

Chapter 4 Development of a prototype web site for making yoghurt

4.1 Introduction

The previous chapter was based on a detailed literature review of all aspects playing a role in the development of a web site. For the development of this particular web site, a selection was made from the available literature. Developing a web site is a time-consuming effort. Due to a number of limitations, imposed by available time and technology, the ideal web site, as described in the literature, could not be developed. It was decided to develop a prototype web site, which can be adapted and changed during the development process. When developing future web sites, aspects needing improvement could be included.

To achieve this aim, aspect such as the best possible of way of transferring information, suitable contents, text design, screen design and navigation have to be adapted form available information, for application in a web site.

4.2 Phases in the development of the prototype web site

Based on the literature review in the previous chapter, initial decisions were made for implementation in the development. Decisions on text design, screen design and navigation were made. The following important information was gathered which forms the framework for decisions taken:

Table 4.1 Content considerations for the web site

The target audience was identified

Dairy farmers in South Africa

The purpose of this web site was defined

The supply of information on the manufacture of yoghurt to small and medium scale farmers on the farm.

A concise outline of information to be included was given (details on CD-ROM)

Yoghurt types to be covered were selected: set yoghurt – low fat, fat free, high and full fat, stirred yoghurt – low fat, fat free, high and full fat, long life yoghurt dessert – set and stirred, drinking yoghurt and frozen yoghurt.

General headings of information were chosen: product description, legal requirements, processes, energy requirements and suppliers.

Specific aspects of yoghurt processing covered by the web site were identified: clarification, separation, standardization, fortification, homogenization, pasteurization, cooling, inoculation, flavour addition and fermentation.

- ***Decisions on text design***
 - Brief paragraphs should be used.
 - One idea per paragraph should be given.
 - Text lines should be not more than 40-60 characters where possible.
 - Left justification should be used.
 - Bold should be used for emphasis.
 - Microorganism names should be indicated by using italics.
 - Underlining should show identification of links.
 - Bulleted lists should be used.
 - Black typeface letters should be used.
 - Links should include the word click here to accommodate novice users.
 - Sans serif Arial font should be used.
 - Different letter sizes should indicate hierarchy.
 - Language used should be familiar to the user.
 - Some scrolling for screens with much information should be used.

- ***Screen***
 - Different colours should be used to indicate different aspects (title and menus).
 - Some “fun” graphics should be included to maintain the interest of the user.
 - A clear and simple interface should be selected.
 - White space should be used (the 25-40% of screen not devoted to text or graphics).
 - Title of the screen should appear in the top centre.
 - Display should be regular and consistent.
 - Title of the screen should be given on each screen.

- An overview of important information (definitions) should be supplied in the top 10 cm of screen.
 - Menus should appear on the edge on the lefthand side of the screen.
 - The colour of the menu should contrast with other colours used.
 - Menus with a vertical layout should be used.
 - Colour should be used to emphasize certain information.
 - Icons should represent a single concept (e-mail and home).
 - Icons should be used consistently throughout site.
 - Graphics with ALT tags with minimum size should be used to reduce downloading time.
 - Hotspots should appear on graphics as links to information.
 - Both GIF and JPEG images should be used.
 - Screen size should be chosen to ensure the printability of text (650 x 420 pixels).
- ***Navigation***
 - Consistent design should be used throughout site.
 - The home page should provide the entry point to site.
 - Labels of links should be unambiguous.
 - Links should be in a contrasting colour.
 - Links should change colour visibly when visited.
 - Link to the home page should appear on every screen.

4.3 First phase in the development of the prototype web site

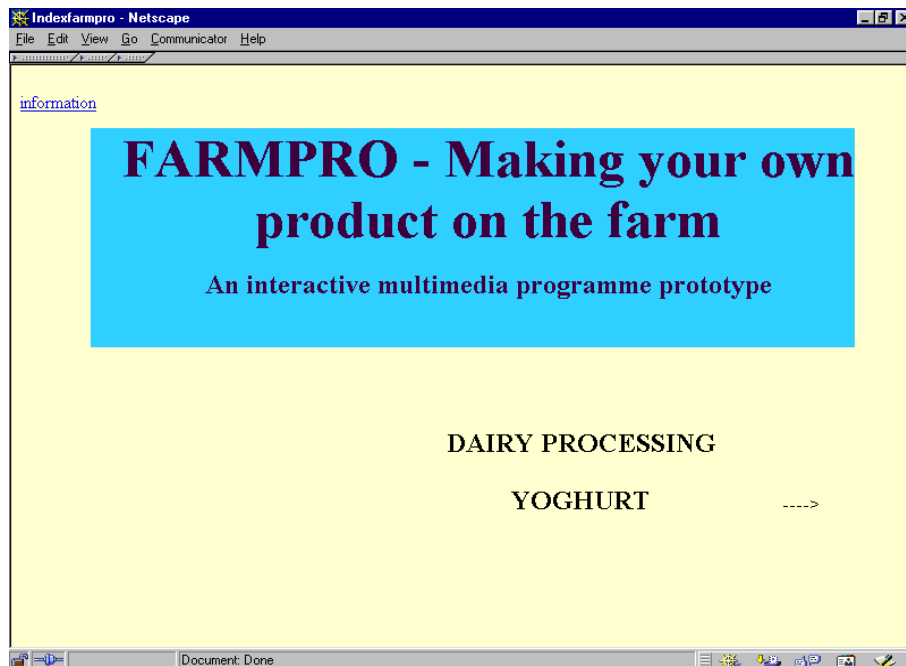
The first phase in the development of the web site was mainly experimental. Colours and graphics selected to create the “look and feel” were also experimental. It was

accepted that it would probably be changed after evaluation. Limited information on yoghurt making was also included, with the intention of expanding this later.

4.3.1 Design of the home page

The home page contained only the title and a brief description of the web site (figure 4.1). The background colour selected was yellow, which was a web safe colour. Almost no icons were used.

