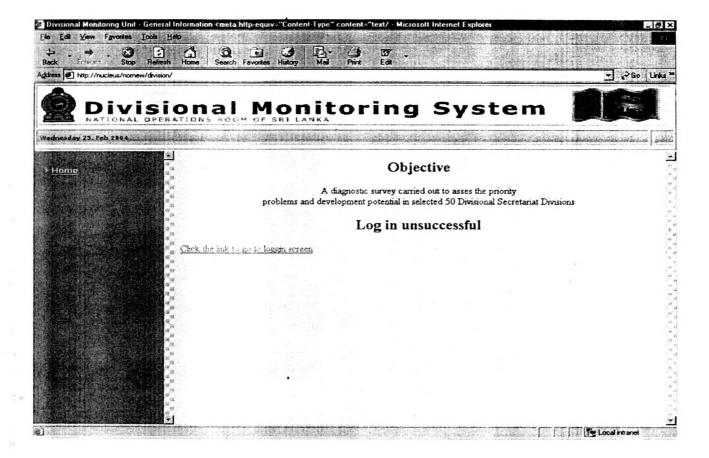
Main form for Financial



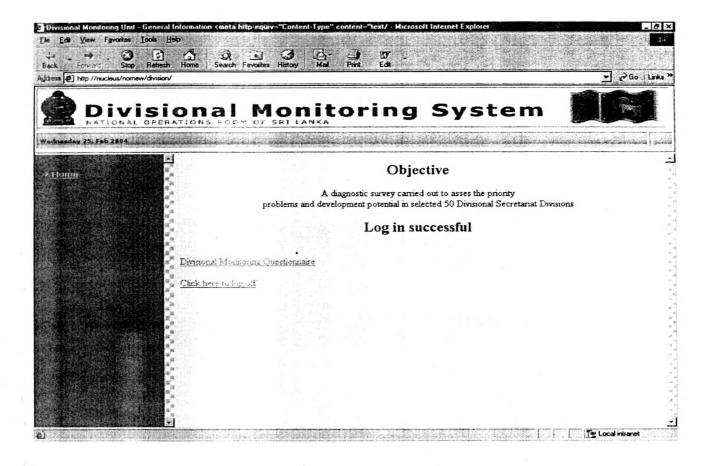
Appendix B

Following validation were used in TMS

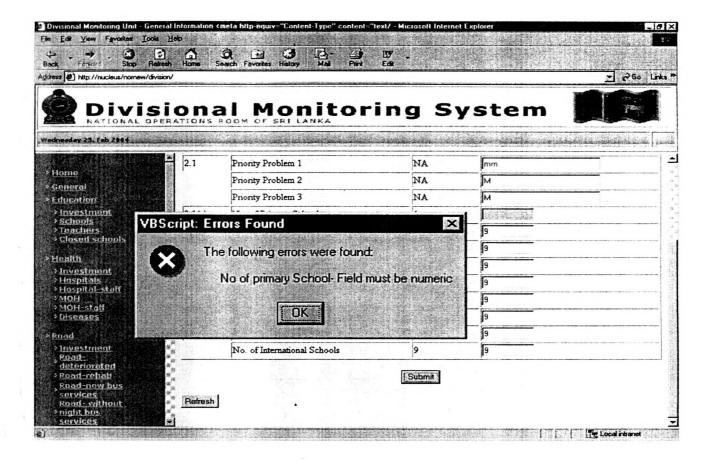
When you enter wrong password



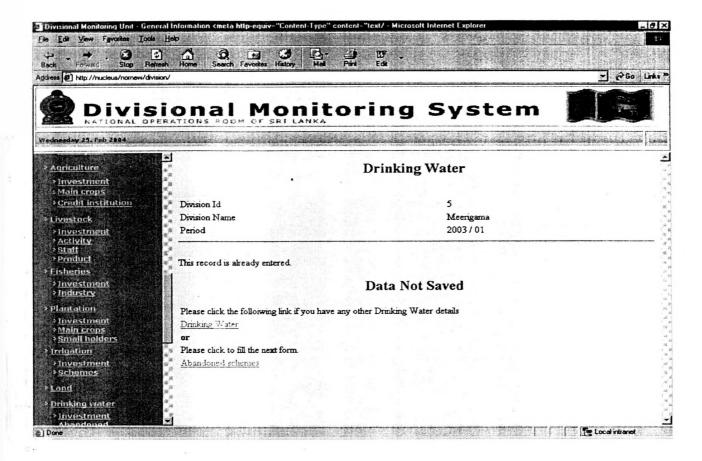
Successful screen



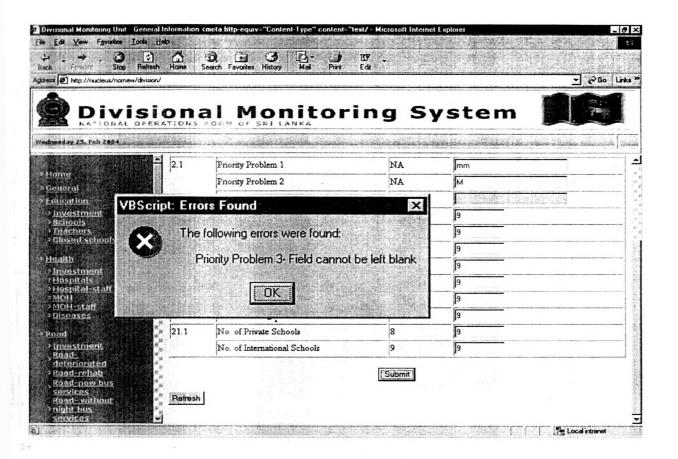
When you fill characters instead of numeric values



If the data already exists



When a text field is left blank



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