Sahelian Vulnerability Monitoring Project

Centre Régional **Agrhymet**
Programme Majeur Information
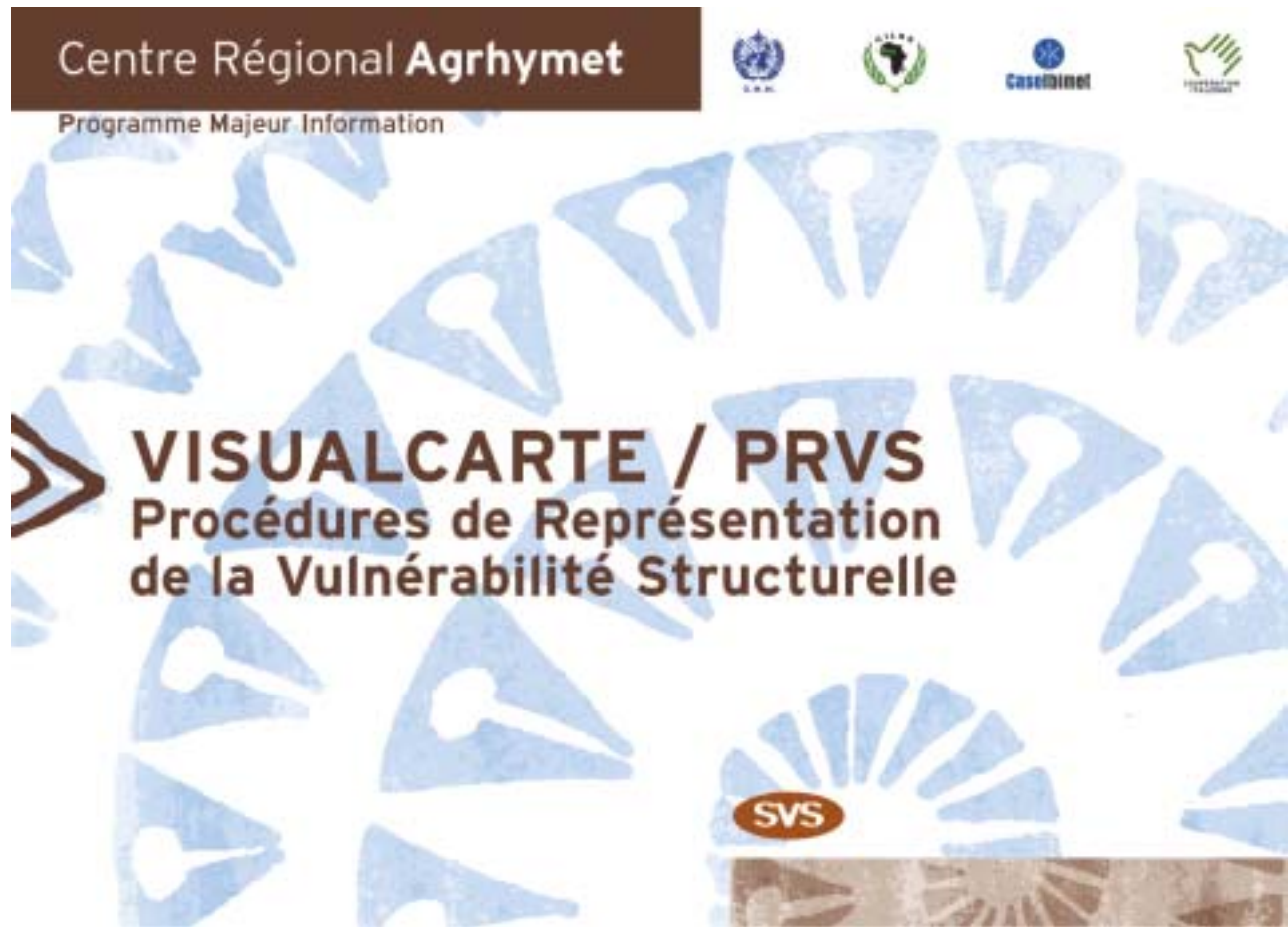
VISUALCARTE / PRVS
Procédures de Représentation
de la Vulnérabilité Structurelle

SVS

User Manual

Version 1.0

The Vulnerability Plugin, the associated databank and the user manual have been produced by the Sahelian Vulnerability Monitoring Project (SVS) funded by the Italian Co-operation and implemented by the World Meteorological Organization as a result of the cooperation agreements binding AGRHYMET, Italy and WMO.

Sahelian Vulnerability Monitoring Project - SVS

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WARNINGS

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Meteorological Organization and the CILSS Secretariat, concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.
This manual constitutes a step towards data homogenisation and integration into a Geographical Information System for early warning.

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Foreword

General Context

The Sahelian Vulnerability Monitoring Project, funded by the Italian Co-operation is a component of the Information Major Programme of the AGRHYMET Regional Centre (ARC). This project is in line with the process of consolidating of the former AP3A project's achievements in order to better meet the needs of the various institutions concerned with crisis prevention in the fields of food security and natural resource management.

The aforementioned project's programme is based on 3 main lines including:

- food crisis prevention by consolidating the national/regional early warning system.
- poverty reduction based on methodologies for analyzing vulnerability and monitoring programme impacts and appropriate information development for producers/farmers.
- Environmental monitoring in order to assess the zoning associated with climate change and the accompanying measures provided for in the Kyoto Protocol

As part of the AP3A Project, since 1995 the AGRHYMET Regional Centre has undertaken a work consisting of developing Structural Vulnerability Mapping Procedures (PRVS) with the following objectives:

- characterizing the risk zones identified by seasonal agropastoral monitoring mechanisms in order to apprehend the impact of any food deficit situation on the populations that live there.
- contributing to defining a frame of reference for identifying vulnerable zones and populations at regional and national level in the CILSS member countries.

The approach used by the AP3A Project in the PRVS definition is based on the principle of integration into other existing methodologies in order to promote a better understanding vulnerability structure.
In addition, PRSV aims at meeting information needs for managing emergencies and long-term planning through the definition of vulnerability context and its dynamics at various levels (regional, national and sub-national).
The project aims at enabling to present results in the form of map in accordance with various ways of mapping (qualitative or quantitative) observed phenomena.

In order to enable a better a dissemination of the methodology at national level and to encourage National Services to take ownership of it, the software engineering work associated with vulnerability mapping procedures was carried out using the VisualCarte platform, a software developed by the AGRHYMET Regional Centre for managing and viewing thematic mapping using MS Visual studio 6 and ESRI MapObjects 2.0.

By releasing the PRVS CD-ROM, the AGRHYMET Regional Centre intends to provide National Services and other institutions of the nine CILSS member countries (Permanent Interstate Committee for Drought Control in the Sahel) concerned with food security, territorial planning and natural resource management with an efficient and user-friendly tool toward a greater capacity for territorial analysis and seasonal agro-pastoral monitoring.

Content of the CD-ROM

The CD-ROM contains :

- the PRVS plugin (module of Structural Vulnerability Mapping Procedures);
- the French and English versions of the user manual ;
- the database resulting from structural vulnerability analysis (VUL);
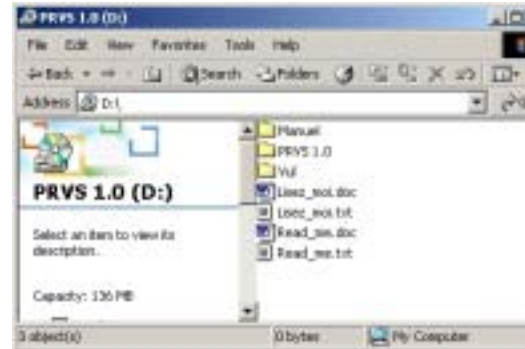- the CD_ROM read_me file (lisez_moi for French version) .

Figure 1

The Software

The PRVS plugin was developed using the VisualBasic® programming environment and the mapping components of the ESRI-MapObject® software. As is the case with VisualCarte version 1.0, it is multilingual, i.e., all its menus, help files and reference documents are available in English, French and Italian depending on the language used by the operating system installed on the end-user's computer.

The plugin is equipped with the main functional characteristics of a GIS software enabling to display thematic layers in ArcView® ("shapefile"), PC-ArcInfo© necessary for a pre-characterization of a territory as well as processing products resulting from current[1] analysis modules.
In addition to the VisualCarte functionalities, it is equipped with tools enabling users to identify and characterise structurally vulnerable zones, calculate vulnerability indicators, create scenarios and perform sensitivity analysis. The software makes it possible to develop current analyses related to food risk due to changes in productions or agricultural and livestock product prices.

The software has been successfully tested on the French, English and Italian version of the Windows 2000 operating system.
The plugin can be installed only on VisualCarte version 1.0: it should be recalled that VisualCarte 1.0 is not compatible with Win'95 and therefore, it should not be installed on this operating system.

Users are kindly requested to report any problem detected and that is not described in the manual at the following e-mail address: apmi@agrhymet.ne with a detailed description of the operations carried out and indicate, if possible, the types of data used (e.g. Shapefiles, PC-ArcInfo© etc.) when the error occurred.

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[1] Translator's note: current = conjunctural (Qualifier applied in economics to those aspects or phenomena most influenced by circumstances and other variables. It is the opposite of structural. Source: Canadian bilingual electronic dictionary).

The User Manual

This manual was produced with the aim of giving basic assistance to the various PRVS software users. It describes the context, which enabled to compile the plugin and the functions. It is subdivided into chapters as described below.

Installation: Contains any information related to the software installation. The most important ones are those related to the configuration of the system supporting the software. In addition, the desinstallation is described.

Start: gives an introduction to the software, its interface, main bar, icons bar, dialogue box, etc.

Menu: details all the various software functions and potentialities with some examples.

Annex 1 : introduces us to the improvements on the pre-existing VisualCarte 1.0 software functions.

Annex 2 : introduce us to the databank associated with the software, its structure, organization and the file formats used.

Annex 3 : introduce us to the PRVS meta-database structure.

Warning

In order to ensure a complete understanding of different tools described in the present PRVS handbook as well as the appropriate utilisation of VISUALCARTE 1.5 plugin, a previous reading of VISUALCARTE 1.0 handbook is suggested. The handbook of VISUALCARTE version 1.0 is included in the CD_ROM previously distributed to National Services of CILSS country by AGRHYMET within the project AP3A.

The Geographic Databank

The geographic databank associated with the plugin is made up of the VUL (Vulnerability) database, which includes basic layers and information intended for a structural analysis of the territory and the identification of vulnerable zones. Basically, VUL constitutes an update for 2002 of vulnerability indicators contained in the SAT database of the VisualCarte 1.0. software

VUL also contains tables with updated data related to agricultural and socio-economic indicators.

The basic statistics used for territorial analysis are derived from the Thematic Database Management System (TDBase 1.0).

The PRVS database is managed through an internal meta-database of the system and unlike the VisualCarte 1.0 database, it cannot be customized or expanded by introducing new layers.

The VUL layers are available on the CD-ROM and can be used either by means of ArcView ® 3.1 (or higher) or through the *"view theme"* function in the main menu of VisualCarte 1.0.

Installing the PRVS Plugin

Configuring the System

The PRVS plugin requires the following hardware and software as minimum:

- Microprocessor: Pentium II, 200-233 MHZ
- Hard disc space: at least 120 MB
- RAM: 64 MB
- Operating systems: Windows XP, 2000, 98 (FR, U.K. or IT version) with Internet Explorer 5 or higher
- The VisualCarte software version 1.0 should be properly installed

Warning

Number format is a parameter of the Microsoft $^{®}$ Windows environment required by some software to properly perform mathematical operations with decimal numbers. The PRVS Plugin installation, as a default, modify the number format parameters existing in the computer operating system where the software is installed. The correct utilization of VISUALCARTE 1.5 is consequently guaranteed. For a proper utilization of the software, the aforementioned parameters will be modified by default as shown in the following example:

On your *Desktop* click on *Workstation* or from the *Start Menu* go to *Parameters* and *Control Panel* and select *Regional Options* (Figure 2).

Figure 2

On the window that will appear (Figure 3), select *Numbers*. Select in:

Figure 3

Decimal symbol: the dot
Digit grouping symbol: the comma

Exiting from the software VisualCarte 1.5, the regional options previously modified, will be restored by default.

Installing the Software

First, check which version of Windows operating system is in your microcomputer and that VisualCarte 1.0 is properly installed on it. Do not install the VisualCarte 1.0 software on operating systems different from Windows XP, 2000 or '98.

Installing the PRVS Plugin

a) Insert the CD-Rom containing the PRVS plugin software into your computer CD-ROM drive and open the \PRVS 1.0 directory using *Windows Explorer.* The software should be installed from the **SETUP.EXE** function: we recommend that you close all open applications before launching the Setup.exe file (by double-clicking on it).
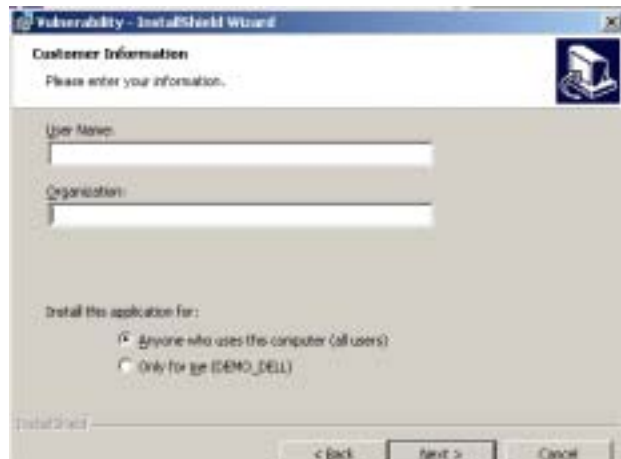

Figure 4

Figure 5

b) Some instructions that appear on the screen will guide you through the various steps. In this version of the software, the InstallShield Wizard interface is exclusively in English. Click on " *Next* " to carry on with the installation procedure and view the *"License agreement* " window: click on "*Next* " in order to accept the terms in the license agreement.

c) Enter your full name and that of your organization. In the event of installation on a microcomputer equipped with Windows 2000, choose the option "*Anyone who uses this computer (all users)"* at the bottom of the window and then click on " *Next* " to display the next window.
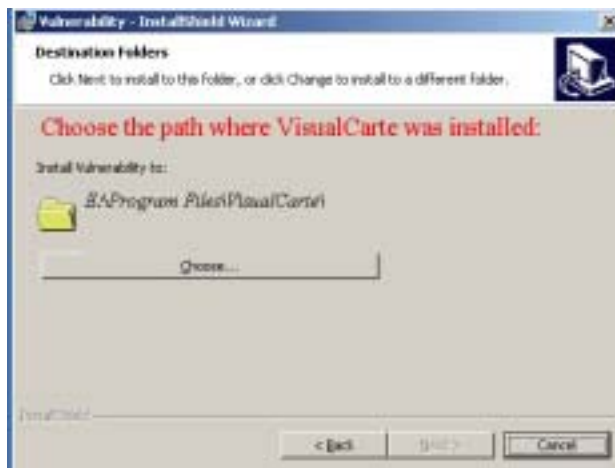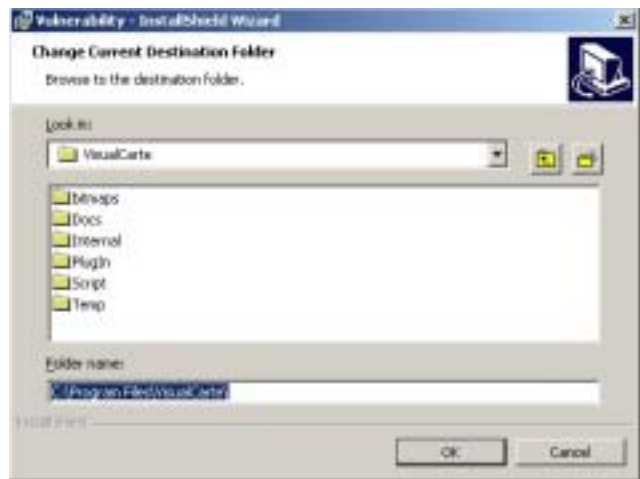
d) Choose the required folder.

Figure 6

Figure 7

e) Click on "*Install* " to start installing the software; click on "*Back*" to go back to the previous window.
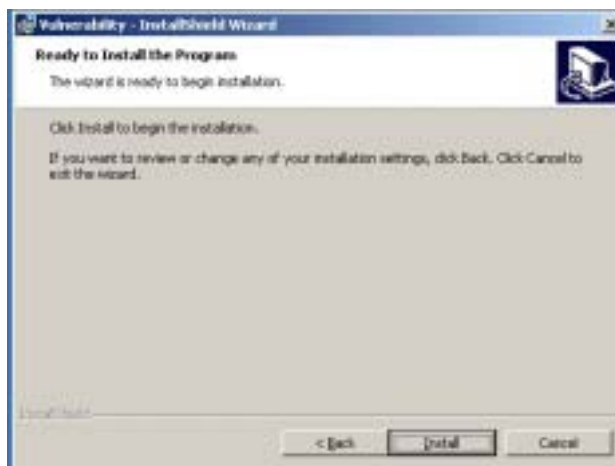At the end of the installation, a message is displayed and by clicking on "Finish" the procedure is completed.

Figure 8

Figure 9

Important Warning

- Installing the PRVS plugin requires that the VisualCarte software version 1.0 be already installed on the microcomputer.

- The PRVS plugin does not work with the VisualCarte software *"BETA "* version. It works ONLY with version 1.0. If your computer is equipped with the *"BETA"* version, you should uninstall it and install version 1.0 to replace it.

- The software should be installed in the folder where VisualCarte 1.0 has been installed: during the installation procedure a default destination folder is created (e.g.: C: \Program Files \VisualCarte). In this case the installation procedure will be carried out without changing the folder. If another folder has been chosen during the installation of VisualCarte 1.0, the same path should be chosen for installing the PRVS Plugin.

Installing the PRVS Database

The PRVS plugin is provided with its own database (contained in the CD-ROM VUL folder): it consists of a tabular part as well as a cartographic part. The latter contains themes related to spatial analysis specific to geographical information systems, including basic layers, intermediate and finished products resulting from the structural analysis of Sahelian food vulnerability.

Data are organized per country and domain: the detailed description of the *" VUL "* database structure is in Annex 2.

The database is managed by means of a meta-database internal to the system. The meta-database is designed in order to allow possible PRVS developments through the introduction of new covers using Microsoft® Access 2000 software. The annex 3 contains a detailed description of files, which are installed with the plugin PRVS 1.0.

After installing the PRVS Plugin, copy the VUL folder onto the SAT directory, i.e., in the directory of the database of the VisualCarte 1.0. Territorial Analysis System. Example C: \SAT\VUL.

Important Warning

- The VisualCarte 1.5 software enables to load all the data contained in the "Sat" database of either your microcomputer or the CD-ROM. Consequently, you can use SAT data directly from the CD-ROM, in order to avoid disc space problems for example.
  In case the SAT directory has not been copied or created on your computer, before copying the VUL database you should necessarily create a directory named SAT as indicated (C: \SAT\VUL).