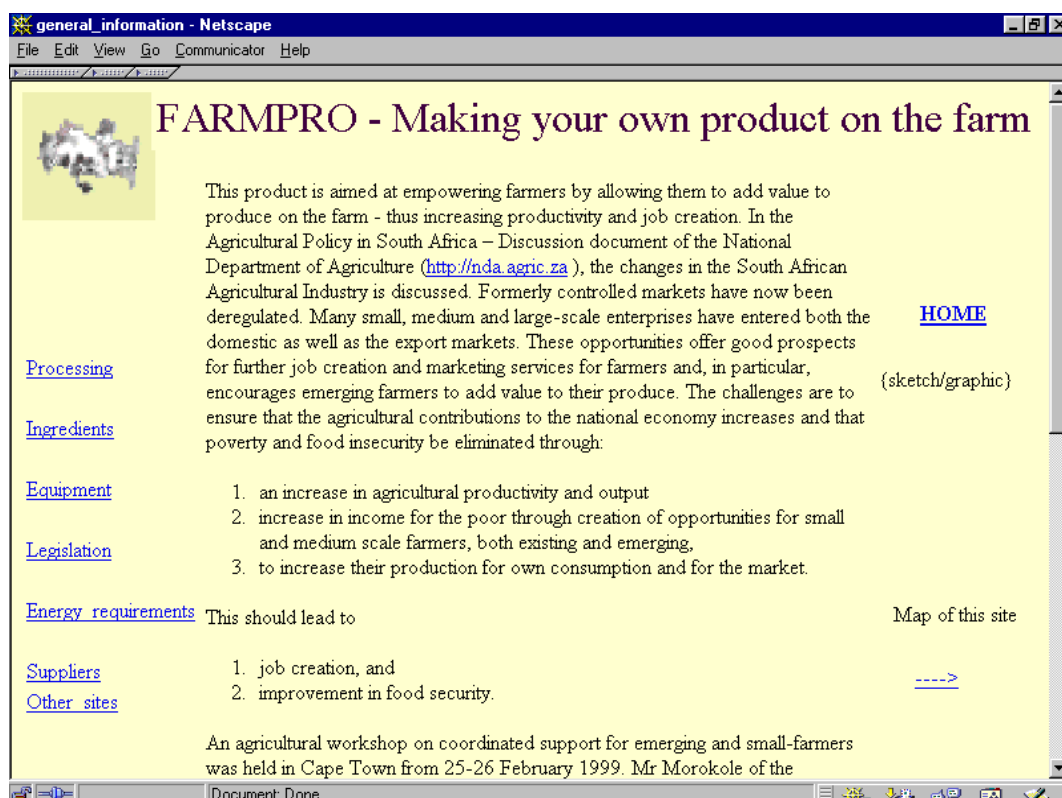
Figure 4.1 Home page of first phase design



4.3.2 Introductory screen of the first phase design

Small animations were included in the top left hand corner (figure 4.4). The menus consisted of active links which gave access to other screens with detailed information (types of yoghurt, processing methods, etcetera) (figure 4.4). Too much information was given on one screen, which necessitated scrolling. The processing graphics were full screen versions which took a long time to download.

Figure 4.2 Introduction screen of first phase design



4.3.3 Evaluation of the first phase

The first phase was not formally evaluated. Comments from classmates and someone from Agrelek were general in nature. The following comments were received:

- Too much information was given on some screens (fig 4.2).
- Animations took too long to download.
- Animations were distracting and did not work on all browsers.
- Use of menus was time consuming, because users first had to open a new screen to get access to information.
- Processing graphics took too long to download.

At this stage, the web site was still in a very rudimentary form and much still had to be done.

4.4 Second phase of the development of the prototype web site

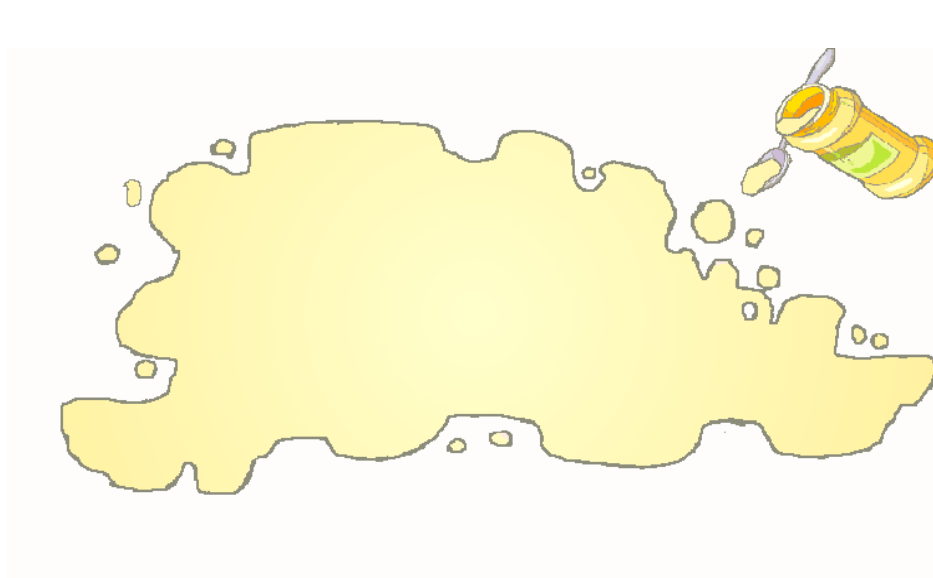
The design and evaluation of the first phase were used as a basis for the second phase. The author of the web site also gradually became more proficient, and improvements and changes were made continuously during the further development. The second phase changes included the following:

4.4.1 Changes to the home page

- A more user friendly look and feel was introduced (figure 4.3).
- The home page was changed to contain more information about:
 - at whom the web site was aimed;
 - how to use the web site; and
 - listing the benefits of using this web site.

- The home page was changed to lead users to other screens.
- the home page was changed (fig 4.3) to a blue background with the WHO, WHY, WHAT questions imposed on the graphic which represented a puddle of milk or yoghurt.
- Active links were introduced with a brief description at the bottom of the screen, leading to other screens.

Figure 4.3 Graphic used as background for the second phase home page

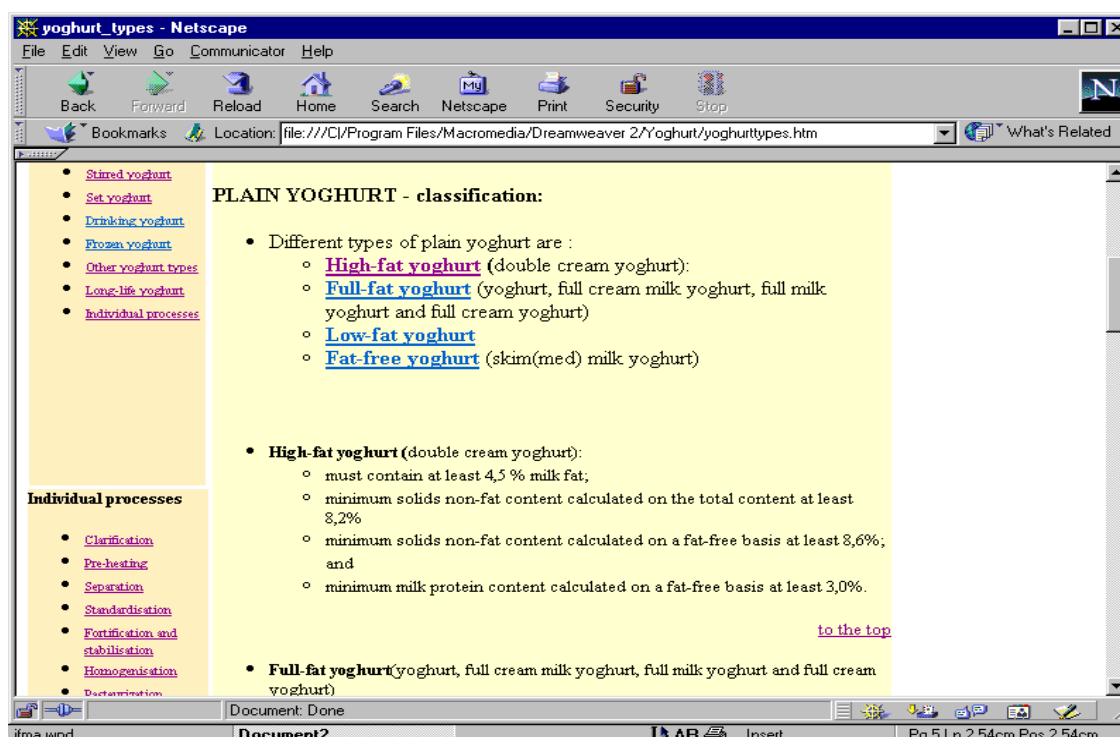


4.4.2 Screen design in the second phase

The menus were changed to include general headings, such as various types of yoghurt and individual processes (figure 4.4). The menus contained a detailed list of the contents (figure 4.4). Menus were highlighted by the use of a darker yellow background (figure 4.4). The text and title appeared in a column with a light yellow background.

A clear distinction was made between different components of the screen: text, menu and titles. Screens were adapted where possible to contain information which could fit on one screen, by using bulleted lists. Other sites of interest to dairy farmers, such as information about banks and weather reports were included. A more user friendly look and feel was introduced.

Figure 4.4 Second phase screen design with separate menus



4.4.3 The use of icons

The right-hand part of screen had a white background on which the following icons appeared:



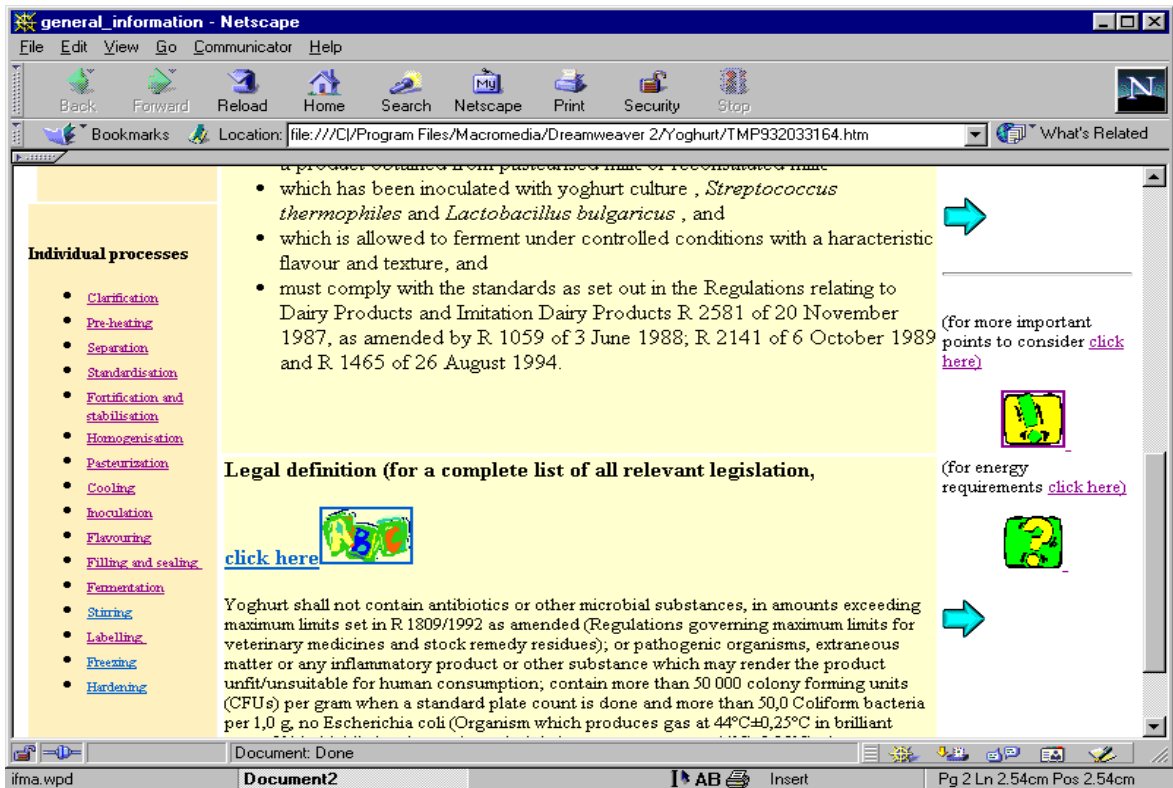
- home  ;
- e-mail  ; and
- arrows and other icons were introduced as required (figure 4.5).

Figure 4.5 Second phase screen with an indication of arrows and graphics used



4.4.4 Evaluation of the second phase

The second phase was again evaluated by classmates and someone from Agrelek. Comments were still very general in nature and the content itself was not evaluated. Comments concentrated mainly on “look and feel” and navigation problems. The following comments were made:

- The home page and some of the other screens contained too much information.
- The three menus present on each screen sometimes extended beyond one screen.

- Problems were experienced when the screens were printed. The yellow background of the text came out as dots on the printed version, reducing legibility.
- The text still contained too many links.
- The screen size was perceived as a problem, because some screens of 840x600 only contained 2-3 lines of text.
- The titles on the screens were too general and not indicative of the content.

4.5 Third phase of the development of the prototype web site

After consideration of the abovementioned comments the following adaptations and changes were made:

4.5.1 Changes to the home page of the third phase

The home page was simplified (figure 4.6) with a new graphic and colour.

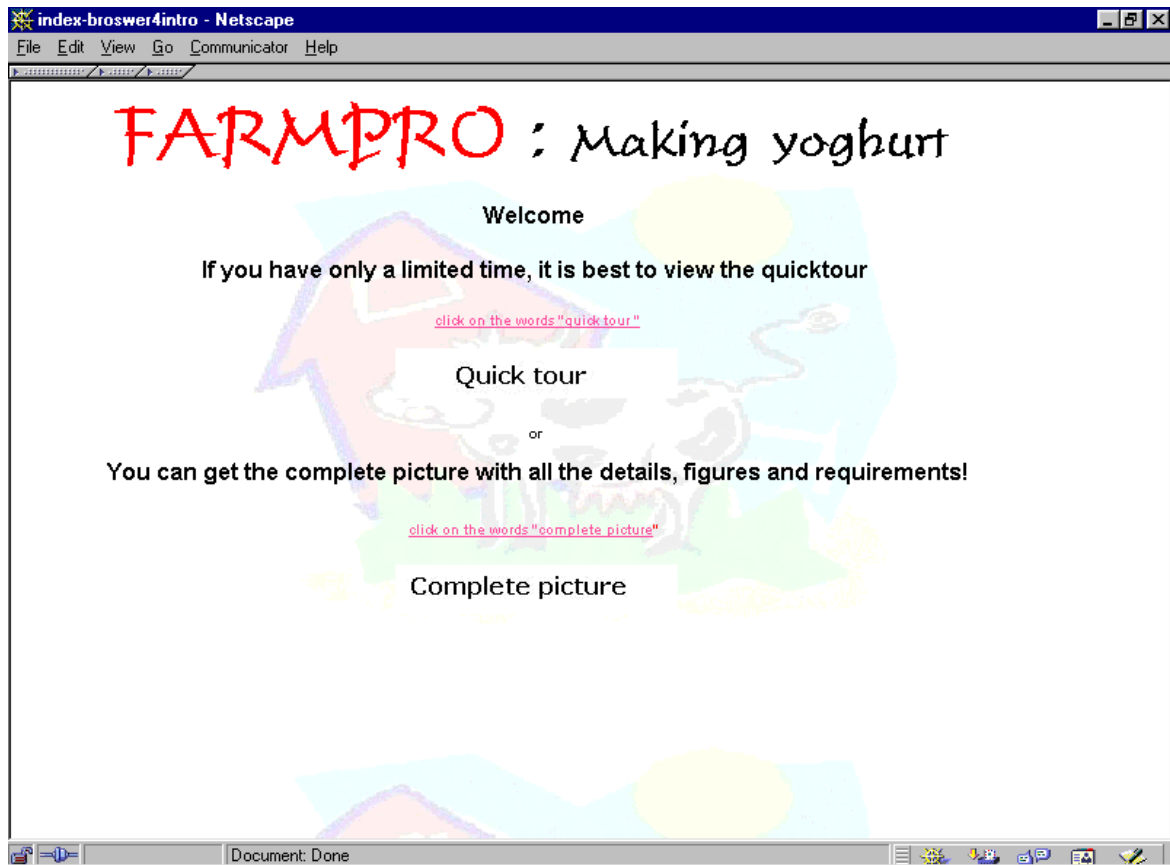
Figure 4.6 Home page of third phase design