Uninstalling the Software

The PRVS plugin can be uninstalled separately from the VisualCarte 1.0 software: therefore, you can remove the vulnerability analysis module while keeping the other functionalities of the VisualCarte 1.0 software. The PRVS module desinstallation procedure consists of the following steps:

1. Open the Windows " *Control panel* " and start the " *Add/Remove programs* " procedure.

2. Select " Vulnerability " in the dialogue window containing the list of programmes currently installed on the computer and click on "*Remove* " to uninstall it.
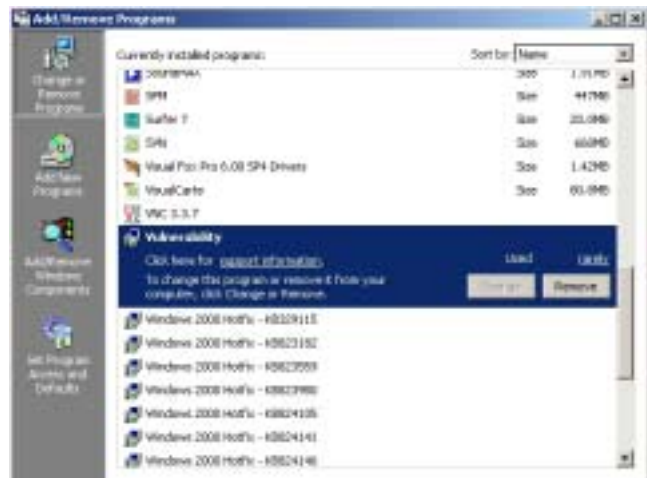

Figure 10   **Figure 11**

Depending on the Windows versions, the procedure interface can change. To this effect, refer to the Manual of the Windows version installed on the computer.

3. To completely uninstall the plugin, i.e., the PRVS module and the associated cartographic and tabular database, you should manually remove the VUL folder contained in the SAT directory.

Starting the Software

Once the PRVS plugin has been installed, you can open the VisualCarte software as you usually do or by clicking on the VisualCarte icon (Figure 12) on your desktop or by double-clicking on the VCarte.exe file in the software directory (Ex: C: \Programme\VisualCarte\).
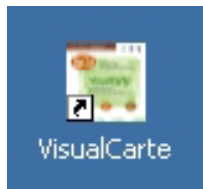

Figure 12

The VisualCarte window will appear (Figure 13). By means of the Start / Démarrer button you can access the software operating environment, which will also comprise the functions added by the PRVS module.
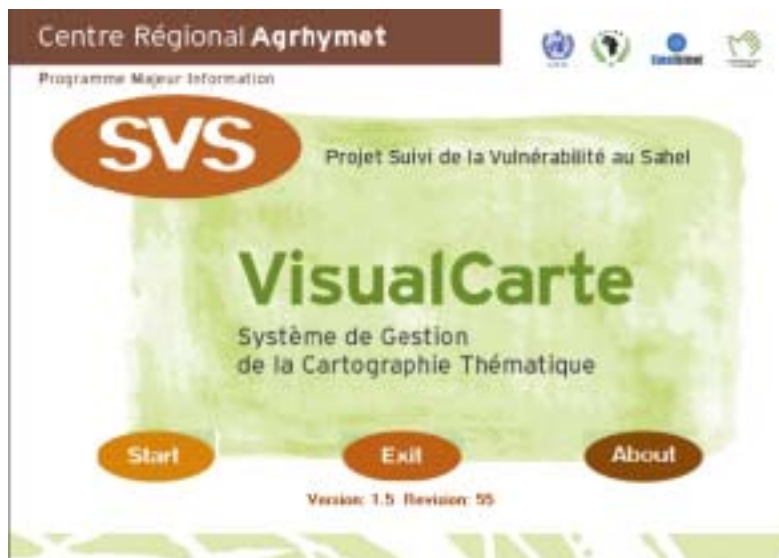

Figure 13

Warning

The PRVS plugin also upgrades the VisualCarte software from version 1.0 to version 1.5.

This new version should be regarded as a real improvement on version 1.0. In addition to the analytical functions contained in the PRVS plugin, new functions have been included in the VisualCarte 1.5 software on a permanent basis, particularly the module for querying a theme attribute table well as the option of selecting many polygons of a layer at the same time. This latter function makes it possible to generate a table containing attributes related only to the selected polygons, which can be dynamically spatialized by using of a layer of administrative boundaries. These new functions will be detailed in annex 1.

THE OPERATING ENVIRONNEMENT

The operating environment of the VisualCarte 1.5 software is characterized as before by the primary window with the <u>title bar,</u> <u>the main menu,</u> <u>the theme table</u> (area where theme legends is displayed), <u>the views window</u> (display space for displaying thematic maps) in its upper part and <u>the status bar, on</u> which you can read the geographical co-ordinates of each country (Figure 14), in its lower part.
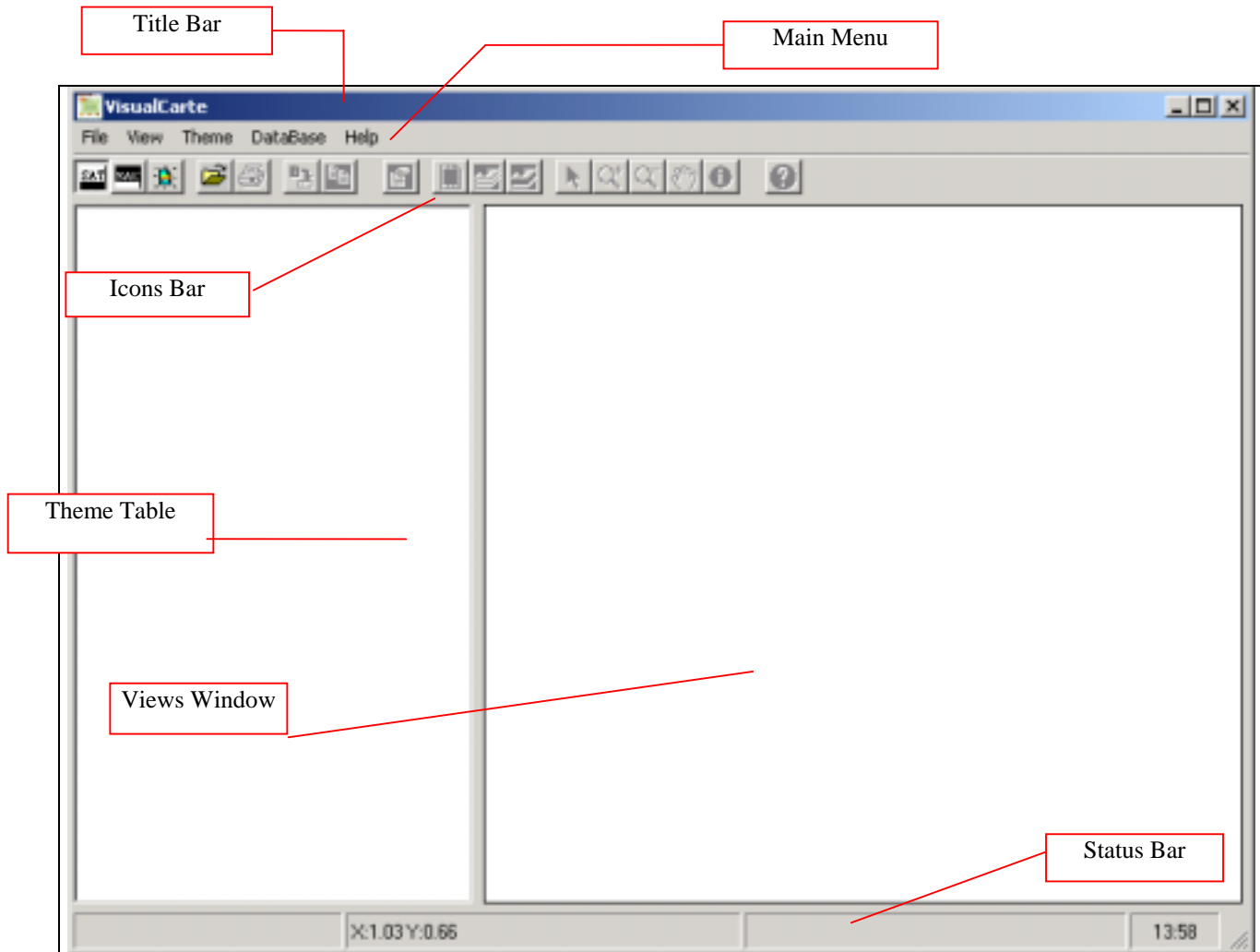

Figure 14

After installing the PRVS plugin, a pull-down menu will be added to the five others normally present on the main menu. Installing the plugin will result in the addition of two new buttons in the icons bar.

The differences between the two installations can be seen when comparing figure 15 (Main menu of version 1.0) to figure 16 (Main menu of version 1.5 after installing the PRVS plugin)
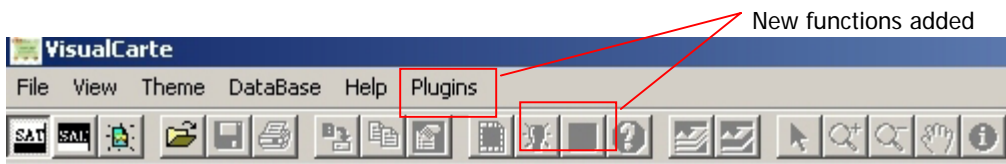
Figure 15

New functions added

Figure 16

To activate the new "*Plugin*" menu, click on it with the mouse: a pull-down menu containing 5 sub-menus will appear as in Figure 17.
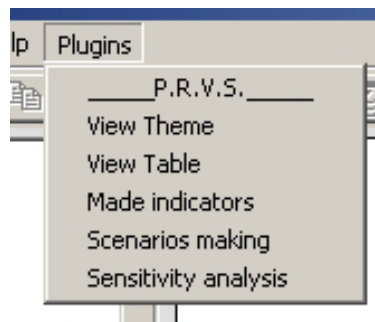

Figure 17

Plugin /PRVS Menu

View Theme:	A user-friendly window guides the user through the choice of any country, domain and theme to be viewed; this function makes it possible to add to the current view a theme (ArcView® "Shapefile", PC-ARC/INFO© vector file contained in the data catalogue installed by the PRVS plugin (VUL).
View Table:	Enables to view on the screen the tabular data contained in the PRVS' VUL catalogue. The table to be displayed is chosen by means of a user-friendly procedure with a hierarchical organization, which guides the user through the selection of any country, domain and theme.
Made indicators:	Makes it possible to perform numeric operations between two fields or a field and a numeric operator of the viewed theme attribute table.
Scenarios making:	Enables to generate simulations per Administrative Unit by looking at Virtual Rate of Cereal Need Coverage (TVCBC). You can assess a given year's current situation and compare it to the structural one by entering the chosen year's agricultural and livestock production values and prices of the various product typologies.
Sensitivity analysis:	Makes it possible to assess all the administrative units' response in term of Virtual Rate of Cereal Need Coverage (TVCBC) in relation to a variation in percentage (positive or negative) of the various parameters (agricultural production, livestock numbers and price) and compared to a baseline case (structural).

Displaying of a Theme

With this option that enables to view the Plugin menu themes, you can add to the current view a theme belonging **to the VUL database, <u>which must necessarily be contained in the SAT directory</u>**

In order to verify the path of SAT data, the user may utilise the Windows Explorer and check that the folder "SAT" contains sub-folder "VUL" (see figure 18). When the database VUL has been copied in the folder SAT, and the analysis system is chosen (see chapter D1, pag. 33 in VisualCarte 1.0 handbook) the images of the database can be displayed with VisualCarte 1.5.

In case the user wants to work on the structural situation of a country as well on the PRVS data, the selection of button SAT (Territorial Analysis System) must occur (figure 16). The selection can also be done trough the Main Menu, by means of menu "Database/ Territorial Analysis System". In order to check the path where the SAT data are stored, you should open, from the Main Menu, the " *Database* " menu and then click on the " *Change data path* " command. From the window "*Choose data path*" (Figure 19) it is possible to verify the path were SAT data are stored : consequently it is possible also to verify the location of sub-folder VUL. The selection of the disk (ex : C:\) where is the folder SAT, allows the choice of requested path.
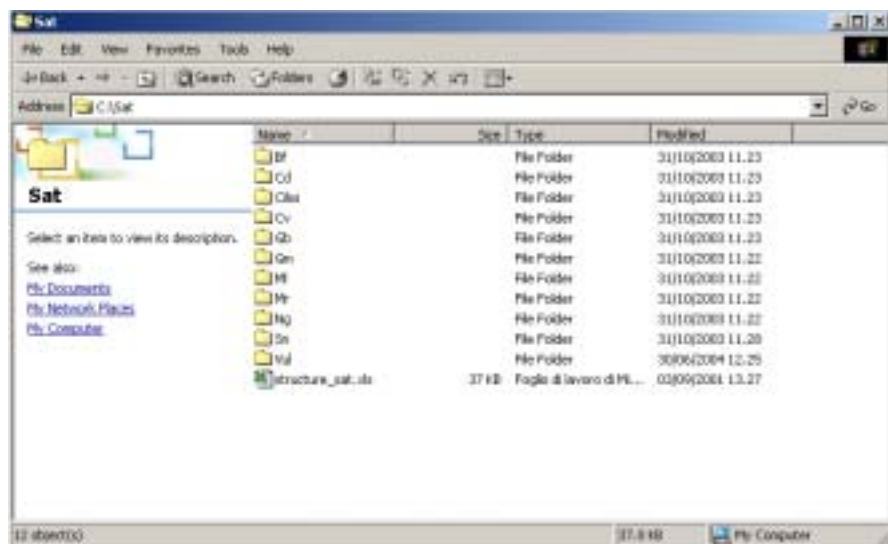

Figure 18

Figure 19

For further information on the SAT database installation as well as details for defining data access path, refer to the user manual of the VisualCarte 1.0 software – chapter D1 - pag.33.

Once VisualCarte 1.0 has been linked to the **VUL** database contained in the **SAT** directory, in order to display any vulnerability thematic map you should click on the "*View theme* " command of the "*Plugins* " menu (Figure 20) and follow the path appearing in the dialogue window.
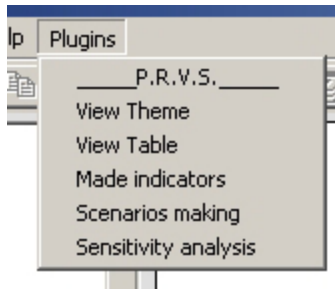
Figure 20

All the themes available in the database are indicated in Annex 2

Selecting a Country

When you click on the "*View Theme* " command of *the* "*Plugins*" menu, a window will appear and inform you that the Theme Wizard for viewing of the theme has started (Figure 21).

To click on "*Forward*". The programme will request you to choose the country in which you are interested; with the mouse pointer click on the black arrow next to the blank space. A list of the various CILSS member countries will appear (Figure 22). Choose one of the countries with the mouse pointer, for example Burkina Faso, and click on "*Forward* "
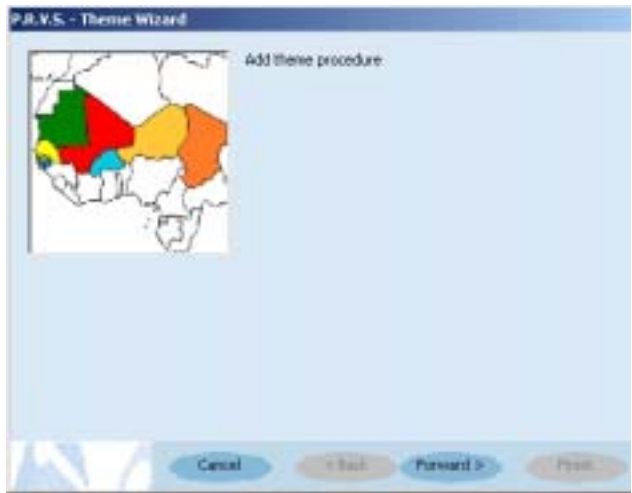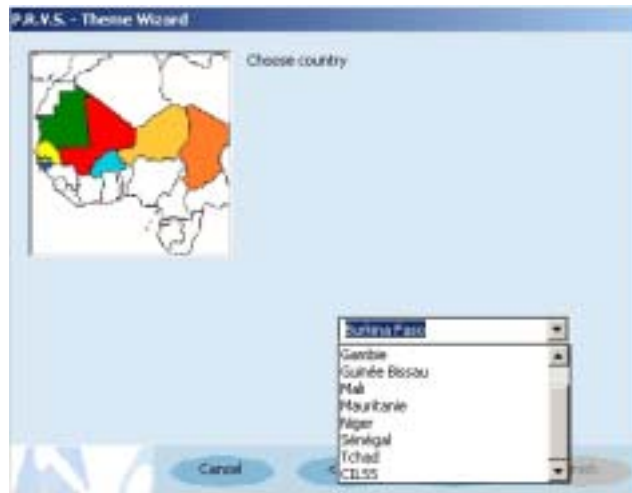

Figure 21

Figure 22

Selecting a Domain

After choosing the country, the dialogue window will request you to choose the theme domain in which you are interested: with your mouse pointer click on the black arrow next to the blank space and the list of theme domains will open (Figure 23). Choose a theme domain (for example *Dynamiques Agricoles*).

Figure 23

When viewing the list, a check/tick box is displayed on the left-hand side of each theme domain like in Figure 23.
If the box is checked/ticked ☑, it means that the theme domain is present in the chosen System (i.e. " *VUL* " in this particular case).

On the other hand, if you select a domain by clicking on any blank tick box ☐, the message in Figure 24 will be displayed.
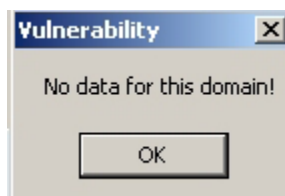This means that the selected domain does not contain any theme related to the selected country.

Figure 24

When clicking on " *OK* " you go back to the window related to the choice of the theme domain.

Once a domain existing in the database has been chosen, you can proceed in order to view the table by clicking on "*Forward".*

A new dialogue window (Figure 25) characterized by two boxes will be displayed. By clicking on the black arrow next to the first box, a list of themes will appear.
When a theme has been selected (for example, "*Dynamiques c. vivrières*), you can view in the second box the attribute table field names of the loaded layer.

In this case, there are two options: you can either choose the appropriate theme field in order to assign this field values to the polygons in the layer, or click directly on "Forward" in order not to view any label on the map. In our example, the " *VIVR_DYN* " field has been selected as label (Figure 25).

By clicking on "*Forward"* a new dialogue window will summarize the selections made (Figure 26).
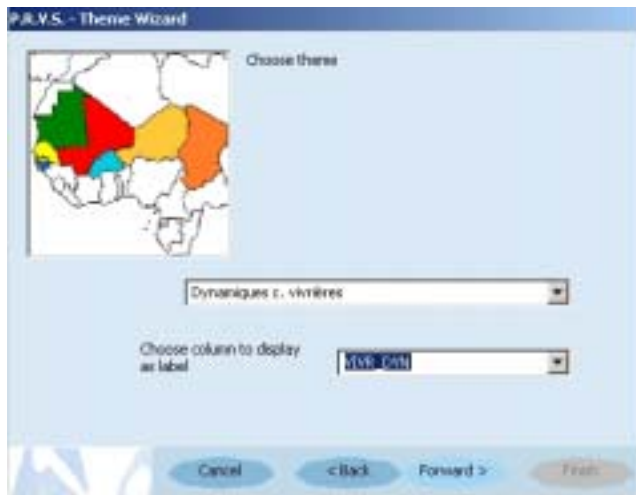
Figure 25

Figure 26

Click on "*Finish*" to view the final result of your selections on the current view.