4.5.2 Changes to the introductory screens of the third phase design

Different introductory screens were prepared for different browsers (browsers 3 and lower, and browsers 4 and higher). After the initial screen, the web site selected the browser and opened the particular screen. Users could then select from the alternatives for Quick tour or Complete picture (figure 4.7).

Figure 4.7 Introductory screen of the third phase design



4.5.3 Screen design of the third phase

More detailed information was included in the titles appearing on screens (figure 4.8). Menus were combined and the background colour of the text was changed to white (figure 4.8).

Figure 4.8 First screen of Complete picture of the third phase design

yoghurt_problems - Netscape

File Edit View Go Communicator Help

MILK & YOGHURT - Points to consider!!

Yoghurt types

- [Stirred yoghurt](#)
- [Set yoghurt](#)
- [Drinking yoghurt](#)
- [Frozen yoghurt](#)
- [Long life yoghurt](#)
- [Individual processes](#)

Individual processes

- [Clarification](#)
- [Pre-heating](#)
- [Separation](#)
- [Standardisation](#)
- [Fortification and stabilisation](#)
- [Homogenisation](#)
- [Pasteurization](#)
- [Cooling](#)
- [Inoculation](#)
- [Flavouring](#)
- [Filling and sealing](#)
- [Fermentation](#)
- [Stirring](#)
- [Labelling](#)
- [Freezing](#)
- [Hardening](#)

Legislation

Energy requirements

Suppliers

Other sites

Milk:

- leaves the cow at 37°C
- must be cooled as soon as possible after milking to 4°C
- must be gently/smoothly be agitated (stirred) to prevent a cream layer from forming on top

Yoghurt:

- is a highly perishable product
- which turn sour if left at room temperature
- it must be heated/cooled to improve:
 - quality,
 - keeping quality, and
 - destroy micro-organisms.
- yoghurt must be stored at temperatures between 4-5°C
- fresh product has a shelf-life of 2-5 days
- long life yoghurt has a shelf-life of several months
- all yoghurt manufactured must comply with all the legislative requirements of the relevant regulations

for a list of all the legislation [here or click](#)

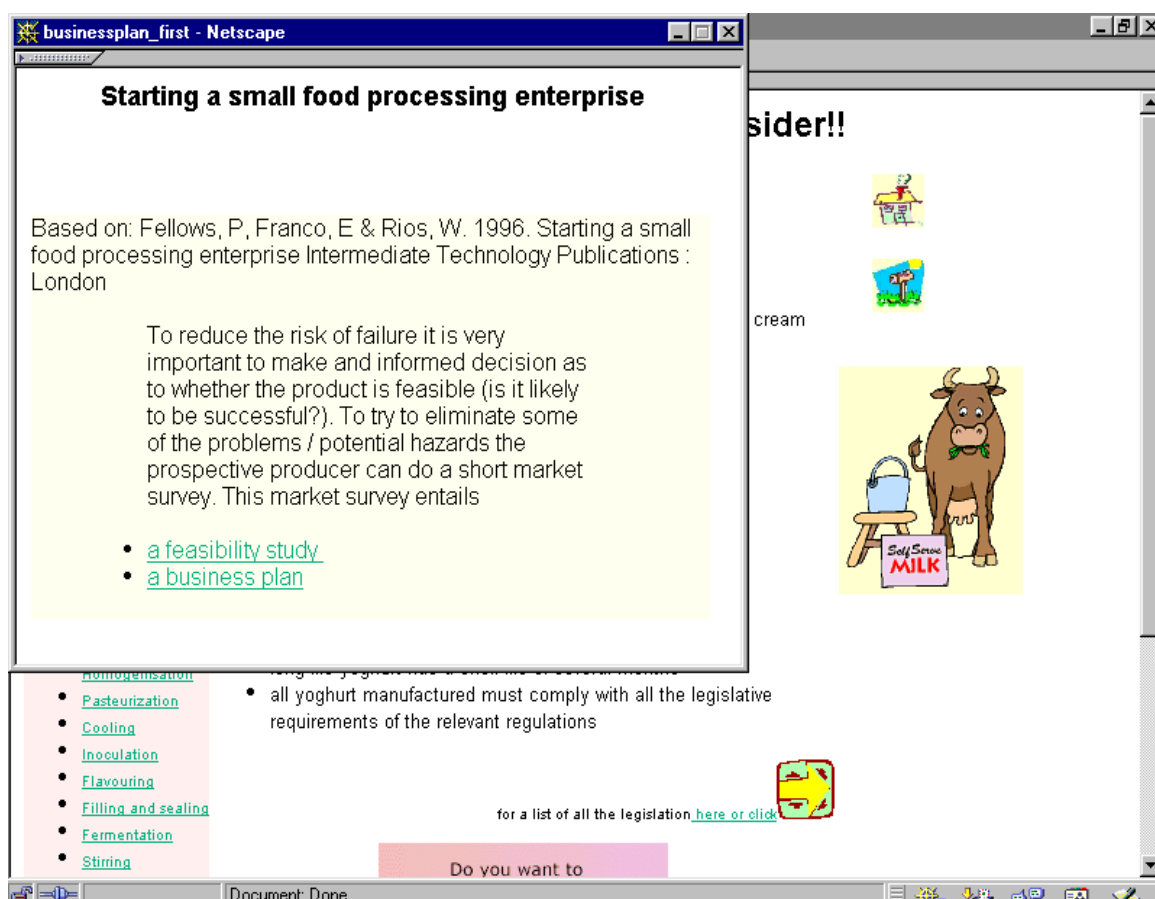
Do you want to know more about the different yoghurt types? [click here](#)

Would you like to know more about starting a small food processing enterprise?

4.5.4 Business plan

A button at the bottom of the first screen (figure 4.8) gave access to guidelines for compiling a business plan (figure 4.9). The business plan opened in a small screen overlaid on the current screen (figure 4.9).

Figure 4.9 Business plan screen overlaid on the introductory screen of the third phase design



4.5.5 Different yoghurt types

A button “Do you want to know more about the different yoghurt types?” appears on the first screen (figure 4.8). It gave access to a screen with the two main types of yoghurt (figure 4.10). The selection of either of the two types of yoghurt (plain yoghurt or yoghurt with additions) ,opened a window with a further division into the more specific types of yoghurt (figure 4.11). A button at the bottom of the screen gave access to the determination of the size of the operation (small, medium or large) (figure 4.10).

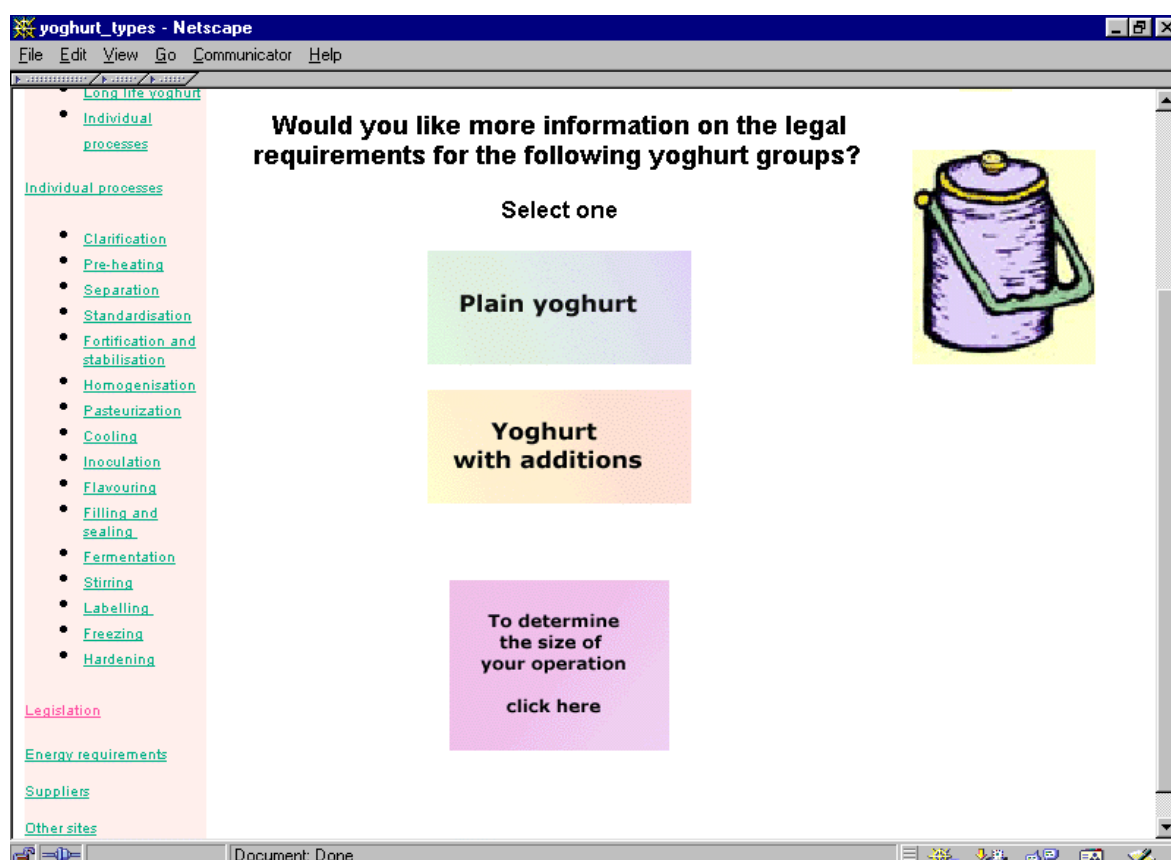


Figure 4.10 Two main types of yoghurt screen of the third phase

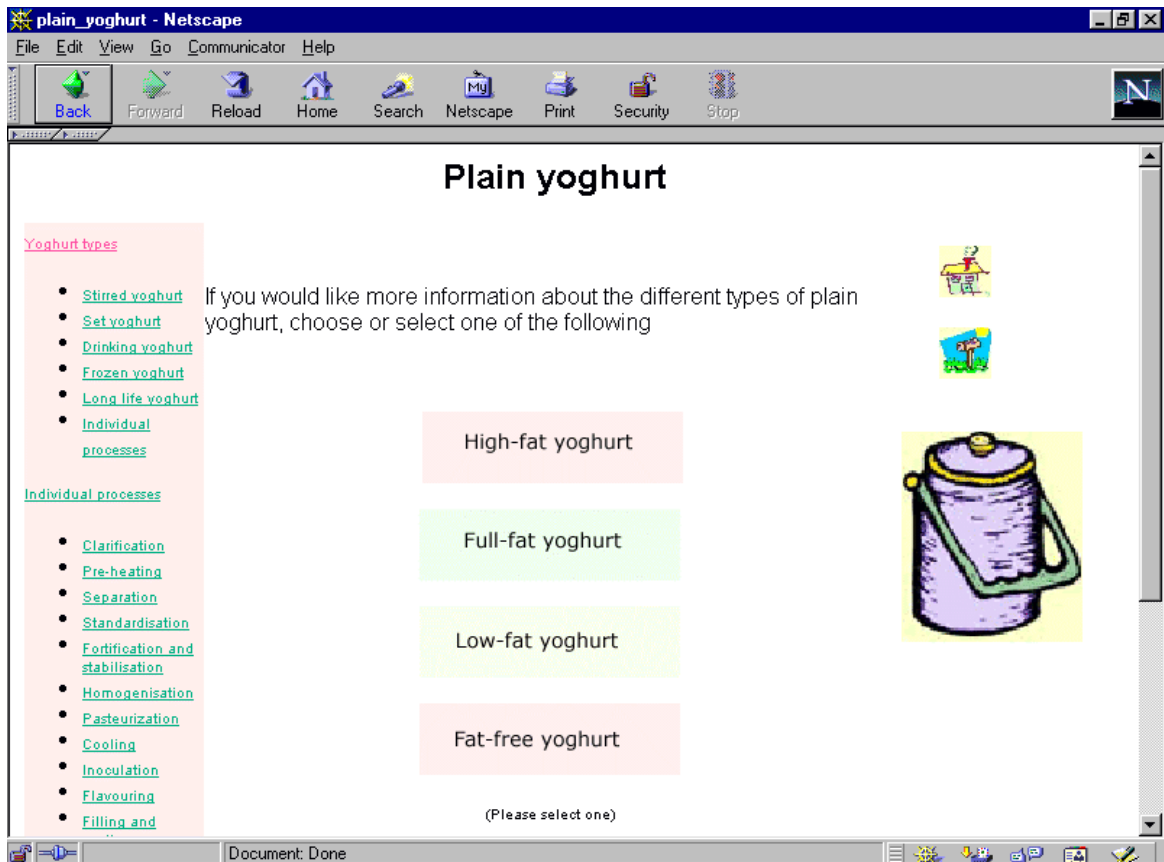
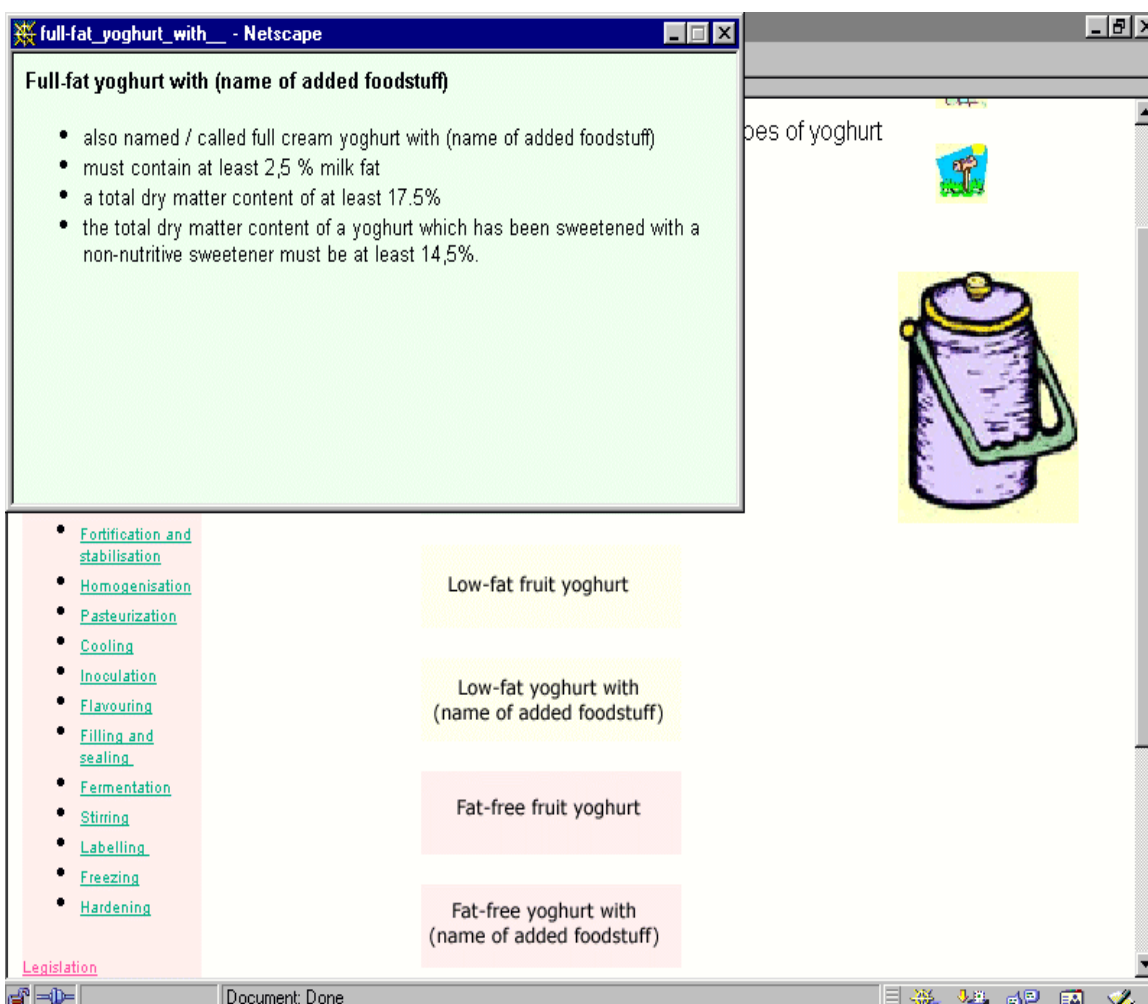