In the above-mentioned example, at the end of the theme loading process, the *Dynamiques c. vivrières* layer of the provinces of Burkina Faso will be displayed in the view (Figure 27). .
In the theme table (left-hand part of the active window of the software), the theme name and related legend will appear.
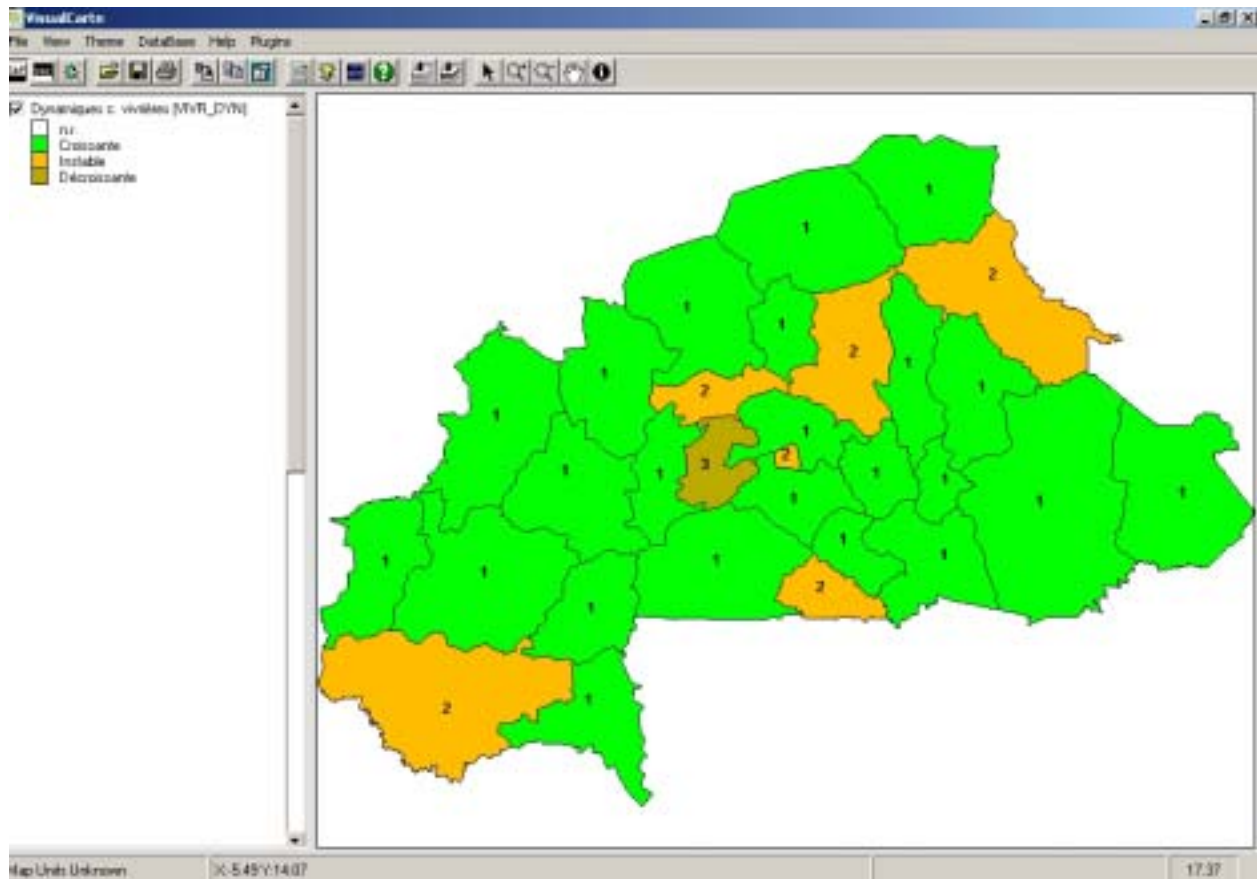

Figure 27

As a default, duplicates are not allowed in the legend when viewing themes with the PRVS Plugin and VisualCarte 1.5. If several polygons have the same label, it is viewed only once: this is the case with some coastal administrative units (see figure 28: example of the Foundiougne department, Senegal) made up of a continental part as well as many islands.

Figure 28

In case you want to view all the labels, you must modify the active theme legend: all you have to do is to place the mouse pointer on the displayed legend in the theme table and double-click. The "*Legend editor*" window of the selected theme will be open (Figure 29). When choosing the "*Label*" function, you can select "*allow duplicates*" in the "*text options*" box (this option has been activated for viewing the theme as is the case in Figure 30).
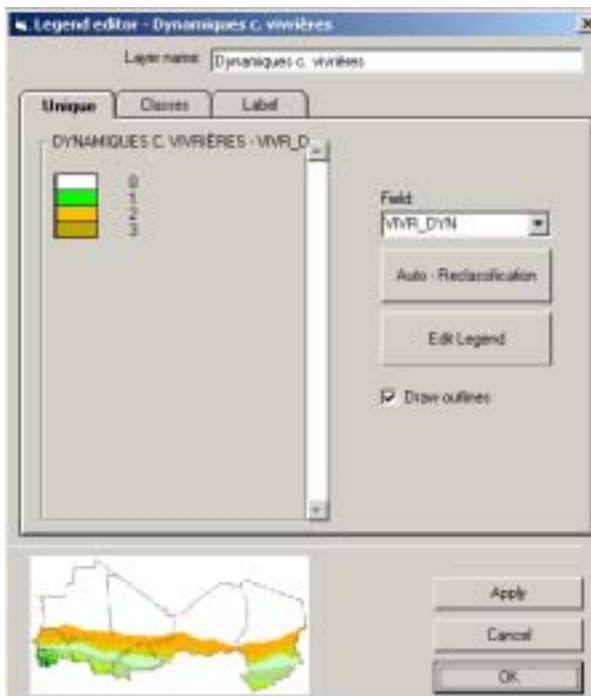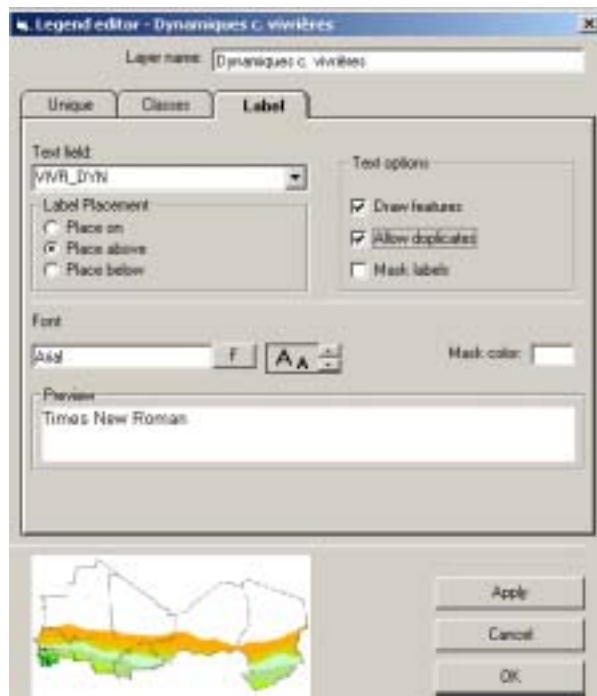

Figure 29

Figure 30

The result of this operation is displayed in figure 31.

Figure 31

For further information on legend management, refer to chapter D.1.5 of the user manual of the VisualCarte 1.0 software

Once a theme has been displayed with the plugin PRVS 1.0, all the VisualCarte 1.0 tools may be utilised and therefore it is possible to save the work session as well to utilise the displaying and management tools as described in the chapters C.3 and C. 4 of VisualCarte 1.0 handbook.

With regard to the utilisation of new tools of VisualCarte 1.5, a detail explanation is reported in annex 1.

It should be recalled that when a theme has been loaded, you can add other themes contained in the VUL database as well as in the SAT or SAC databases. In the first case, you simply have to follow the steps described in the previous paragraphs; in order to add some themes from the SAT and SAC catalogue refer to chapter D.1.3 of the user manual of the VisualCarte 1.0 software

When one or more themes are displayed in theme table, you can activate and select a specific theme.
In order to activate a theme, you should click on its name or legend in the theme table; it will appear while being underlined, with a line below its own legend.
In order to select a theme, you should click on the tick/check box located on the left-hand side of the theme name in the theme table. This is what enables to display or not to display a theme in your view.

It should be kept in mind that if many themes are overlaid, it is only the one placed at the top that is viewed on the screen. In this case, in order to view another theme, all what you need to do is to drag and drop it at the top of the theme table with the mouse for it to be the first in the order of display.

When placing the theme at the top of the theme table, it always appears in the foreground of the view.
In order to deselect a view theme, remove the check mark next to the theme name and it will disappear from the view.

For any other view option and geographic polygon selection, the user should refer to annex 1.

Removing a Layer

In order to remove a theme derived from any database (VUL, SAT, SAC), all what you need to do is to select the *" Theme "* menu and then "*Remove active theme "* (see figure 32).
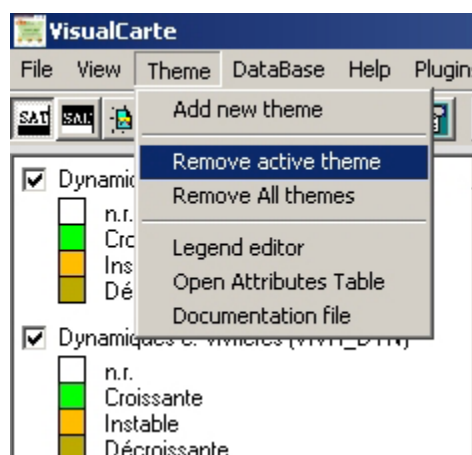

Figure 32

In the same menu, *" Remove all themes"* enables to remove all the images listed in the theme table, even if they are neither activated nor selected.

Viewing Tables

This option enables view tables in .DBF format from the VUL database containing statistical data or indicators related to animal husbandry and agriculture.

With regard to each country, the tables available in the VUL database are listed in Annex 2.

Displaying a table

Before displaying tables, check the path to the SAT data location using the *" Database"* menu and by clicking *on* the *"Change data path"* command as described in the previous chapter *" Displaying of a Theme"*.

Once VisualCarte 1.5 has been linked to the SAT database (containing the VUL folder), in order to display a table all what you need to do is to click on the *" View Table"* command of the *"Plugins" menu* and follow the instructions of the dialogue windows (figure 33).
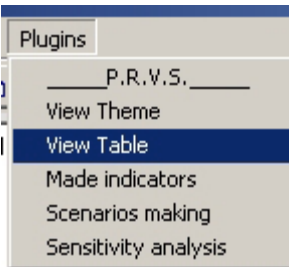
Figure 33

Selecting a Country

By clicking on the " *View Table* " command of the " Plugins " menu a window will appear in order to let you know that the procedures for table loading have started (figure 34)

The " *Forward* " button makes it possible to go to the window enabling to choose the country in which you are interested; with your mouse pointer click on the black arrow next to the blank space (Figure 35). The list of the various CILSS member countries will be displayed. Choose a country (for example, Burkina Faso) and click on " *Forward* ".

Figure 34

Figure 35

Selecting a theme

After choosing the country, the dialogue window will request you to choose the theme domain in which you are interested: with your mouse pointer click on the black arrow next to the blank space and the list of theme domains will open. Choose a theme domain (for example " *Systèmes de production*") (Figure 36).

As we have already seen in the thematic mapping loading, when viewing the list, a check box is displayed on the left-hand side of each theme domain

If the box is checked/ticked ✔, it means that the theme domain is present in the chosen System (i.e. "*VUL*" in this particular case).

On the other hand, if you select a domain by clicking on any blank box ☐ the message in Figure 37 will be displayed.

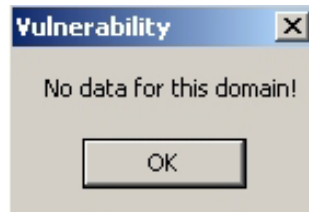This means that the selected domain does not contain any theme related to the selected country.

Figure 36

Figure 37

When clicking on "*OK*" you go back to the window related to the choice of the theme domain.

Once a theme domain existing in the database has been chosen, you can proceed in order to view the table by clicking on "*Forward*". .

The dialogue window (Figure 38) will request you to choose a theme by checking/ticking the blank box (for example, choose "*Répartition de la production agricole dans les UA*").

Then by clicking on "*Forward*" another dialogue window will summarize of the selections that you have made (Figure 39). Click on "*Finish*" to display the final result of your selections on the view.
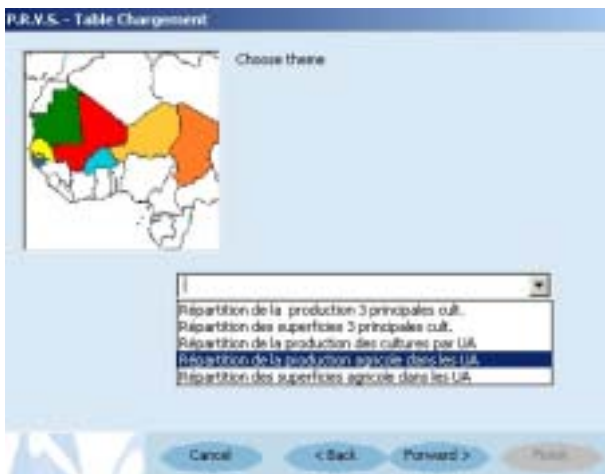

Figure 38

Figure 39

Here, you can view the distribution of the agricultural production of each province of Burkina Faso in terms of percentage (Figure 40).

Figure 40

Querying the Table

Once the table has been viewed (Figure 40), you have two options that can be managed using the two buttons at the bottom of the table: when clicking on " *Close* " you will close the table , when clicking on " *Query Manager*" you will query the table based on the various fields.

The dialogue window (Figure 41) will enable you to formulate the query through the selection of fields, numbers and logical operators, which make it possible to formulate a real request. The function enables you to view only the records related to the request: there is no save option.

Suppose that we are interested in the administrative units of Burkina Faso, which have a groundnut production above 5 percent out of total production.

First, you should choose the field of the table you want to query: with your mouse pointer click on the black arrow next to the blank box and the table field list will appear. In order to choose the theme in which you are interested you simply have to click on the name (for example " Arachide - *Groundnut* "). Once a field is selected, the values will be displayed in the right-hand side blank window; if it is a numeric field, maximum and minimum values can be viewed (in the example, 18.3 and 0.6 respectively); if the values are alphanumeric ones all the attribute names will be displayed.

In order to perform the query, the logical expression defining it should be viewed entirely in the third blank box at the bottom. To select a field, you should double-click on it. Yet, you can also write directly the field name and the logical expression of the request.

After defining the " Arachide - *Groundnut* " field, double-click on the name and check that the term is correctly written in the box related to the expression (see figure 41).

< above

> below

<> different

= equal

AND two criteria should be true

OR at least one criterion out of the two should be true

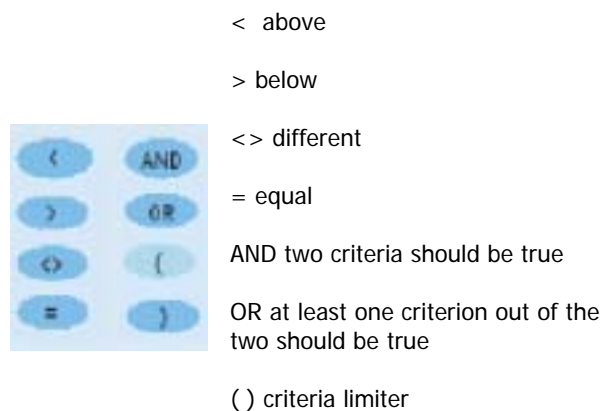( ) criteria limiter

Figure 41   **Figure 42**

To perform the query, you can write all the terms in the special box, by moving the cursor to that box and single-clicking to activate it.

When you double-click on the logical operator to be used, the symbol is automatically inserted in the box related to the expression.

Figure 42 shows the criteria, which can be selected for formulating logical expressions using the " *Query Manager*" option of the Plugin.
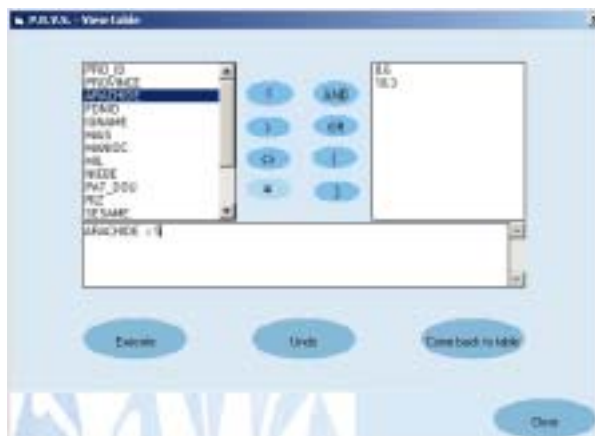
Figure 43

The third term of the logical expression can be entered in the box next to the selected fields and operator, "Arachide - *Groundnut* " in this particular case (Figure 43). You can also double- click directly on one of the values displayed in the right-hand box (maximum or minimum value).

You can launch the execution of the query with the *"Execute"* command: if the query performed does not correspond to any record the message in Figure 45 will be viewed on a blank table.

When clicking on " *OK* " you can view the attribute table previously loaded (Figure 40) and you can perform a new query with the "*Query Manager*" button.

Figure 44

Figure 45

If the query performed corresponds to at least one record, a table with the list of values will be displayed (Figure 44). By double-clicking on *"Close"* you close the views window.

During the query formulation, you can click on "*Undo*" if you want to redo the formulation operations. By means of the "*Come back to table* " button, you can also close the query window and display again the table view previously open.

The "*Close* " button located at the bottom right-hand angle of the view enables to close all the applications of the query window and go back to the software views window.

The query window also makes it possible to formulate complex logical expressions.
Suppose that we are interested in the administrative units of Burkina Faso, which have a groundnut production of at least 5 percent out of total production and at the same time higher than cotton production.

You should use brackets to formulate the expression: by doing as previously described, you can obtain the expression in Figure 46. As you can see there is a logical expression based on two fields. The query result is shown in figure 47.
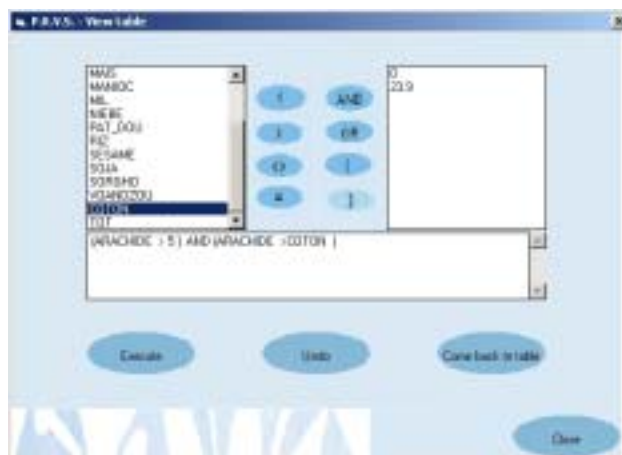

Figure 46

Figure 47

Calculating Indicators

This option makes it possible to perform operations between two fields of a theme table or a field and a numeric operator.