Figure 4.11 Example of plain yoghurt screen of the third phase

4.5.6 Example of specific yoghurt types

The listed specific types of yoghurt were active links. When selected it opened the legal definition of the selected type of yoghurt in a small screen overlaid on the current screen (figure 4.12).

Figure 4.12 Definition of selected yoghurt overlaid on types of yoghurt screen



4.5.7 Different scale of processing

Small, medium and large scale processing was included. The user made a choice of processing capacity, which lead either to a small, medium or large scale processing screen (figure 4.13).

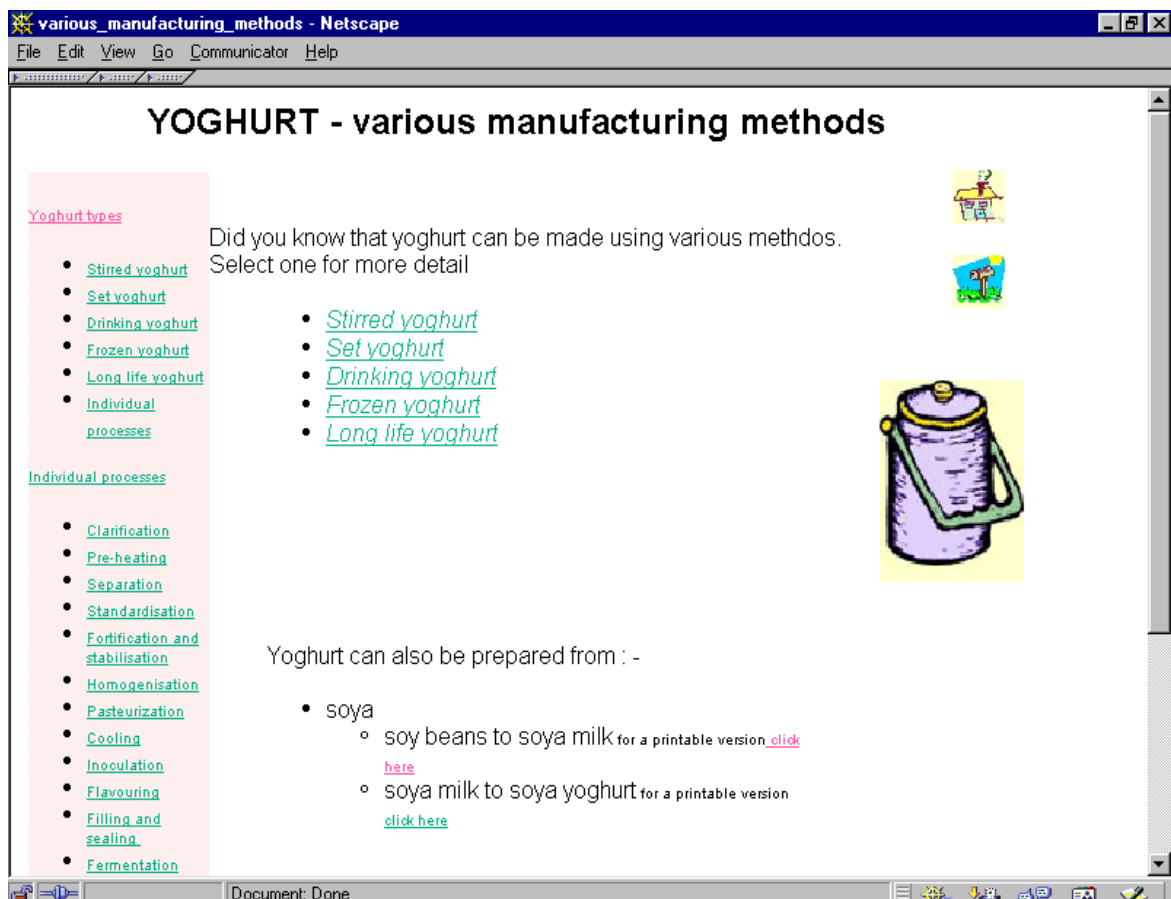
Figure 4.13 Medium scale processing screen of third phase



4.5.8 Various manufacturing methods

The previous screen gave the user access to the various manufacturing methods (figure 4.14). Detailed printable versions of complete manufacturing process were also included (figure 4.14).