This can prove useful in the creation of new indicators and for computing new parameters.

For better understanding the command potentiality, we will give an example. Suppose we want to create a new field related to agricultural pressures in Burkina Faso, in which administrative unit surface areas (Province) are not only expressed in square kilometres but also in hectares.

In order to launch the command, you must first activate the theme in which you are interested on the primary window theme table and then select the *" Plugins/Make Indicators "* menu (see Figure 48).
The command is active only if the theme table in the view is activated. Consequently, before launching the command, a theme must be displayed and activated. If this operation has not been performed, the message in Figure 49 will appear: by clicking on " *OK* " the previous window will be viewed and an image could be loaded.
.
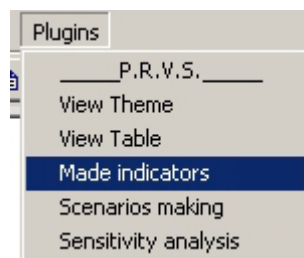
Figure 48
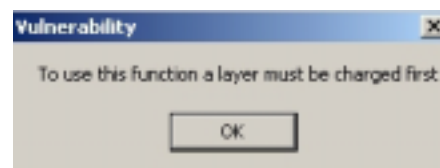
Figure 49

With regard to the following example, we need to load the agricultural pressure (pressions agricoles) theme of Burkina Faso.
The " *PRVS/Create indicators* " window (Figure 50) contains, on its left-hand side, functions for entering the field operator 1 and for choosing the identity field to be used. On the right-hand side, it comprises functions for entering the field operator 2 of the expression and in the centre has buttons with numeric operators managed by the software.
In the lower part, there is a box for viewing results and buttons associated with functions enabling to export displayed results in the following formats: Access (* .mdb), dBase (* .dbf), ASCII text (* .txt) and ArcView (* .shp).
It should be indicated that the expressions are applied to all the table rows and it is not possible to calculate the indicator for selected records.
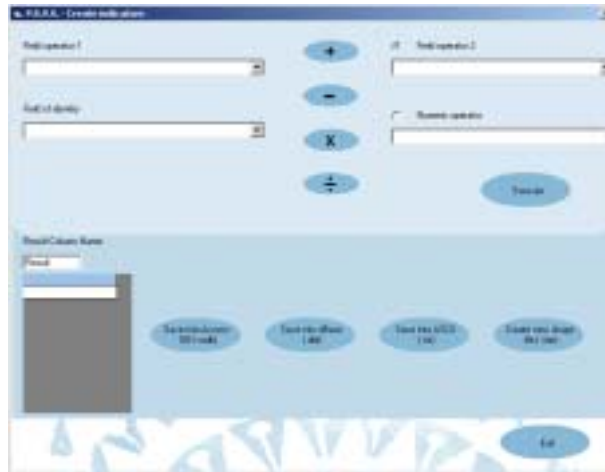
Figure 50

After activating the view theme on which you want to perform the operation, the dialogue window requests you to choose the field in which you are interested: click on the black arrow next to the blank box related to " *Field* operator 1 " with your mouse pointer in order to open the list of all the attributes.

Choose a field (in our example, *Superficie de la province en km* ^{2} as is the case in Figure 51).
In order to obtain the surface area in hectares, as proposed in the example, you should multiply the value in square kilometres by one hundred: in this case a numeric operator should be used; as a default, the window shows the option for performing the operation between two fields *("Field operator 2 ");* therefore, you should choose the second option (" *Numeric operator")* and enter the number in the blank box (Figure 52).
The " *Field of identity* " box can be chosen for selecting an identity field from the original table. Choosing this option is mandatory only in the event of data saving.
The possibility of choosing a field of identity is fundamental to managing and viewing information related to the units.
The presence of buttons, enable to choose from the four basic operations: the selected operator is highlighted with the lightest colour.

Once the mathematical operator is selected (multiplication in this case) and by clicking on "*Execute*", the button is highlighted by the lightest colour. When you activate the calculation, you can immediately view the results in the special box (Figure 52); you can now proceed with two options: either save the results or exit the view.
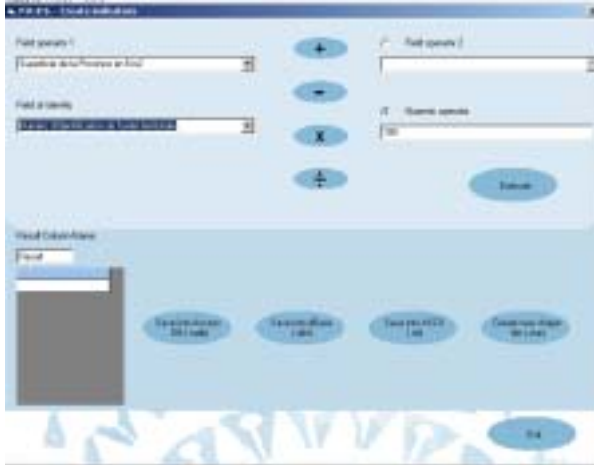
Figure 51
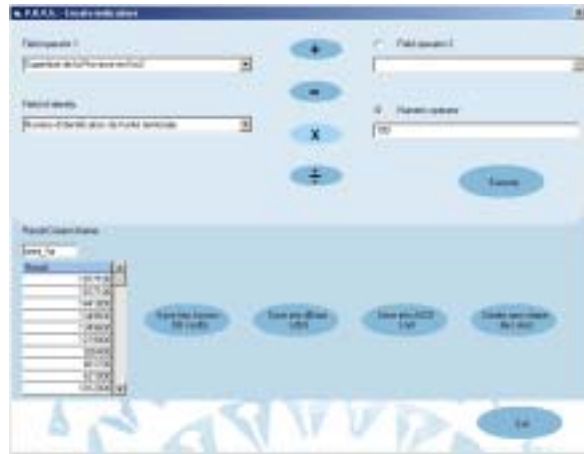
Figure 52

If you choose the first option, there will be four saving methods depending on whether you want to obtain a tabular, text or cartographic format. In every case, you should specify the identity field and file name to be saved.

If the save option is selected, but the identity field is not specified the following message will appear.
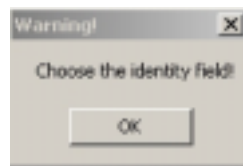
Figure 53

Considering an example related to the saving of data produced in shapefile: the destination folder should be specified (in Figure 54, you can viewed the window for saving the result in shapefile). Once the operation is completed, the message in Figure 55 is viewed.

The table we have just saved can be displayed using VisualCarte 1.5 commands; in Figure 56 you can view the shapefiles generated and classified using the self-reclassification option of the *" Result "* field (named *" Area_HA "* in this particular case)* of the table obtained.

As in the case of the example, you can name the result column: if you decide to save data in .dbf format, you should comply with the limits of 10 characters for the field name; if no new name is entered, as a default the column is named *" Result "*.

Figure 54
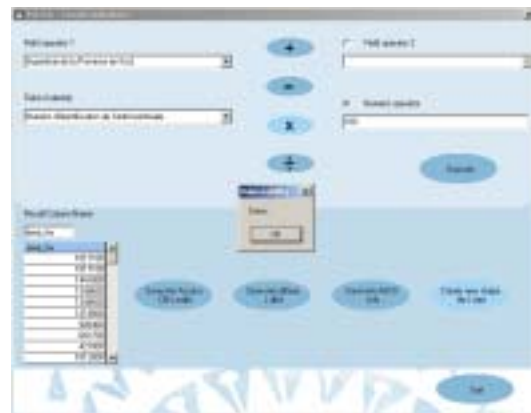
Figure 55

NOTE: Anytime you save the results derived from the "C*reate Indicators* " function, be they in dBase or other formats, the table you will obtain is composed of five columns: *" field operator 1 ", " field operator 2 "* or the numeric operator used; identity field chosen and the column of results obtained.

In Figure 57 the fifth column *"FeatureId"* is the standardized identification column for the default thematic layers created using the software.

Figure 56

Figure 57

Now, suppose that we want to know if Burkina Faso's agricultural potential is different from the pastoral/range potential.

After displaying the "*Potentialités agricoles* " theme of the " *Pressions agricoles*" domain for the country concerned (Figure 58), you can click on the indicator calculation command.
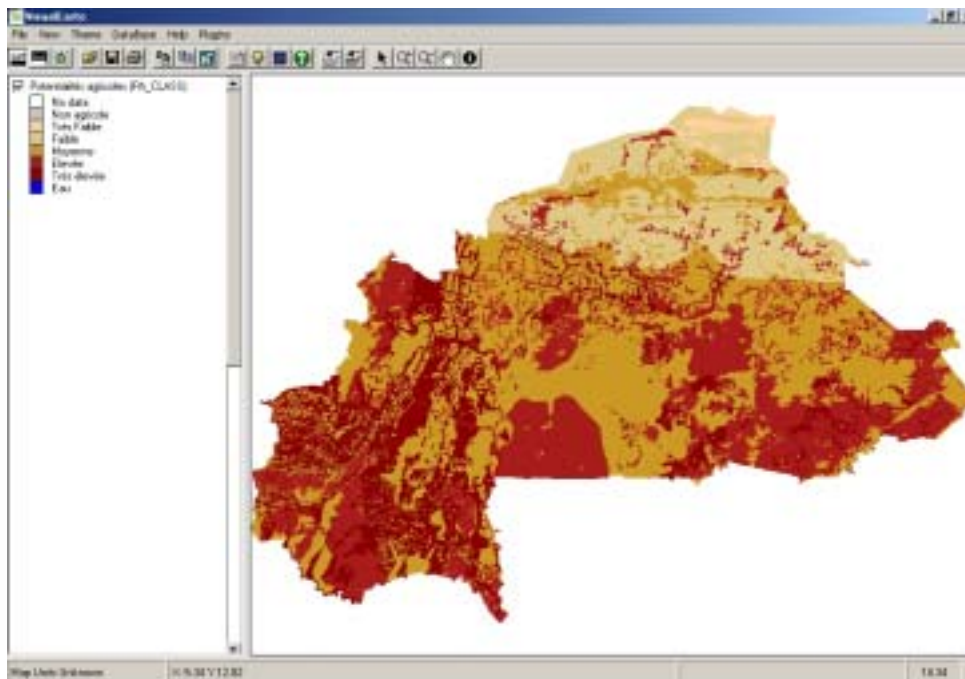
Figure 58

Now we must calculate the difference between two fields of the attribute table of the *potentialités agricoles* layer.

In the field operator 1 and the field operator 2 , you can enter the "*classe d'aptitude agricole*" and "*classe d'aptitude pastorale*" respectively (figure 59).
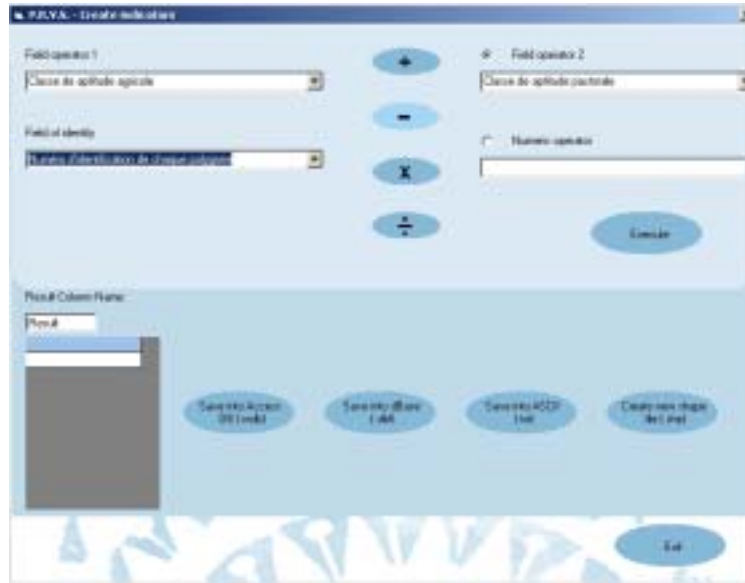
Figure 59

The difference enables you to see that all zero values belong to units with the same potential: by clicking on

the [—] operator and execute button you will view this result in the column named " *diff_apt* " (Figure 60).

You can proceed with the various options for saving the data obtained.
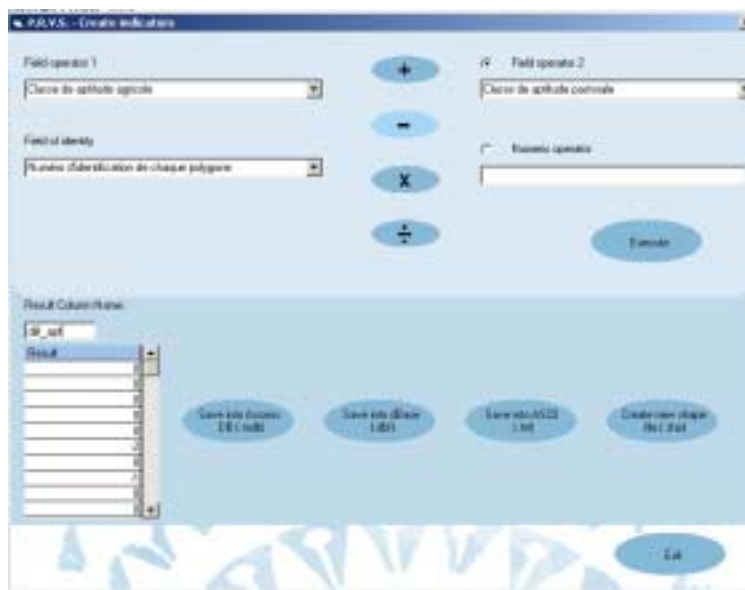
Figure 60

Important warning

- The tables obtained via the "*Make Indicators*" function can be joined to the other tables used in the food vulnerability characterization system. Since the join operation can only be performed with .dbf files named using less than eight characters, it is advisable to create .dbf and .shp files with names, which do not exceed eight characters.
  In the event of joins with .dbf files without these characteristics the message in Figure 61 will be displayed.
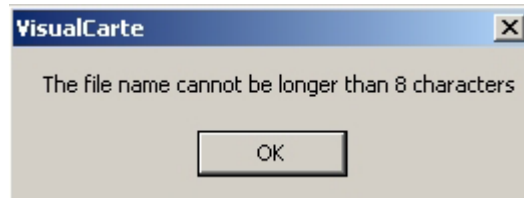
Figure 61

- With regard to the choice of identity field for joining values related to administrative units, it is strongly advisable to always use the unit code field, as indicated in Table 1 for each country. In the case of "*pression agricole*" (agricultural pressure) and "*dynamique de la vulnérabilité*" (vulnerability dynamics) layers, the identification number is represented by the identification number of territorial units (UT_ID), finest administrative units available with regard to Burkina Faso, Mali, Niger and Senegal.

Pays	Champ d'identification
BF	DEP_ID
CD	PREF_ID
CV	ILE_ID
GB	REG_ID
GM	DIV_ID
ML	CER_ID
MR	REG_ID
NG	ARR_ID
SN	DEP_ID

Table 1

Making Scenario

This function makes it possible to simulate the calculation of the current Virtual Rate of Cereal Need Coverage (TVCBC) for given a year: you can perform simulations of geographical areas which will be vulnerable and make assumptions on vulnerability causes or better still the primary production sector that which will impact more on the food balance sheet.

When choosing a simulation year, some input values will be automatically updated for determining the current TVCBC.

In order to perform the simulation, you should click on the " *Plugins/Scenarios making* " menu (Figure 62) and to follow the instructions appearing in the dialogue windows. When clicking on the command, the first window, which appears, informs you that the analysis data are being loaded (Figure 63). From that moment, you should choose or fill in manually the data required for the calculation.
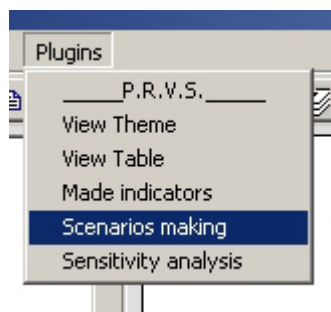
Figure 62   **Figure 63**

When single-clicking on " Forward ", the window requests you to choose the country in which you are interested. You can choose it by clicking on the black arrow next to the blank box using your mouse pointer (Figure 64).

Figure 64   **Figure 65**

When the selection has made, by clicking again on *"Forward "* you can choose from second or third-level administrative units based on the information available for the analysis (Figure 65).

The next step relates to the year for which you want to perform the simulation: using the two black arrows, you can up scroll or down scroll the numbers related to years (Figure 66). The selected country and administrative unit remain visible in this window and in the following one that summarizes the choices made (Figure 67).

Figure 66   **Figure 67**

NOTE: When choosing a simulation year, some input values (such as the population size) will be automatically updated for determining the current TVCBC. The updating will be based on the official rate of population growth.

You can modify the selected settings by clicking on *" Back ";* by clicking on *"Finish" you* can launch the TVCBC calculation procedure.

The window that you are going to view (Figure 68) is made up of two parts: the left-hand side consisting of all the structural analysis data and the right-hand side containing current simulation data.

P.R.V.S. - Virtual ratio of cereals needings

Country selected: Burkina Faso Average Sur. Agri. 63140 Simulation Year: 2004 Rural population 205974
Administrative Unit: BAM Population year 1985: 162575 Reference cereal: Sorgho

STRUCTURAL ELABORATION VALUES | SCENARIOS MAKING 25% ○ Average ⊙ 75% ○

Céréales	nom	Produz 25%	Moyen	Produz 75%	Coef_Riduz	Prix	Coef_Cost		nom	Moyen	Coef_Riduz	Prix	Coef_Cost
1	Mil	6187	10819	16000	0.15	105.9	0		Mil	10819	0.15	105.9	0
2	Sorgho	13779	22029	30954	0.15	95.6	0		Sorgho	22029	0.15	95.6	0
3	Mais	860	1574	2019	0.15	103.1	0		Mais	1574	0.15	103.1	0
4	Riz	37	112	126	0.35	-999	0		Riz	112	0.35	-999	0
5	Ble	-999	-999	-999	0.15	-999	0		Ble	-999	0.15	-999	0
6	Fonio	7	23	33	0.15	-999	0		Fonio	23	0.15	-999	0

Rente	nom	Produz 25%	Moyen	Produz 75%	Coef_Riduz	Prix	Coef_Cost		nom	Moyen	Coef_Riduz	Prix	Coef_Cost
1	Coton	585	1085	973	0	170	0.8		Coton	1085	0	170	0.8
2	Arachide	937	1946	3276	0	150	0.6		Arachide	1946	0	150	0.6
3	Other1	-999	-999	-999	0	-999	0		Other1	-999	0	-999	0
4	Other2	-999	-999	-999	0	-999	0		Other2	-999	0	-999	0

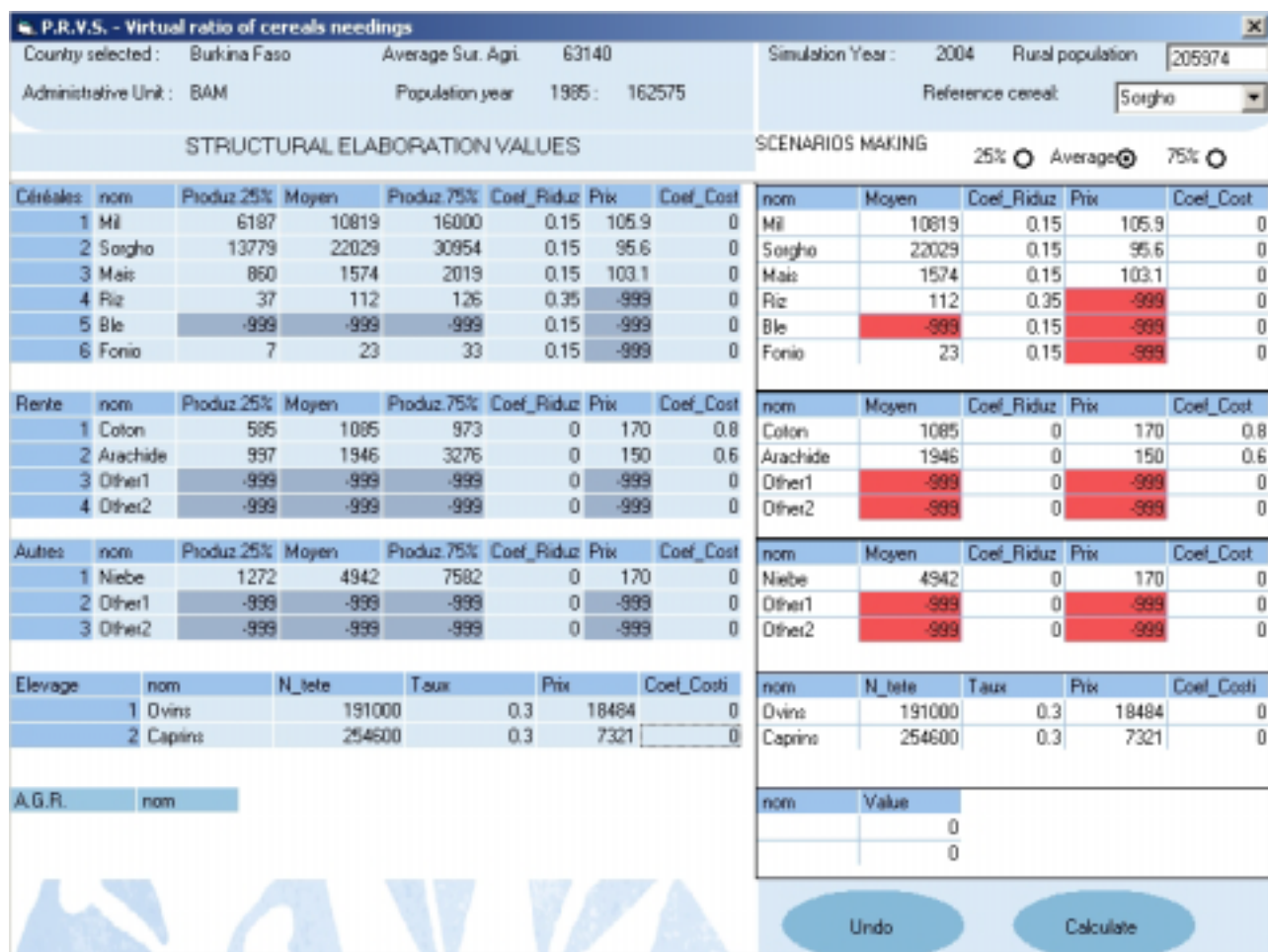| Autres	nom	Produz 25%	Moyen	Produz 75%	Coef_Riduz	Prix	Coef_Cost		nom	Moyen	Coef_Riduz	Prix	Coef_Cost
1	Niebe	1272	4942	7582	0	170	0		Niebe	4942	0	170	0
2	Other1	-999	-999	-999	0	-999	0		Other1	-999	0	-999	0
3	Other2	-999	-999	-999	0	-999	0		Other2	-999	0	-999	0

Elevage	nom	N_tete	Taux	Prix	Coef_Costi		nom	N_tete	Taux	Prix	Coef_Costi
1	Ovins	191000	0.3	18484	0		Ovins	191000	0.3	18484	0
2	Caprins	254600	0.3	7321	0		Caprins	254600	0.3	7321	0

A.G.R.	nom		nom	Value
				0
				0

Undo   Calculate

Figure 68

In the part upper part of the window, some information concerning the chosen Administrative Unit are indicated: you can see the average surface areas on the basis of which the calculation has been done and also the population data recorded with regard to the year for which statistics are available (year 1985 in this particular case).

The selected year's population value is showed with the reference cereal of the State to which the unit administrative belongs.

The rows below show statistics related to the production of cereals, cash and other crops (pertaining to rice and legumes). A reduction coefficient can be seen: it has been applied to gross productions in order to obtain net outputs, which exclude all possible losses due to factors such as harvest attacks by pests. This reduction factor is applied in order to obtain the actually saleable production value.

The table also shows commodity prices and a potential variation coefficient, which must take into account production costs expressed as % of the commodity unit value. This applies to cash crops (cultures de rente) such as groundnut and cotton.

Concerning animal husbandry, the number of heads of livestock is indicated in the table while the exploitation/off take rate and livestock unit price (FCFA per head) with the variation coefficient. As in the previous case, this factor must take into account costs borne when raising livestock, expressed as % of animal unit value. Livestock data are taken into consideration because of the possibility of exchanging a head of livestock for a cereal equivalent based on market prices.

Population data are used for calculating cereal demand based on cereal consumption norms; the population is calculated based on growth rates applied to the structural analysis year's population until to the simulation year.

You can choose from two options for compiling the table for all the data. You can compile the values with the scenario making command, which provides for average, below average or above average production conditions: by using the 25% or 75 % centile, differences in production can be appraised (Figure 69 and Figure 70).

Scenarios making   25% ⊙   Average○   75% ○

nom	Produz.25%	Coef_Riduz	Prix	Coef_Cost
Mil	6187	0.15	105.9	0
Sorgho	13779	0.15	95.6	0
Mais	860	0.15	103.1	0
Riz	37	0.35	-999	0
Ble	-999	0.15	-999	0
Fonio	7	0.15	-999	0

nom	Produz.25%	Coef_Riduz	Prix	Coef_Cost
Coton	585	0	170	0.8
Arachide	997	0	150	0.6
Other1	-999	0	-999	0
Other2	-999	0	-999	0

nom	Produz.25%	Coef_Riduz	Prix	Coef_Cost
Niebe	1272	0	170	0
Other1	-999	0	-999	0
Other2	-999	0	-999	0

nom	N_tete	Taux	Prix	Coef_Costi
Ovins	191000	0.3	18484	0
Caprins	254600	0.3	7321	0

Scenarios making   25% ○   Average○   75% ⊙

nom	Produz.75%	Coef_Riduz	Prix	Coef_Cost
Mil	16000	0.15	105.9	0
Sorgho	30954	0.15	95.6	0
Mais	2019	0.15	103.1	0
Riz	126	0.35	-999	0
Ble	-999	0.15	-999	0
Fonio	33	0.15	-999	0

nom	Produz.75%	Coef_Riduz	Prix	Coef_Cost
Coton	973	0	170	0.8
Arachide	3276	0	150	0.6
Other1	-999	0	-999	0
Other2	-999	0	-999	0

nom	Produz.75%	Coef_Riduz	Prix	Coef_Cost
Niebe	7582	0	170	0
Other1	-999	0	-999	0
Other2	-999	0	-999	0

nom	N_tete	Taux	Prix	Coef_Costi
Ovins	191000	0.3	18484	0
Caprins	254600	0.3	7321	0

Figure 69   **Figure 70**

The two images represent the right-hand side of the window with current analysis data. Of course, only current analysis data can be managed since structural data have been obtained through statistical analysis over a historical series: the blue-coloured boxes indicate that data cannot be modified.

When applying the 25% or 75% scenarios, livestock data are not modified since they are calculated based on livestock growth rates.

The other option for compiling the table consists of entering data manually. The table contains boxes with three different colours: blue means that the value contained in the box cannot be modified: it is the case with structural data related to a period of time covering many years.
The red-coloured boxes indicate missing data and white-coloured boxes comprise data, which can be modified by the user. Once you enter a new datum, the box becomes blue (Figure 71).

Virtually all the data required for the current analysis can be changed, including the population of reference in case new information are made available for updating it.

You can also choose the reference cereal, whose price will be taken into account for calculating of the terms of trade in relation to livestock and other cash crops.
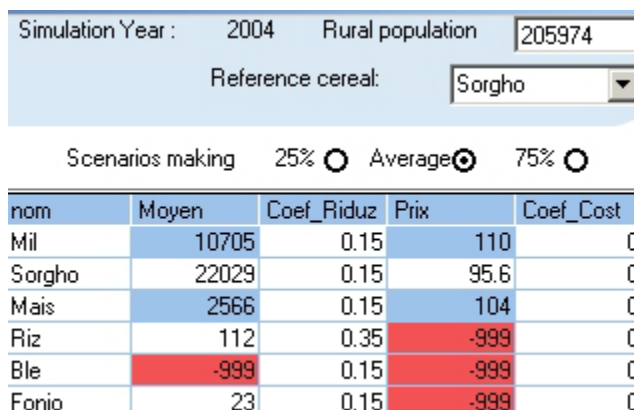

Figure 71

The " *Name* " and " *Value* " fields in Figure 68 can be used with regard to all the values to be used for taking into account additional incomes derived from other income generating activities (IGA) expressed in F CFA currency.

When the data have been entered, you can launch the calculation procedure or exit it. If some data are still undefined (-999), the message in Figure 72 will be displayed and you can decide to continue with the calculation or stop it.
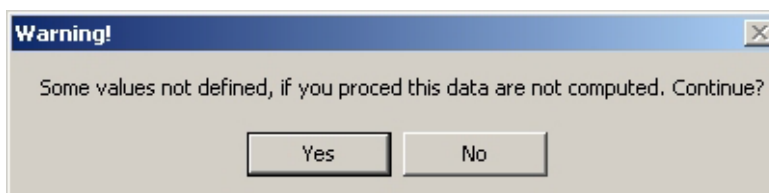

Figure 72

If you click on " *Yes* " all the rows with undefined data will not be used in the calculation.
A window with the results will appear and indicate them in terms of Virtual Rate of Cereal Need Coverage (TVCBC), which takes into account all the sources of income and the supplies for the selected unit (Figure 73).
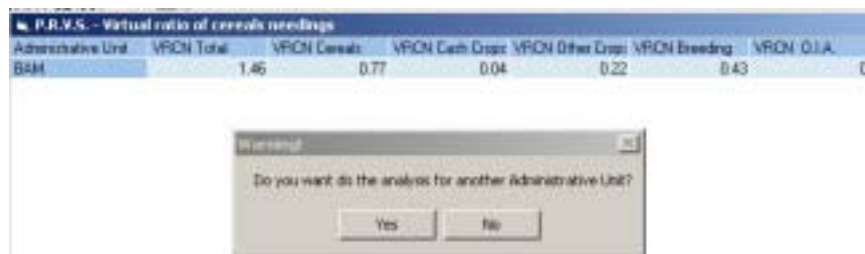

Figure 73

This analysis can be carried out for an administrative unit at a time: in case you want to carried out other analyses, you should proceed per unit by clicking on " *Yes* " in the message.

When you are satisfied with the units analysed and you should click on " *No* " another window will be displayed (Figure 74) with the summary of all the TVCBCs calculated for each administrative unit.
The options you can choose from the five buttons are explained in Table 2.

Figure 74

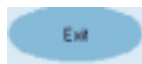|	
Tables	This icon makes it possible to view the table with the results for each administrative unit derived from the current and structural analysis.
Graphics	This icon enables to obtain graphics representing variations in TVCBC in the two different analyses for each administrative unit. It is useful for viewing trends. In order to view the graphics corresponding to a unit, it should be selected in the table by clicking on the row defining it: two types of graphics (pie and bar charts) will be displayed for the two types of analyses (Figure 75).
Save	Selecting this icon enables you to save your processing: if you click on it when the table is displayed, you will save the data in * .txt format. If you click on it when the graphics are displayed, the saving will consist of an image in * .bmp format.
Map making	This icon makes it possible to save the processing obtained while creating a theme: the table is used to create a shapefile table in *.dbf format, which can be viewed with VisualCarte 1.5.
Exit	This icon enables you to exit the analysis and view the primary window.

Table 2
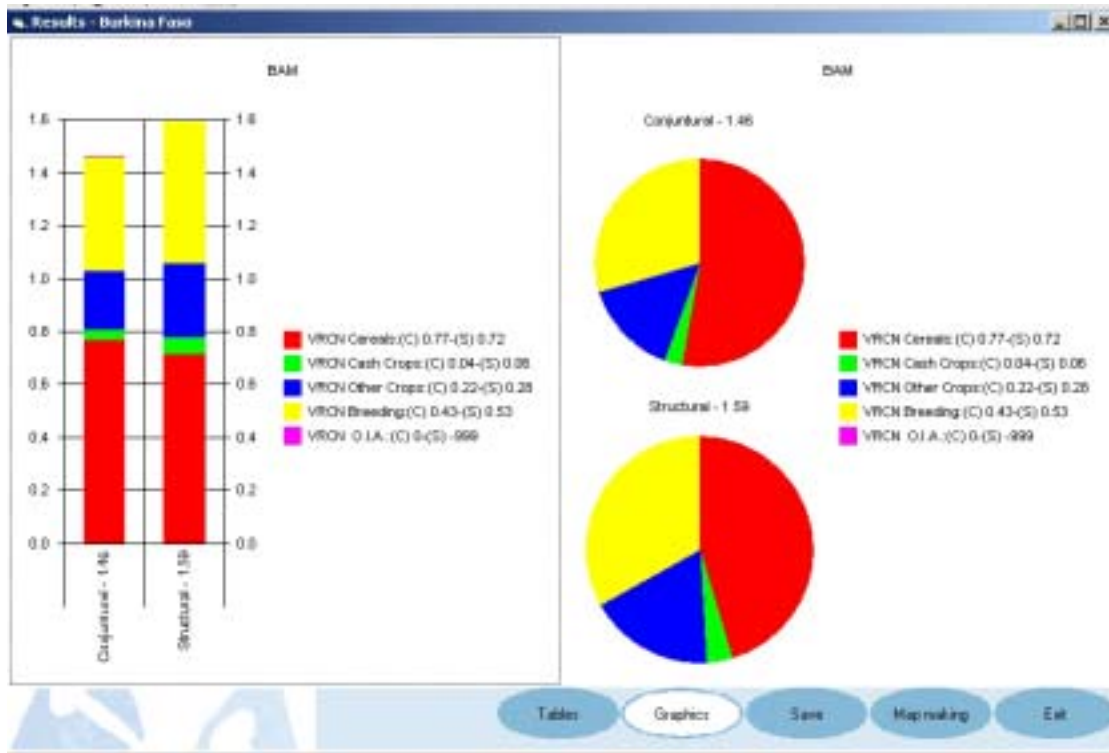
Figure 75

Sensitivity Analysis

This menu enables to start a TVCBC procedure for a given year at national level, with the possibility of using only some calculation factors. The function is the same as the " *Scenarios Making* " command but in this case, the analysis is carried out at national level and it no longer possible to select only one unit.

The analysis aims at calculating a simulated TVCBC trend based on actual or assumed changes and enables to assess the impact resulting from the variation of one or more parameters in term of availability and/or access to food in relation to administrative units' structural characteristics.

In addition, you cannot enter specific values as was the case with the data of the previous current/conjunctural processing. Yet, you can enter values representing variations, in terms of percentage, of tradable agricultural production, livestock or prices compared to average values.
Therefore, it is possible to assess the impact resulting from a reduction/increase in the productive potential of a crop typology (cereals, cash crops, other crops) or livestock numbers and from a relative variation in agricultural produce and/or livestock price.

In other words, the results derived from this module can highlight the most important risk factors for each unit based on the impacts on the Virtual Rate of Cereal Need Coverage (TVCBC) resulting from the variation of one or more factors.

In order to launch the procedure, you should choose the" *Plugins / Sensitivity Analysis* " menu and follow the usual instructions appearing in the dialogue window (Figure 76).
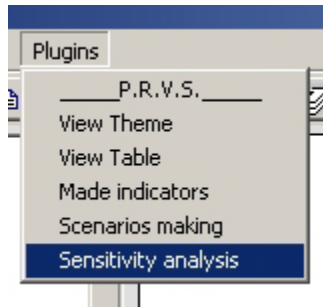
Figure 76

In the "*Sensitivity analysis*" window, you should choose the country in which you are interested and the simulation year: the "*Forward*" button enables you to carry on with the query configuration. You can also choose to exit the operation or go back to the previous window and to modify the choices made (Figures 77 and 78).

As a default, the simulation year is 1995, which is considered as an average year over the historical series. Yet, you can change it.
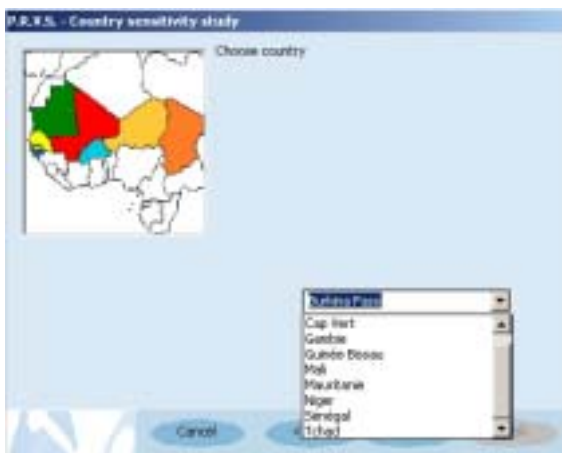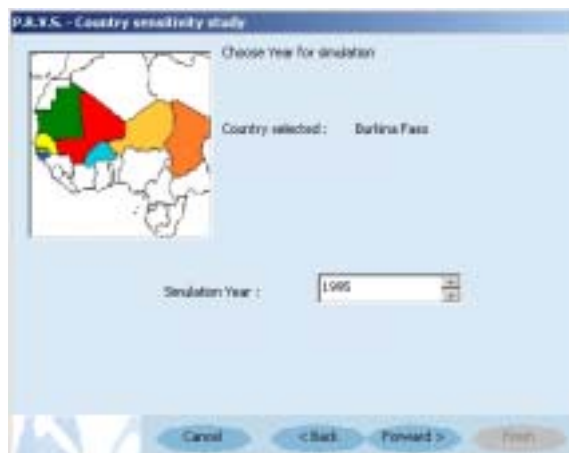

Figure 77

Figure 78

A window will summarize the parameters chosen during the queries (Figure 79); by clicking on "*Finish*" you will be in a position to view the window related to the choice of parameters associated with variations in productions and prices (Figure 80).