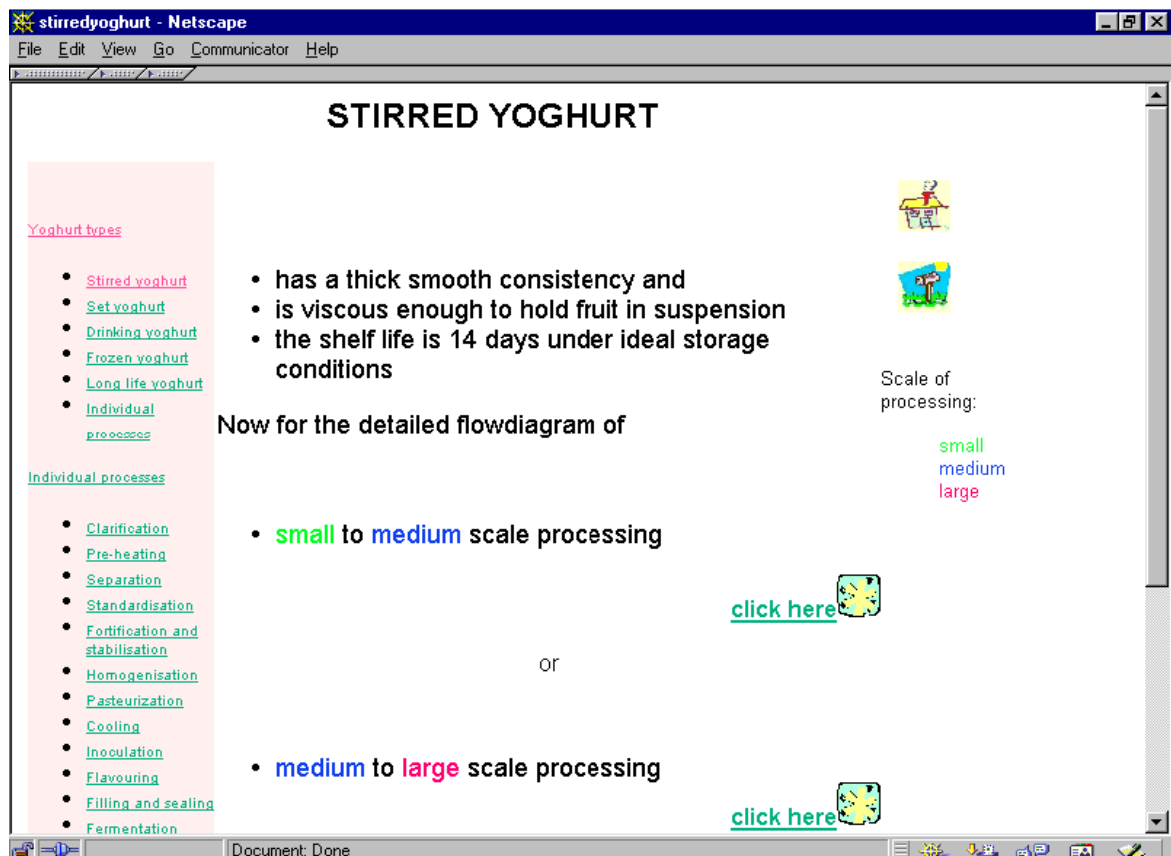
Figure 4.14 Various manufacturing methods of yoghurt of the third phase



4.5.9 Specific yoghurt types

After selection of a specific type of yoghurt, a new screen was opened. On this screen links to small, medium and large scale processing appeared (figure 4.15).

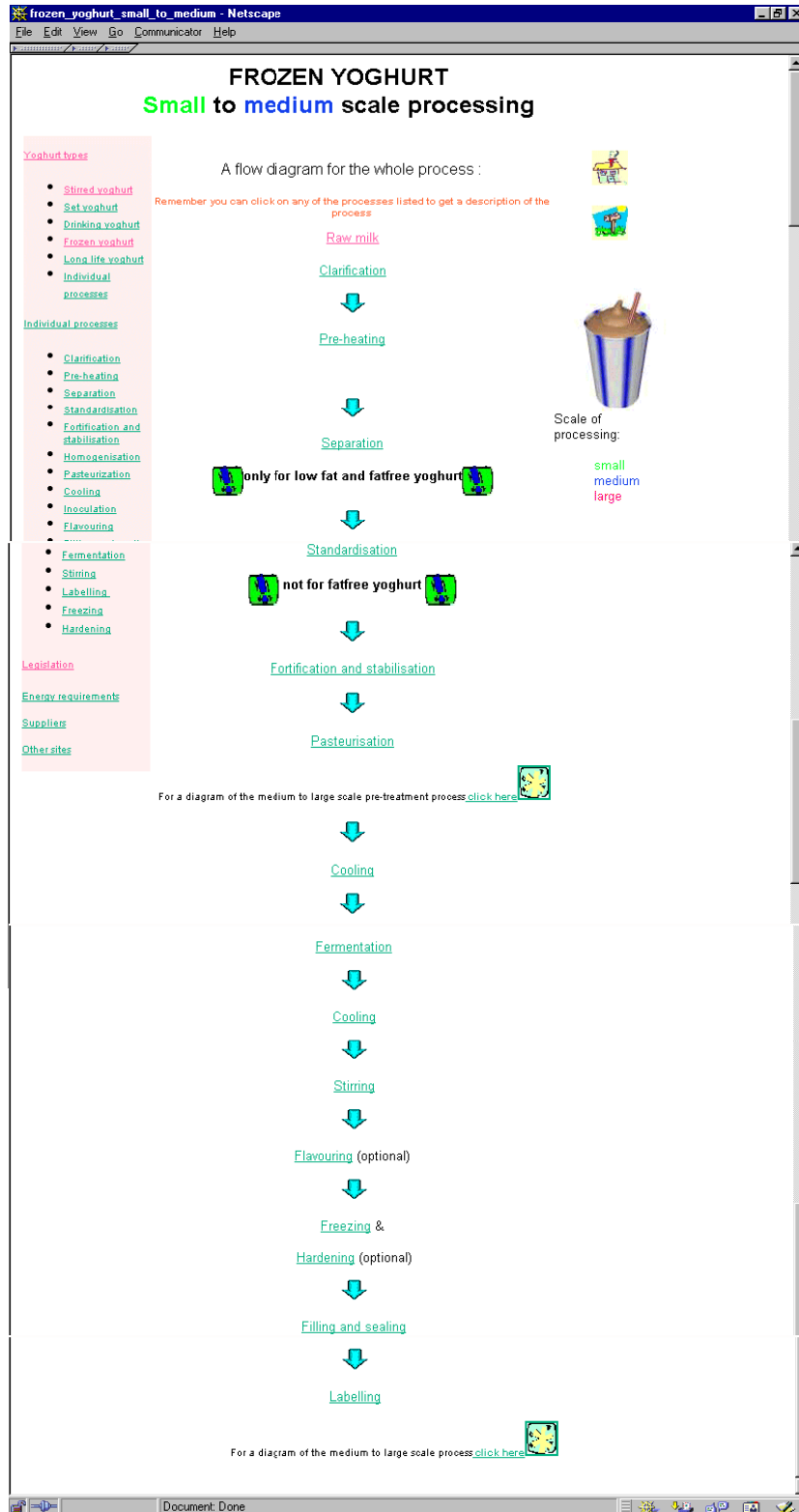
Figure 4.15 Stirred yoghurt screen with links to various scales of processing



4.5.10 Screen with flow diagram

A flow diagram with links to the individual processes was opened when a specific scale of processing was selected (figure 4.16).