It should be underscored that the values to be entered in the input window enabling to initialise the sensitivity analysis model are represented by the variation in % of the various parameters (expected or estimated) in relation to a baseline case (i.e. that resulting from the structural analysis).

On the right-hand side of each blank box, there are two black arrows enabling to increase or decrease the numbers corresponding to positive or negative variation in percentage.
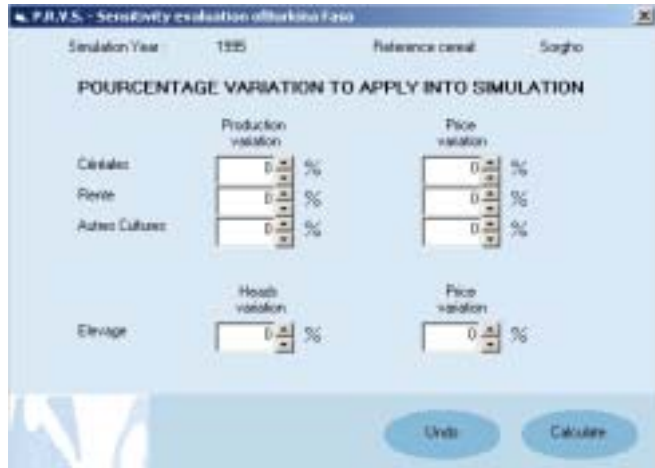
Figure 79

Figure 80

Once all the values have been entered (Figure 81), you can launch the processing by clicking on "*Calculate*"; once the software completes the calculations, the message in Figure 82 will be displayed.
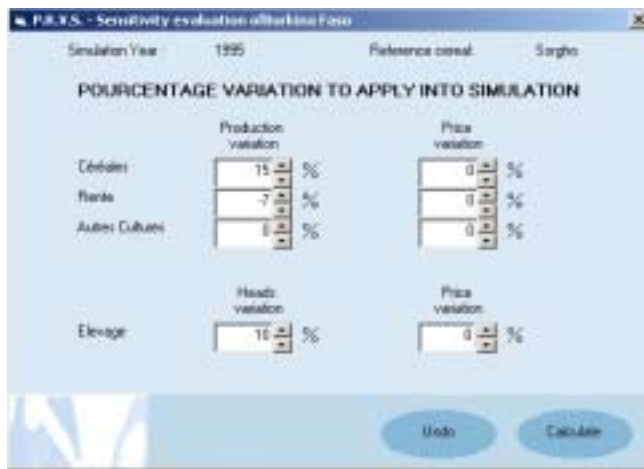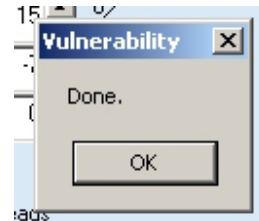

Figure 81

Figure 82

By clicking on " OK " you will view the table with the results derived from the current analysis-based simulation compared to those derived from the structural analysis frame of reference and relative difference values for all the Administrative Units (AU) of the selected country (Figure 83).
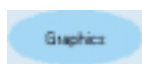
Figure 83

The functions controlled by the five buttons at the bottom right-hand side of the window are described in Table 3.

Tables	This icon makes it possible to view the table with the results for each administrative unit derived from the current and structural analysis.
Graphics	This icon enables to obtain graphics representing variations in TVCBC in the two different analyses for each administrative unit. It is useful for viewing trends. In order to view the graphics corresponding to a unit, it should be selected in the table by clicking on the row defining it: two types of graphics (with absolute and relative values) will be displayed for the two types of analyses (Figure 85).
Save	Selecting this icon enables you to save your processing: if you click on it when the table is displayed, you will save the data in * .txt format. If you click on it when the graphics are displayed, the saving will consist of an image in * .bmp format.

This icon makes it possible to save the processing obtained when creating a theme: the table is used to create a shapefile table in *.dbf format, which can be viewed with VisualCarte 1.5.

This icon enables you to exit the analysis and view the primary window.

Table 3

In order to view the two available graphics for a unit, it should be selected beforehand: the selected row will appear in blue (Figure 84).

Figure 84

Figure 85 shows the result of the sensitivity analysis for an administrative unit in the form of graphics: the graphic representation of total TVCBC and the contribution of the various components as a result of the variations performed can be seen.
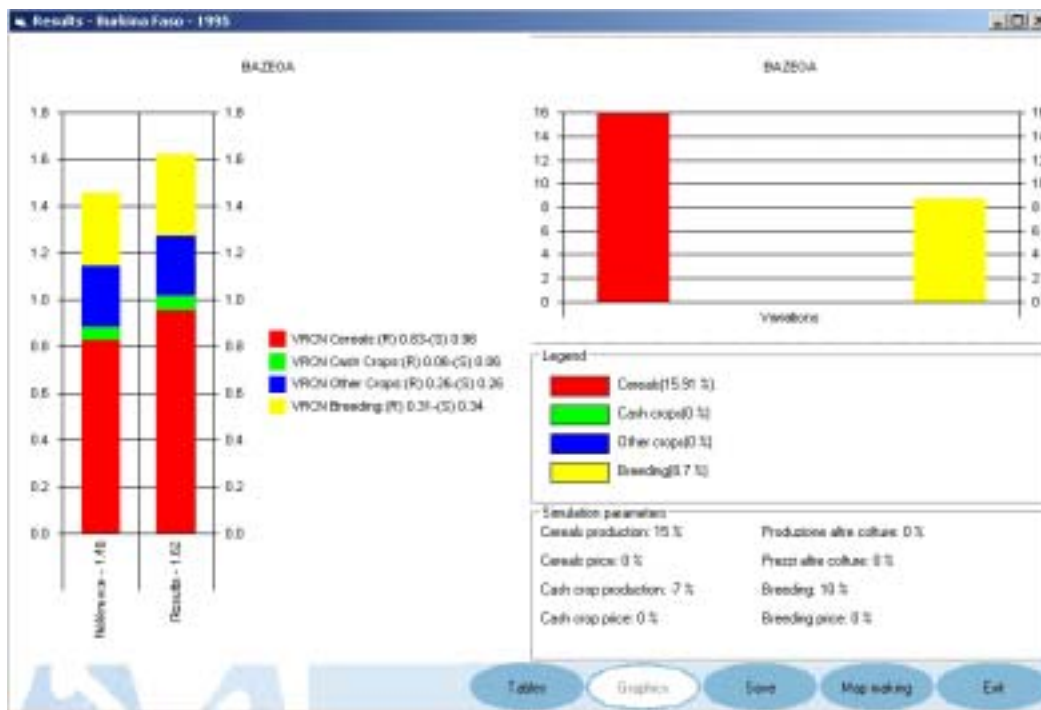
Figure 85

The right-hand bar graph shows the result (s) of the simulation at the level of an administrative unit (Bazega) while the second on the left-hand side relates to the result derived from the structural analysis of Reference (R): each colour represents cereal need coverage by each commodity category (in % against the total).

The right-hand graph shows the relative variations in the contribution of breeding, food crops, cash crops, as well as other crops to TVCBC per administrative unit.

This representation makes it possible to appraise how one or more variations in the input parameters will be reflected in term of relative variation in the contribution of each commodity category. Thus, in the example, we can see how a – 10% variation in cereal production can finally result in a 15.91% reduction in the contribution of these crops to TVCBC and in the same way, a 10% increase in breeding make this sub-sector account for 8.7% of the total contribution.

In order to supply a useful model to evidence plugin's new functions, an example is reported below.
The creation of a new theme by means of the sensitivity analysis and the adding of new attributes to a cartographic map by means of a join operation will be described.

Let's suppose to be interested to the Senegal agricultural pressure and the sensitivity analysis for the 2004 as consequence of a cereals production decrease by 10%.

As first step the sensitivity analysis has to be generated for the country: choosing "*Sensitivity analysis*" from the plugin's menu, it is possible to obtain the required data and to save the results en *.shp format.
The steps of entire procedure are shown below (Figure 86-91).

Figure 86

Figure 87

Figure 88

Figure 89

Figure 90

Figure 91

In the example after obtaining the table with reference data and computed simulation data and the relative percentage difference, the results have been saved in a shapefile named *« sn04_v.shp »* (Figure 92).

In order to open the shapefile, it must be displayed by the command *"Open file"* of the VisualCarte main menu (Figure 93), considering that the creation of a new shapefile does not imply its management by the meta-database linked to the SAT database .

Figure 92

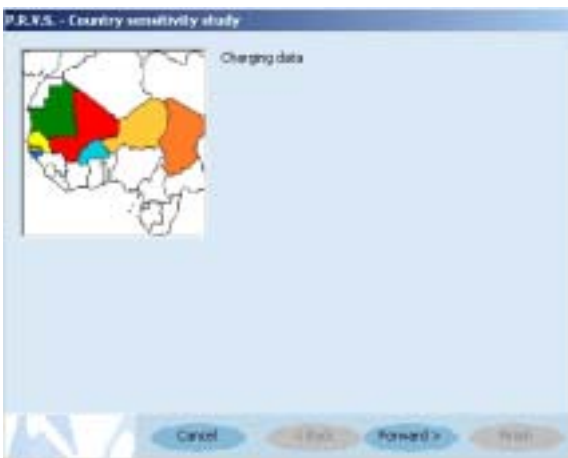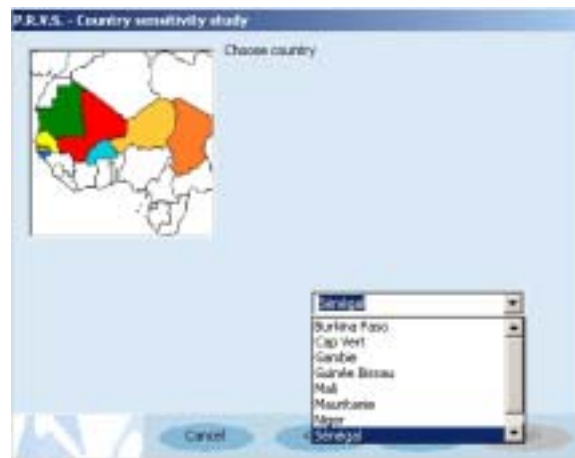**Figure 93**

Going on as shown in the example of the following images (Figure 94-95), it is possible to display the shapefile obtained by the sensitivity analysis managed with the plugin.
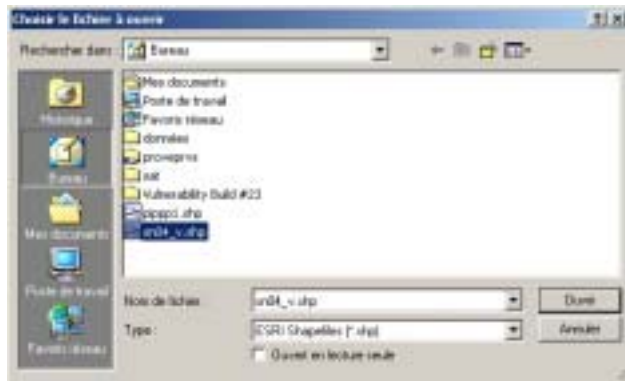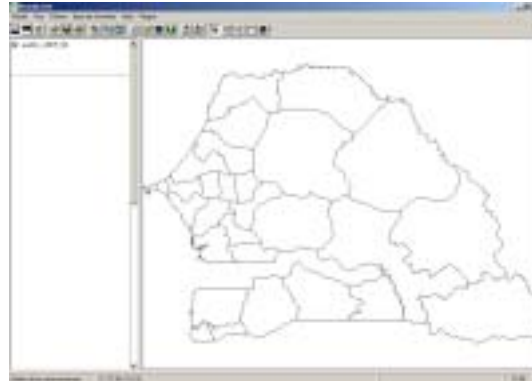

Figure 94

Figure 95

The visualisation of the attributes table of the theme *« sn04_v.shp »* allows the activation of join operation with the file sn_press.dbf (concerning the agriculture pressures) requested by the example.

The join is an operation of appending fields from a source table into another tables based on a common field.

In VisualCarte 1.5 the join may occur just between an attribute table of a theme and a table Dbase which name can not exceed 8 characters. For this reason, during the analysis procedures, the creation of files *.dbf and *.shp named with more than 8 characters, should be avoided.

Concerning the choose of common fields for the join, users are reminded to utilise the field of the administrative unit code as reported in table 1 chapter of this handbook.

In VisualCarte 1.5 the join operation may be processed with the visualisation of a theme and its attributes table: in order to activate the operation choose the *"join"* button close to the buttons for the file export and for the documentation file display.

When the button *« Join table »* is chosen, the Windows Explorer is shown in order to select the file *.dbf to join (Figure 97).

<u>Attention</u> : in the example the file *sn_press*.dbf corresponds to the attribute table of *« sn_press.shp »* shapefile (located in the folder VUL\SN\COVER) .

After choosing the file to join, the window for the choice of key field is displayed: as shown in the figure 98, the *"Select field"* window allows the user to visualise all the fields presents in the two files to join as well as their names. The first square shows the fields of the active theme to which the attributes table will be joined and the second square is that one relative to the attributes table *.dbf; for the second one, the name and the entire address is displayed.

Scrolling the bar, the list of the fields is entirely visualised : in the example the join is proceeded with the key field *« Dep_ID ».*

Figure 96

Figure 97

When the two fields have been selected, clicking the « OK » button the *"Select field"* window will disappeared and the current view will be restored. The updating of the table with new jointed fields can be displayed.

Figure 98

Figure 99

In the view window, choosing the identification tool, the values corresponding to the selected record will be displayed (Figure 100) as well as the jointed values.

Figure 100

It is possible to operate more that one joint for a theme. It is specified that in this case the saving of current work session will preserve just the last joint. In case of loading of this work session, the joints will be lost except the last one.

In order to remove the jointed values, it is necessary to remove the jointed theme and to reload it in the window.

Annex 1 - Improving Functions in VisualCarte 1.5

Installing the PRVS plugin makes it possible to update of the pre-existing functions of the VisualCarte 1.0 software; this operation will be carried out automatically in the process of installing the plugin and the new functions will be permanent in the VisualCarte 1.5. software.

The update concerns data selection and query functions.

Selecting Data

View

View Properties
Export view...
Normal mode
Zoom In
Zoom Out
Pan Mode
Identify Mode
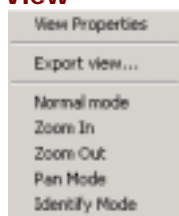
Before installing the PRVS plugin, the *"Normal mode"* function of the *"View"* menu enabled to restore the view to its normal conditions (ex: disables the zoom functions previously used).

After the installation, the same command makes it possible to restore the selection mode: as a result of the selection of this mode when displaying the view, you can select the units/polygons of the viewed theme.

Figure a1

By clicking on the units/polygons or by demarcating an area on the displayed map (figure a1), you can highlight with a different colour the units/polygons selected or contained in the demarcated area (figure a2). In order to highlight the records, the theme should be activated and placed at the same time at the top of the list of displayed themes, if other themes are present in the theme table, for it to be the first theme in the order of display. In order to view the selected units/polygons in figure a3, you should drag the theme with the mouse and drop it at the top of the theme table or disable the themes, which are at the top place in the theme table.

Figure a2
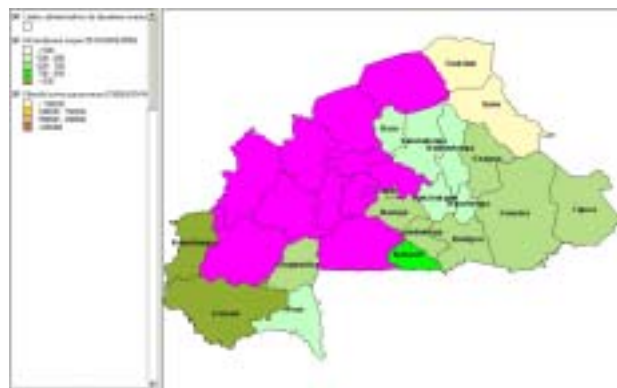
Figure a3

In order to deselect the units/polygons, you should select the "Normal mode " and click the mouse pointer on a blank area on the window.

Querying Data

Concerning the Theme menu, the commands added can be seen in figure a4: in addition to the functions for viewing or removing themes, editing legends and opening tables and documentation files, there are two new functions enabling to perform queries and manage them:
- *View selected features*
- *Query Manager*
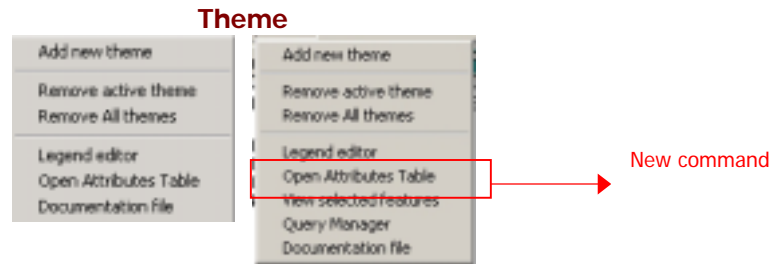
Figure a4

The *"view selected features"* command enables to view data selected using the procedure described above.

When double-clicking on the menu command or the corresponding button ▓ on the icons bar, the table with the records selected will be viewed (figure a5): all the fields can be viewed by means of the scroll bar below the table.

You can also view the same query results on the active theme attribute table, but when closing this table the query records will be lost.
The "*Attribute table*" window contains export functions in text (*.txt), dBase (*.dbf) and Access (*.mdb) formats.

Figure a5

Another improved tool is the management of attribute tables: whereas in VisualCarte version 1.0 it was not possible to perform queries (figure a6, attribute tables of VisualCarte 1.0), now in VisualCarte version 1.5 when viewing tables, a new button makes it possible to consult data according to the values characterizing the various fields.

As you can see in figure a7 (attribute tables of VisualCarte 1.5) the "*Query Manager*" button next to "Close" makes it possible to open the window in order to perform queries (Figure a8).

Figure a6

Figure a7

With your mouse pointer click on the black arrow next to the blank box and the list of table fields will appear (Figure a 8): you can use the scroll bar.

Suppose we are interested in the administrative units of Burkina Faso, which had a millet production above 50,000 kg/ha during the period 1985-1994.

Figure a8

Figure a9

In order to choose the theme in which you are interested, you simply have to double-click on the corresponding name (for example "*Mipr8594* "). Once a field is selected, the values will be displayed in the right-hand blank window: if the field is a numeric one, maximum and minimum values will be displayed (Figure a9); if the values are alphanumeric ones, attribute names will be displayed.
In order to perform the query, you can proceed with the logical expression defining it by double-clicking on the operator and choosing the second operator: if it is made up of another field, you only have to double-click once again the corresponding field. If it is a numeric value, you should enter it directly in the query box.
Once you have checked that the expression is entirely displayed, you can click on *"Execute"*.

An attribute table of records determined through the query will appear (Figure a10). Three methods for exporting the table obtained are available: text (* .txt), dBase (* .dbf) and Access (* .mdb) formats can be chosen.

Figure a10

Figure a11

For example, only the Kossi province matches the query (Figure a11).

In this case, if you click once again on *"Query Manager"* you will perform a query on the records selected by the previous query.

Now when clicking on *" Mipr8594 "* you can see that maximum and minimum values match (Figure a12) since you are performing a query based on a single record (previously selected).

In order to cancel the query formulation, you only have to click on *" Undo "* and by clicking on *" Close* ", circled in blue, you can go back to the selected attributes table.

Therefore, if you want to repeat a query on all the fields you should "*Close*" the window (circled in red) and restore the whole table.
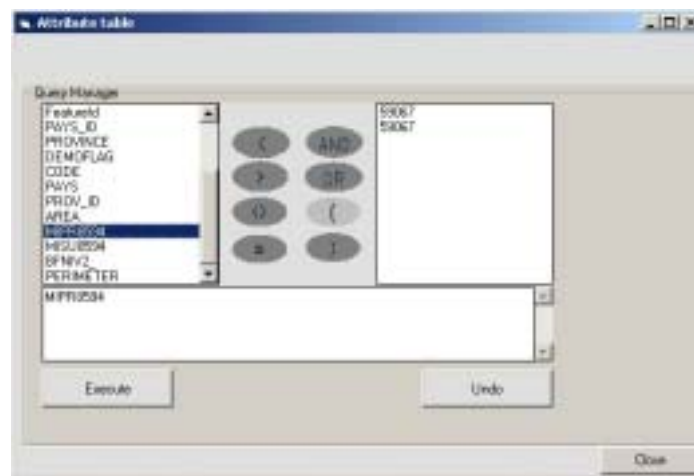
Figure a12

The function for querying attribute tables can also be performed from the [icon] button of the icons bar preceding the dialogue window in figure a13.

Figure a13

Once again, you can formulate the query (Figure a14) and click on *"Execute"* or *"Undo"* in order to formulate a new query or on *"Close"* to exit the window and view the result.
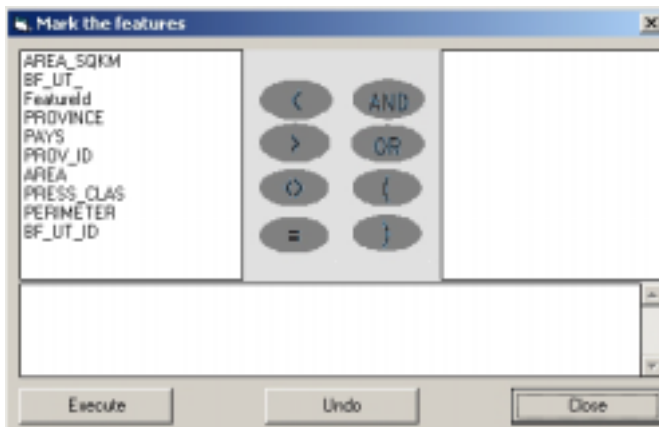
Figure a14

Figure a15

The query result will be displayed in the attribute table (Figure a15) that you can open using the special icon . The result can be saved in tabular format using Text (* .txt) dBase (* .dbf) and Access (* .mdb) formats.

ANNEX 2 - VUL Database Structure

Data associated with the PRVS plugin are organized in a first hierarchisation of directories per country: the VUL folder should be included in SAT.

```
SAT\VUL ─────┬─────────── BF      - Burkina Faso          .

             ├──────────── CD      - Chad

             ├──────────── CV      - Cape Verde

             ├──────────── GB      - Guinea Bissau

             ├──────────── GM      - The Gambia

             ├──────────── ML      - Mali

             ├──────────── MR      - Mauritania

             ├──────────── NG      - Niger

             ├──────────── SN      - Senegal

             └──────────── CILSS   – All the CILSS member countries
```
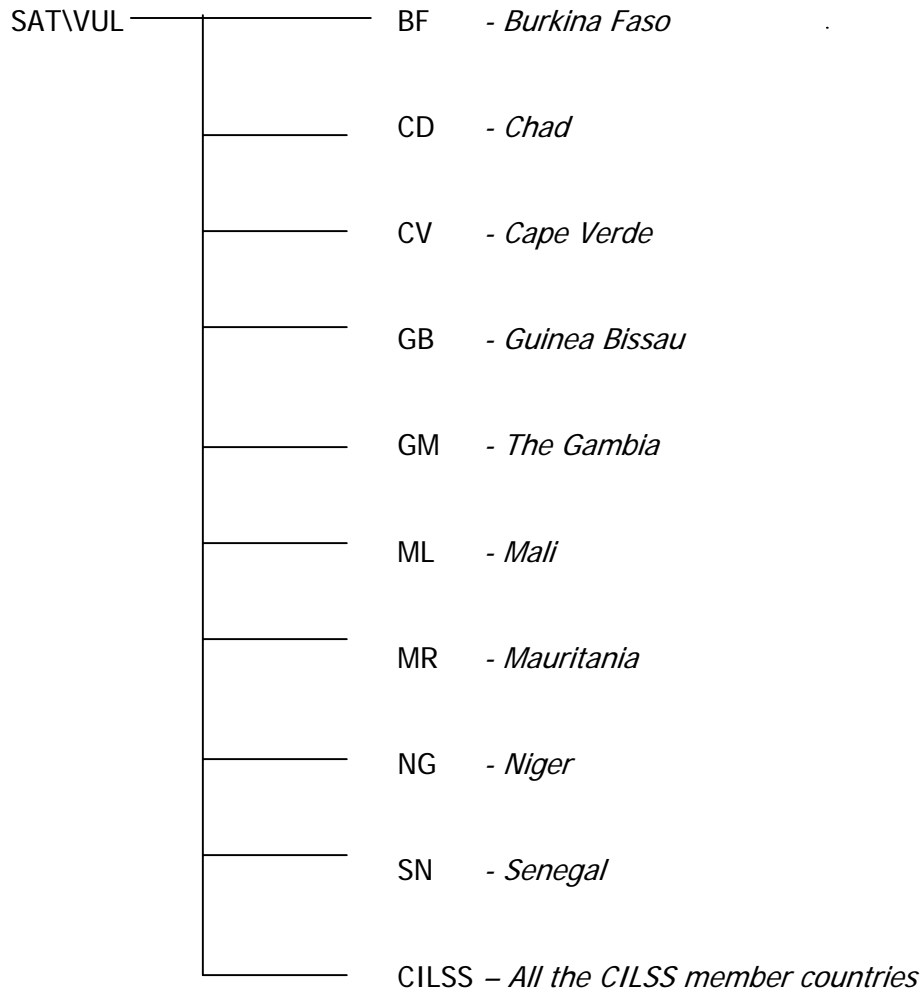
For each country, the directories containing data can be found according to various typologies and formats:

COVER Vectorial layers in ArcView® format resulting from processing carried out on the basic layer.
Summary files for describing ArcView® layers (format, name, shape.txt).
Field definition files (text format, name, shape.def)

TABLE   Agriculture and breeding Domain: tabular data obtained from the processing of national statistics (* .DBF files) and the corresponding structure description files (* .txt files).

The nomenclature utilised for the different files contained in the folders « Cover » et « Table » is the same for each type of file except for the first two characters corresponding to the country code (reported below as "country") . The country codes are the same as the names of folders in the database VUL. (Ex: Burkina Faso is codified as BF).

C:\Sat\Vul\COUNTRY\COVER

COUNTRY_dyn.shp   Dynamics of food crops and cash crops

COUNTRY_potagr.shp   Agricultural potentiality

COUNTRY_press.shp   Agricultural pressure

COUNTRY_sys_pr.shp   Production systems

COUNTRY_tvcbc.shp   Virtual Rate of Cereals Needs

COUNTRY_vdyn.shp   Dynamics of vulnerability

C:\Sat\Vul\COUNTRY\TABLE

COUNTRY_3_pro.dbf   Percentage production of the three main crops

COUNTRY_3_sup.dbf   Percentage occupation of three main crops

COUNTRY_prodA.dbf   Percentage production for each crop on the total production

COUNTRY_prodC.dbf   Percentage production for each crop on the total rainfed production

COUNTRY_r_UBT.dbf   Distribution of Units of Tropical Livestock in the administrative units

COUNTRY_sup.dbf   Percentage surface occupied by each crop on the total cropped surfaces

COUNTRY_TE_el.dbf   Exchange rate at current prices of sheep and goats

C:\Sat\Vul\CILSS\COVER

Cilss_pluie.dbf   Yearly average rainfall on the period 1971-2000

Saison.dbf   Average length of agriculture season on the period 1971-2000

Shapefiles Available in the VUL folder

	Production / Farming System	*Virtual Rate of Cereal Need Coverage (TVCBC)*	*Agricultural Potential (Potentialités agricoles)*	*Agricultural Pressures (Pressions Agricoles)*	*Agricultural Dynamics (Dynamiques agricoles)*
BF	x	x	x	x	x
CD	x	x	x	x	x
CV	x	x			x
GB	x	x	x		x
GM	x	x	x	x	x
ML	x	x	x	x	x
MR	x	x	x	x	x
NG	x	x	x	x	x
SN	x	x	x	x	x

	Average Seasonal Length (71-00)	*Average rainfall (71-00)*
CILSS	x	x

Tables Available in the VUL folder in dBase Format

	Production Distribution - 3 Major Crops	Surface Area Distribution - 3 Major Crops	Crop Production Distribution per AU	Agricultural Production Distribution in AUs
BF	X	X	X	X
CD	X	X	X	X
CV	X	X	X	X
GB	X	X	X	X
GM	X	X	X	X
ML	X	X	X	X
MR	X	X	X	X
NG	X	X	X	X
SN	X	X	X	X
CILSS				

	Agricultural Area Distribution in AU	Tropical Cattle Unit Distribution in AU	Small Ruminants/Cereals Terms of Trade
BF	X	X	X
CD	X	X	X
CV	X	X	
GB	X	X	
GM	X	X	X
ML	X	X	X
MR	X	X	
NG	X	X	X
SN	X	X	X
CILSS			

ANNEX 3 – THE PRVS METADATABASE

The software VisualCarte 1.0 and the plugin PRVS utilise a Meta-Database that allows to the software to find the paths of data files. This Meta-DataBase has been designed with *Microsoft® Access 2000 :* therefore it is possible to access and to modify it through *Microsoft® Access 2000.*
With regards to the software VisualCarte 1.0, the file containing the Meta-DataBase is in the software installation folder and is referred to **Données.mdb** (E.g. *C:\Program Files\VisualCarte\Données.mdb*). As reported in the chapter D.4 of VisualCarte 1.0 handbook it is possible to customize the meta-database from the main menu *« Database\Meta-DataBase Managment».*

Besides allowing the display of cartographic themes, the plugin PRVS can manage a computing procedure for the sensitivity analysis and the scenarios making: in order to manage this functions, a Meta-DataBase is necessary for the organisation of input data and for the stock and visualisation of output data.
As consequence, after the installation of the plugin, two new files will be added in the same folder where the Meta-DataBase of VisualCarte 1.0 is located (in other words where is located the file *Données.mdb*): **Vulnerability.mdb** and **Vulnerability2.mdb** (figure b1).
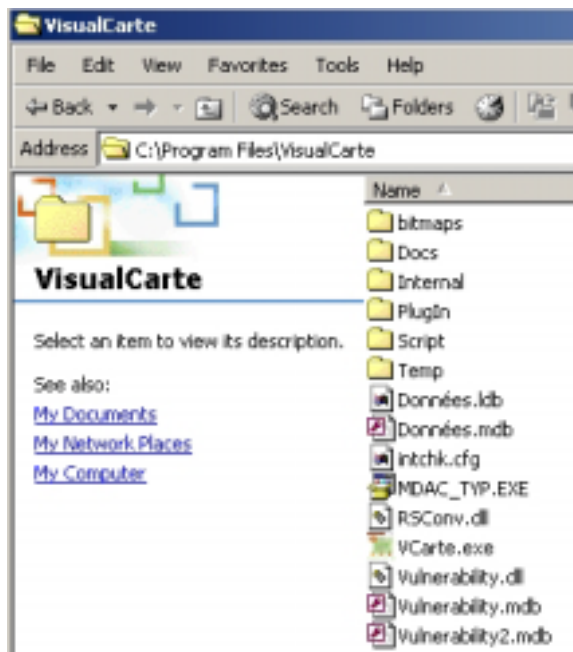
Figure b1

Important warning

It is necessary to underline that the removal Meta-DataBase files have not to occur. If the file containing the Meta-DataBase for the plugin is removed, the user will be able to utilise just the software VisualCarte1.5.
In case of removal of the file Données.mdb, the software VisualCarte 1.5 will not work correctly.

If the files are removed from the system, a new installation of VisualCarte 1.0 and of the PRVS plugin is suggested : of course it can occur just after the desinstallation of the corrupted software.

The Meta-Database of PRVS plugin is structured as follows and it includes the thematic maps and tables archived in the VUL Databases.
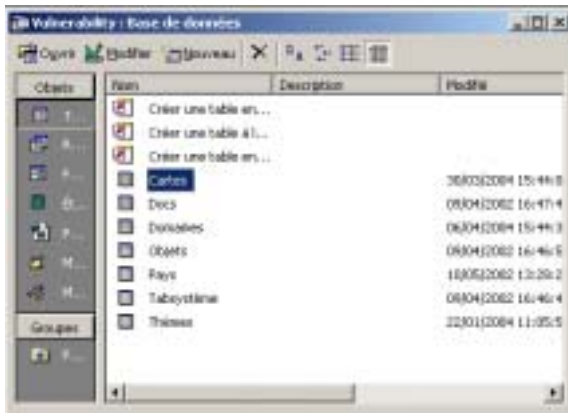
Figure b2

Figure b3

Vulnerability.mdb contents the path to follow in order to display the data files : it includes the thematic maps stocked in VUL.

It is constituted by seven tables containing the information for each thematic map.

A detailed description of the fields presents in each table can be consulted.

- **Cartes**

Figure b4

This table (figure b4) contains three columns: IDCarte, Nom and Parcours

- IDCarte: primary key of the table, it is a counter independent from the other table data and directly managed by *Microsoft® Access 2000*. Each row includes an identification of each file.
- Nom: Contains for each row the name of Shapefiles (extension *.shp) or the table en format dBase (ending with the *.dbf extension). For further details on file description see the annex 2.
- Parcours: It contain the path of each shapefile and files dBase. The path is inserted without its root, which is generally determined from the software «Database/Change data path» .

- **Domaines**

The domain table (Figure b5) identifies the belonging of the themes handled by the plugin PRVS and contained in VUL.
The plugin PRVS and VisualCarte 1.5, as well as the last software version, allow the user to add new themes and to manage themes connected on the base of his needs.
In case the user customizes the Meta-DataBase, he will need to complete all the fields table according to the following scheme.

		IDDomaine	Nom	Sigle
	+	68	Systèmes de production	SP
	+	69	Taux Virtuel de couverture des	TV
	+	70	Pression Agricole	PA
▶	+	71	Dynamiques Agricoles	DA
	+	72	Autres indicateurs socio-écon	AI
	+	73	Paramètres météorologiques	ME
	+	74	Dynamique de la vulnérabilité	DV
*		(NuméroAuto)		

Figure b5

The table is subdivided into three columns: IDDomaine, Nom, et Sigle (Figure b5).

1. ***IDDomaine :*** Contains in each row the ID of each domain of each country. To its left there is a checkbox. A cross in this box indicates that a link exists between the row of the domain table as well as one or several rows of the Theme table, which includes data relating to the layers that will be viewed**.**

2. ***Nom :*** Contains the names of each domain. In the database provided with the plugin PRVS, the following domains can be found: for each country all the listed domains are linked to different data types*.*

3. ***Systeme de production (Productive system)*** : this domain is related to the productive systems evaluated according to the presents crops. The data concerning the surface and production distribution in the units are presents too.

4. ***Taux virtuel de couverture des besoins cerealieres (Virtual ratio of cereals needs***): this domain includes for each country the themes with information about the satisfaction of food needs by the primary sector.

5. ***Pression Agricole (Agricultural Pressure)*** : The domain is linked to the data concerning the agricultural pressure within homogeneous land units and the soil agricultural potential.

6. ***Dynamiques Agricoles (Agricultural Dynamics)*** : this domain includes the themes about the agricultural dynamics based on the surfaces and yields of cereals and cash crops.

7. ***Autres indicateurs socico-economiques (Other socio-economics indicators)*** : this domain is related to the UBT ratio and to the exchange coefficient between little ruminants and cereals.

8. ***Paramètres météorologiques (Meteorological parameters)*** : This domain contains the themes concerning the elaboration of historical meteorological series as the average length of season and the average rainfall (1971-2000) obtained trough the spatialisation of rain gauge data from the whole of CILSS countries.

9. ***Dynamique de la Vulnérabilité (Vulnerability Dynamic)***: this domain is linked to the evaluation of the dynamic of vulnerability based on the pressure and on the agricultural dynamic.

- <u>Sigle </u>: each domain (in French language) is codifies by an abbreviation contained in the third column
    - ⇒ SP = Systeme production
    - ⇒ TV = Taux Virtuel
    - ⇒ PA = Pression Agricole
    - ⇒ DA = Dynamique Agricole
    - ⇒ AI = Autres indicateurs
    - ⇒ ME = Meteorologique
    - ⇒ DV = Dynamique Vulnerabilité

- **Pays**:

This table (Figure b6) contains the list of countries of which the data are included in the database. There are three columns: IDPays, Nom et Sigle.

	IDPays	Nom	Sigle
	17	Burkina Faso	bf
	18	Tchad	cd
	19	Mali	ml
	20	Mauritanie	mr
	21	Niger	ng
	22	Sénégal	sn
	23	Cap Vert	cv
	24	Gambie	gm
	25	Guinée Bissau	gb
▶	27	CILSS	cilss
*	(NuméroAuto)		

Figure b6

- <u>IDPays</u> **:** As regards each country, there is an ID allowing the viewer to recognise the files to display. This ID is necessarily present both in the Domain table and in the Theme table.
- <u> Nom </u>: Contains the name of each CILSS country.
- Sigle : Includes an abbreviation of each country.

⇒ BF = Burkina Faso
⇒ CD = Tchad
⇒ CV = Cap Vert
⇒ GB = Guinée Bissau
⇒ GM = Gambie
⇒ ML = Mali
⇒ MR = Mauritanie
⇒ NG = Niger
⇒ SN = Sénégal
⇒ CILSS = CILSS

- **Tabsystème**

This is the table of plugin system containing the database root path. This table may be modified manually using *Microsoft® Access* or via the software package using the function «*DataBase/Change data path*».

- **Thèmes**

The theme table (Figure b7) contains the data relating to the layer or map that will be displayed by the viewer. It is made up of 8 columns: IDThème, IDCarte, Couche, Description, Légende, IDPays, IDDomaine et SysDB.

IDThème	IDCarte	Couche	Description	Légende
924	443	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
925	444	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
926	445	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
927	446	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
928	447	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
929	448	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
930	449	PRESS_CLAS	Pression agricole	VUL\UTILITY\Palette\Press_ag.pal
932	451	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
933	452	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
934	453	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
935	454	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
936	455	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
937	456	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
938	451	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
939	452	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
940	453	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
941	454	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
942	455	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
943	456	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
944	457	RENT_DYN	Dynamiques c. de rente	VUL\UTILITY\Palette\Dyn_rent.pal
945	457	VIVR_DYN	Dynamiques c. vivrières	VUL\UTILITY\Palette\Dyn_vivr.pal
946	458	PA_CLASS	Potentialités agricoles	VUL\UTILITY\Palette\Pot_agri.pal
947	459	PA_CLASS	Potentialités agricoles	VUL\UTILITY\Palette\Pot_agri.pal
948	460	PA_CLASS	Potentialités agricoles	VUL\UTILITY\Palette\Pot_agri.pal
949	461	PA_CLASS	Potentialités agricoles	VUL\UTILITY\Palette\Pot_agri.pal
950	462	PA_CLASS	Potentialités agricoles	VUL\UTILITY\Palette\Pot_agri.pal

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Figure b7

As it can be noticed, this table is linked to other tables (Cartes, Domaines et Pays). Therefore, beware not to modify the values in these columns, otherwise the software package will not run.

- <u>IDThème</u> : The column contains an ID for each theme.
- IDCarte :   Includes the ID of each coverage in ArcView®.

- <u>Couche</u> :   Contains the name of the column, corresponding to the theme to be displayed, of the attribute table of ArcView® or PC-ARC/INFO© files.
- <u>Description</u> : in this column and in each row the description of themes to be displayed is supplied. The description is displayed during the chose of theme to be opened in the plugin "Theme wizard"
- <u>Légende</u> : This column is very important because it contains, for each layer, the description of the path to be followed by the software package to access the respective palette files (* .pal). Therefore in correspondence of tables files, the légende column will be empty as well as the *« Couche »* column.
- The two columns, IDPays_ and _IDDomaines are important too, because they contain for each selected theme, the respective ID of the country and the domain.
- The last column <u>SysDB</u> is utilised by the plugin in order to distinguish the analysis system in which to work: therefore the work options are the cartographic maps (VUL) and the table files (TAB).

The file **Vulnerability2.mdb** (Figure b3) contains the information useful for the plugin PRVS in order to generate the elaborations. It is constituted by 13 tables: 11 contain data for the elaboration processing and 2 are utilised for the display of obtained results.

- **Adm_limit**

This table (Figure b8) contains all the information concerning the administrative units for the different CILSS countries involved in the vulnerability analysis : population and agricultural data can be consulted too. Besides supplying statistic data, the table is utilised for the elaborations of new themes.

Figure b8

- <u>ID_GIS</u> : it contains an ID for each administrative unit of each country ; the ID is the same utilised in the database TDBase.
- <u>ID_PAYS</u> : it contains the ID of each country as reported in the table *"Pays"* of Vulnerability.mdb.

- <u>NOM</u> : Contains the name of each administrative unit
- <u>Sup_Agr_Med</u> : The field contains the data about the average surface cropped for each administartive unit. The average has been computed for the period 1971-2000.
- <u>Pop_Cens</u> : It contains the data about the population according to the last census in each country.
- <u>Ann_Cens</u> : It reports the year in which the last census has been taken.

- **Agr**

This table is accessory and it can be utilised in case of registration of new data about agricultural statistics.

- **Elevage**

The table (figure b9) contains the information concerning the livestock that are utilised as data entry for the scenarios making and for the sensitivity analysis. The data are registered for each administrative unit.

ID_GIS	ID_PAYS	ID_TYPEELEV	N_Tete	Taux	Prix	Coef_Cost
1320100	23	1	244	0.3	-999	0
1320100	23	2	10924	0.3	-999	0
1320200	23	1	123	0.3	-999	0
1320200	23	2	5647	0.3	-999	0
1320300	23	1	493	0.3	-999	0
1320300	23	2	6473	0.3	-999	0
1320400	23	1	24	0.3	-999	0
1320400	23	2	686	0.3	-999	0
1320500	23	1	110	0.3	-999	0
1320500	23	2	4138	0.3	-999	0
1320600	23	1	8030	0.3	-999	0
1320600	23	2	56755	0.3	-999	0
1320700	23	1	148	0.3	-999	0
1320700	23	2	21461	0.3	-999	0
1320800	23	1	26	0.3	-999	0
1320800	23	2	4239	0.3	-999	0
1320800	23	1	18	0.3	-999	0
1320900	23	2	4008	0.3	-999	0
1480100	18	1	409500	0.3	6185	0
1480100	18	2	813000	0.3	6185	0
1480200	18	1	300	0.3	6055	0
1480200	18	2	400	0.3	6055	0
1480300	18	1	17900	0.3	6188	0
1480300	18	2	35500	0.3	6188	0
1480400	18	1	411900	0.3	7381	0
1480400	18	2	817200	0.3	7381	0
1480500	18	1	76900	0.3	5217	0
1480500	18	2	152400	0.3	5217	0
1480600	18	1	127900	0.3	6358	0

Figure b9

- <u>ID_GIS</u> : it contains an ID for each administrative unit of each country ; the ID is the same utilised in the database TDBase.
- <u>ID_PAYS</u> : it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.
- <u>ID_TYPEELEV</u> : It contains the code identifying the type of breeding as reported in the table « TYPEELEV » of **Vulnerability2.mdb**.
- <u>N_Tete</u> : The field contains the data concerning the head of cattle by the census for each administrative unit.
- <u>Taux</u> : It contains the data about the exploitation livestock rate. For the current analysis the rate of yearly growing applied for the goats and sheep is 30%.
- <u>Prix</u> : It contains the data about the exchangeable values for livestock expressed in the current money for each country (generally FCFA). Many of this data type are missed.

-       <u>Coef_Costi</u> : It contains the potential coefficient representing the production cost expressed as a percentage of the product's value.

• **Pays**

The table of the country (Figure b10) includes the ID codes utilised in the database. It is constituted by seven columns as follows.

Figure b10

-       <u>IDPays</u> : For each country an ID allows the plugin to recognise it. This ID is must to be present in the table Themes.
-       <u>Nom</u> : Contains the name of each CILSS country.
-       <u>Sigle</u> : It contains for each country the country acronym.
-       <u>NOC</u> : It represent the official per capita consumption of each country according to the national statistics.
-       <u>ID_TYPECOLT</u> : each crop type is identify by a code collected the table *"TYPECOLT"*.
-       <u>CHAMP</u> : It contains the field name of the corresponding shapefile (column « Shp ») which contains the ID of the administrative units of all CILLS countries.
-       *Shp* : It contains the name of the file containing the administrative boundaries.

• **Produz**

Figure b11

- ID_GIS : it contains an ID for each administrative unit of each country ; the ID is the same utilised in the database TDBase.
- ID_PAYS : it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.
- ID_TYPEREND : it describes the code utilised for the identification of production type for cereals and cash crops. The different ID are listed in the table « TYPEREND ».
- ID_TYPECOLT : for each crop the ID is listed according to the table « TYPECOLT »
- 25% : it represents the values of crop production according to the « ID_TYPEREND », in case of production lower than the average level.
- Moyenne : it represents the values of crop production according to the « ID_TYPEREND », in case of average production.
- 75% : It represent the values of crop production according to the « ID_TYPEREND », in case of production higher than the average level.
- Coef_Ridux : It contains the value to apply to the gross productions in order to obtain the net productions which exclude the possible losses due for example to the parasite attacks or to the harvesting.
- Prix : It contains the crops prices allowing the conversion of productions into the equal cereals value.
- Coef_Cost : It contains the potential variation coefficient taking in consideration the production costs expressed as the percentage of product value loss for the crop replanting.

- **Results**

This table (Figure b12) is utilised by the plugin PRVS in case the user saves the scenarios making results in Dbase format.
The table looks completely empty if any elaboration has not been started; the presence of values reveals that at least one elaboration occurred.
The displayed values correspond to the results obtained with the last elaboration and they represent only the results for the current analysis.

ID_GIS	ID_PAYS	Taux_Calc	Taux_ce	Taux_ren	Taux_nie	Taux_ac	Taux_ele
	0	0	0	0	0	0	0

Figura b12

- ID_GIS : it contains an ID for each administartive unit of each country ; the ID is the same utilised in the database TDBase.
- ID_PAYS : it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.
- Taux_Calc : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount of needs sustained by all the primary activities.
- Taux_ce : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount of needs sustained by all the rainfed cereal's production.
- Taux_ren : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount n sustained by the cash crop's production.
- Taux_nie : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount of needs sustained by the southern pea's production.
- Taux_ac : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount of needs sustained by other crop's production.
- Taux_ele : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last scenarios making elaboration. The value represents the amount of needs sustained by the livestock system.

- <u>Taux_agr :</u> This field will be utilised in case the table *"Agr"* will be filled: in this plugin's version it cannot be managed.

- **ResultsSens**

This table (Figure b13) is utilised by the plugin PRVS in case the user saves the sensitivity analysis results in Dbase format.
The table looks completely empty if any elaboration has not been started; the presence of values reveals that at least one elaboration occurred.
The displayed values correspond to the results obtained with the last elaboration and they represent only the results for the current analysis.

ID_GIS	ID_PAYS	Taux_Calc	Taux_ce	Taux_ren	Taux_nie	Taux_ac	Taux_ele
8540100	17	1.47	0.63	0.06	0	0.27	0.51
8540200	17	1.36	0.74	0.06	0	0.26	0.3
8540300	17	1.84	1.02	0.29	0	0.3	0.23
8540400	17	1.54	0.79	0.19	0	0.3	0.26
8540500	17	1.72	0.68	0.05	0	0.62	0.37
8540600	17	1.8	1.13	0.4	0	0.12	0.15
8540700	17	2.1	0.87	0.06	0	0.5	0.67
8540800	17	2.08	0.87	0.21	0	0.38	0.62
8540900	17	1.75	0.9	0.1	0	0.33	0.42
8541000	17	1.96	1.21	0.48	0	0.13	0.14
8541100	17	2.32	0.73	0.06	0	0.52	1.01
8541200	17	2.6	1.41	0.82	0	0.21	0.16
8541300	17	2.52	1.48	0.39	0	0.34	0.31
8541400	17	1.54	0.58	0.07	0	0.53	0.36
8541500	17	2.33	1.26	0.52	0	0.33	0.22
8541600	17	1.16	0.62	0.25	0	0.08	0.21
8541700	17	1.34	0.59	0.06	0	0.16	0.53
8541800	17	1.61	0.76	0.04	0	0.52	0.29
8541900	17	1.28	0.57	0	0	0.08	0.63
8542000	17	1.62	0.81	0.02	0	0.47	0.32
8542100	17	1.58	1.1	0.04	0	0.28	0.16
8542200	17	1.33	0.81	0.03	0	0.08	0.41
8542300	17	1.47	0.71	0.06	0	0.23	0.47
8542400	17	1.64	0.72	0.01	0	0.05	0.86

Figure b13

- <u>ID_GIS</u> : it contains an ID for each administrative unit of each country ; the ID is the same utilised in the database TDBase.
- <u>ID_PAYS</u> : it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.
- <u>Taux_Calc</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of Needs sustained by all the primary activities.
- <u>Taux_ce</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of needs sustained by the rainfed cereal's production.
- <u>Taux_ren</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of needs sustained by the cash crop's production.
- <u>Taux_nie</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of needs sustained by the southern pea's production.

- <u>Taux_ac</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of needs sustained by other crop's production.
- <u>Taux_ele</u> : It describes the Virtual Ratio of Cereals Needs (TVCBC) obtained with the last sensitivity analysis elaboration. The value represents the amount of needs sustained by the livestock system.
- <u>Taux_agr</u> : This field will be utilised in case the table *"Agr"* will be filled: in this plugin's version it cannot be managed.
- <u>VarPerc_ce</u> : It contains the percentage difference between the current Virtual Ratio of Cereal Needs and the structural one referred to the rainfed cereals.
- <u>VarPerc_re</u> : It contains the percentage difference between the current Virtual Ratio of Cereal Needs and the structural one referred to the cash crops.
- <u>VarPerc_ac</u> : It contains the percentage difference between the current Virtual Ratio of Cereal Needs and the structural one referred to other crop's types.
- <u>VarPerc_ele</u> : It contains the percentage difference between the current Virtual Ratio of Cereal Needs and the structural one referred to the livestock system.

- **Tasso_Pop**

This table (Figure b14) is utilised by the plugin PRVS for the update of population value in the elaborations which require the data..
For the computation of the number of inhabitants in a certain year, the population's growing rate is applied to the value recorded at the census year. Therefore the table is constituted by the following columns.

ID_Tasso	ID_GIS	ID_PAYS	Ann_Ini	Ann_Fin	Tasso
631	5620101	21	1977	1989	0.0484682621
632	5620101	21	1989	1990	0.0387509184
633	5620101	21	1990	1994	0.0388061229
634	5620101	21	1994	1995	0.0370320684
635	5620101	21	1995	1996	0.0376809746
636	5620101	21	1996	1997	0.0374612774
637	5620101	21	1997	1998	0.0373903207
638	5620101	21	1998	1999	0.0373288544
639	5620101	21	1999	2021	0.0373017583
640	5620102	21	1977	1989	0.0484682621
641	5620102	21	1989	1990	0.0387509184
642	5620102	21	1990	1994	0.0388061229
643	5620102	21	1994	1995	0.0370320684
644	5620102	21	1995	1996	0.0376809746
645	5620102	21	1996	1997	0.0374612774
646	5620102	21	1997	1998	0.0373903207
647	5620102	21	1998	1999	0.0373288544
648	5620102	21	1999	2021	0.0373017583
649	5620103	21	1977	1989	0.0484682621
650	5620103	21	1989	1990	0.0387509184
651	5620103	21	1990	1994	0.0388061229
652	5620103	21	1994	1995	0.0370320684
653	5620103	21	1995	1996	0.0376809746

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Figure b14

- <u>ID_Tasso</u> : It defines the ID number of each record : for each administrative unit the growing rate related to the reference period is listed.
- <u>ID_GIS</u> : it contains an ID for each administrative unit of each country; the ID is the same utilised in the database TDBase.
- <u>ID_PAYS:</u> it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.

- Ann_Ini : This field represents the beginning year of the period at which the growing rate must be applied.
- Ann_fin : This field represents the ending year of the period at which the growing rate must be applied. (For instance for the unit with the ID_GIS 5620101 the growing rate 0,04846 must be applied from 1977 until 1989 and 0,03875 until 1990).
- Tasso : It is constituted by the population's growing rate.

- **Taux_Str**

The table Figure b15 lists the Virtual Ratio of Cereals Needs (TVCBC) computed for the reference period 1986-2002.
The Virtual Ratio values are reported for each primary production's type within the CILSS countries, as well as for the whole primary sector.

	ID_GIS	ID_PAYS	Moyen	cereal	rente	a_colt	elevage	
+	1320100	23	0.07	0.07	-999	-999	-999	
+	1320200	23	-999	-999	-999	-999	-999	
+	1320300	23	0.12	0.12	-999	-999	-999	
+	1320400	23	-999	-999	-999	-999	-999	
+	1320500	23	0.23	0.23	-999	-999	-999	
+	1320600	23	0.17	0.17	-999	-999	-999	
+	1320700	23	0.22	0.22	-999	-999	-999	
+	1320800	23	0.12	0.12	-999	-999	-999	
+	1320900	23	0.26	0.26	-999	-999	-999	
+	1480100	18	1.32	0.5	0.04	0.04	0.74	
+	1480200	18	-999	-999	-999	-999	-999	
+	1480300	18	0.51	0.38	0.02	0.04	0.07	
+	1480400	18	1.32	0.7	0.05	0.3	0.27	
+	1480500	18	1.27	0.82	0.19	0.13	0.13	
+	1480600	18	0.28	0.14	0	0	0.14	
+	1480700	18	0.43	0.24	0	0.02	0.17	
+	1480800	18	1.03	0.62	0.26	0.08	0.07	
▶ +	1480900	18	1.49	1.05	0.26	0.06	0.12	
+	1481000	18	1.05	0.78	0.1	0.06	0.11	
+	1481100	18	1.26	0.84	0.17	0.2	0.05	
+	1481200	18	1.12	0.52	0.12	0.36	0.12	
+	1481300	18	1.16	0.24	0.12	0.01	0.78	

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Figure b15

- ID_GIS : it contains an ID for each administartive unit of each country ; the ID is the same utilised in the database TDBase.
- ID_PAYS : it contains an ID for each country ; the ID is the same utilised in the table « Pays» of Vulnerability.mdb.
- Moyen : It describes the TVCBC of the primary sector.
- Cereal : It describes the TVCBC for rainfed cereals.
- Rente : It describes the TVCBC for cash crops.
- A_colt : It describes the TVCBC referred to other crop's types.
- Elevage : It describes the TVCBC of the livestock system.
- Agr : Even if this column is present, it is not available for this version, but it can be utilised for further data in next version.

- **TYPEAGR**

This table is available for further data types in next version. It cannot be managed.
-     ID_TYPEAGR : empty

- <u>Nom</u> : empty

- **TYPECOLT**

This table allows to identify all the crop's types involved in the elaborations and displayed in the other tables.

	ID_TYPECOLT	ID_TYPEREND	Nom
	1	1	Mil
	2	1	Sorgho
	3	1	Mais
	4	1	Riz
	5	1	Ble
	6	2	Coton
	7	2	Arachide
	8	3	Niebe
	9	1	Fonio
	10	2	Autre 1
	11	2	Autre 2
	12	3	Autre 1
▶	13	3	Autre 2
✳	(NuméroAuto)	0	

Figure b16

- <u>ID_TYPECOLT</u> : It contains the ID number of each crop.
- <u>ID_TYPEREND</u> : It contains the Id number of the yield's type corresponding to the crop.
- <u>Nom</u> : It contains the name of the crop.

- **TYPELEV**

The table contains the code corresponding to the breeding type foreseen for the sensitivity analysis and for the scenarios making.
The version 1.0 of PRVS computed the Virtual Ratio of Cereal Needs sustained by the livestock system only considering the pastoral sector: therefore only sheep (Ovins) and goats (Caprins) are codified in the tables.

		ID_TYPEELEV	Nom
	+	1	Ovins
▶	+	2	Caprins
✳		(NuméroAuto)	

Figure b17

- ID_TYPEELE : It contains the ID number defining the livestock type.
- Nom : It describes the type of livestock

- **TYPEREND**

The table contains the ID number corresponding to the classifications of crops according to the yield's type they are able to generate. Therefore the different crop's types contained in the table *« Typecolt »* have been subdivided in three classes: cereals, cash crops and other crop's types.

Figure b18

- <u>ID_TYPEREND</u> : It contains the code corresponding to the crops classified according to the yield's type..
- <u>Nom</u> : It defines the yield's type.

Warning

As it has been explained at the beginning of this Annex, the PRVS Meta-Database has been structured with Microsoft® Access 2000, and for this reason the update, modification or customisation of this Meta-Database should be done knowing the main functions of the Microsoft® Access 2000 software. This annex has been written as support to understanding the PRVS Meta-Database structure.

However it must be highlight that the plugin PRVS 1.0 was not designed to allow user's updates. Main PRVS aim is to ensure the access to vulnerability indicators and to give the possibility to assess analyses about the current context. In fact user-friendly interface developed for VisualCarte 1.0. is not available for the PRVS plugin. Therefore the management of PRVS Meta-Database files is not supported. For this reason its modification should be avoided in order to ensure the correct running of PRVS.