Figure 4.16 Flow diagram for frozen yoghurt



4.5.11 Screens with information on pretreatment and processing

These screens gave access to the processing diagrams for the pre-treatment process (figure 4.17) and the processing diagram for the specific product (figure 4.18).

Figure 4.17 General pretreatment processes for all cultured milk products screen

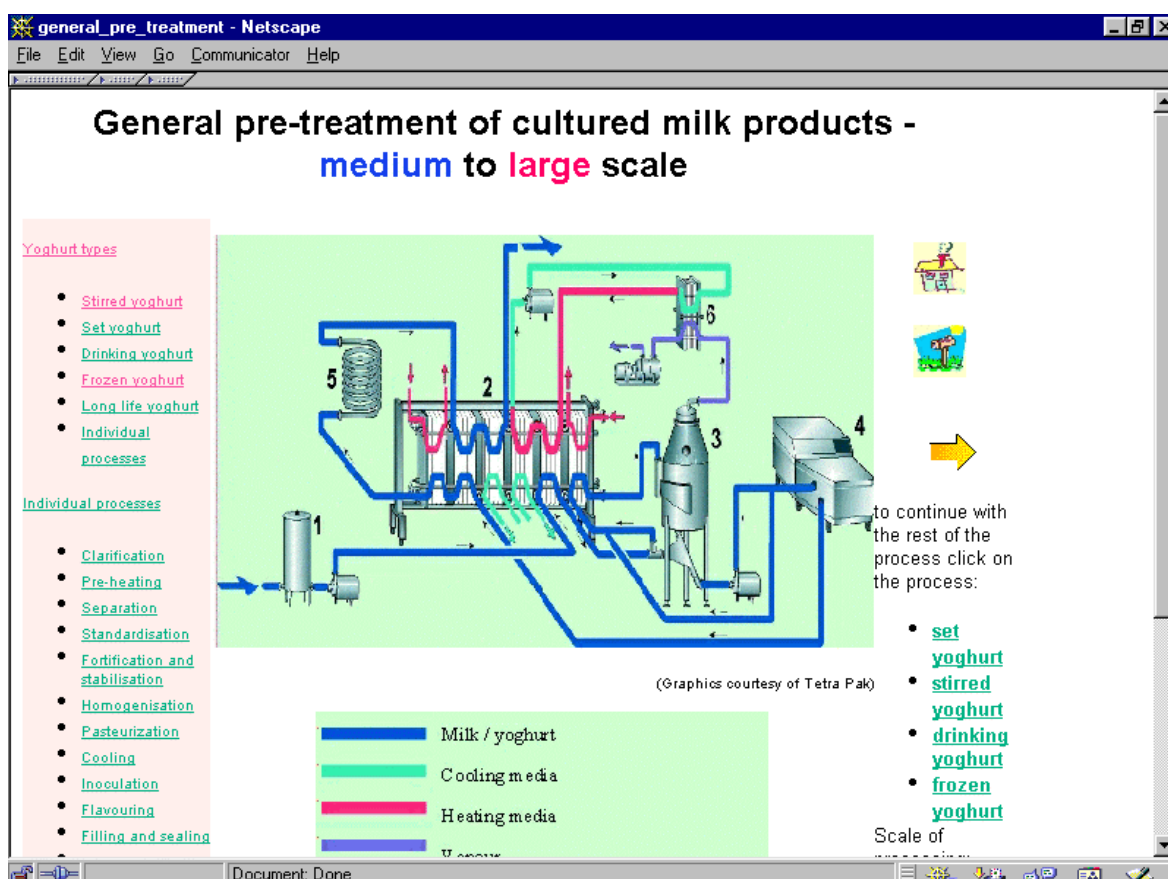
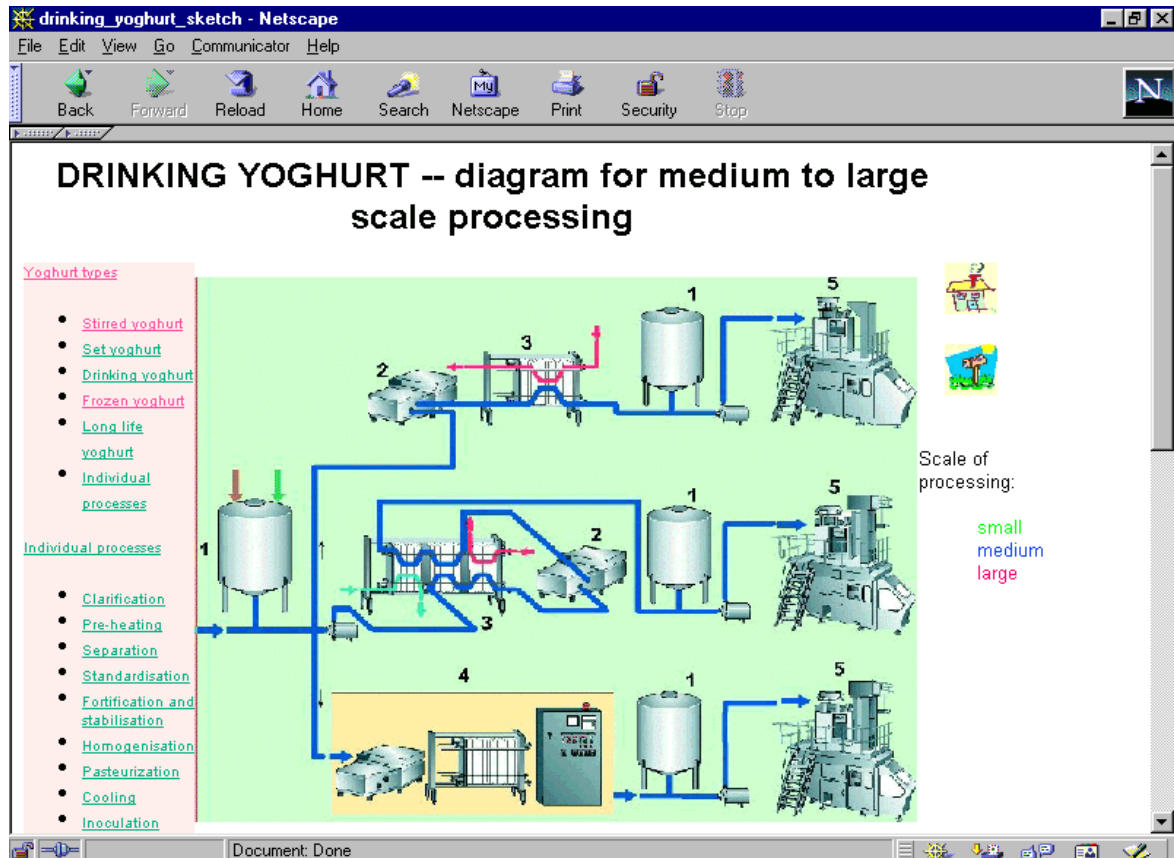


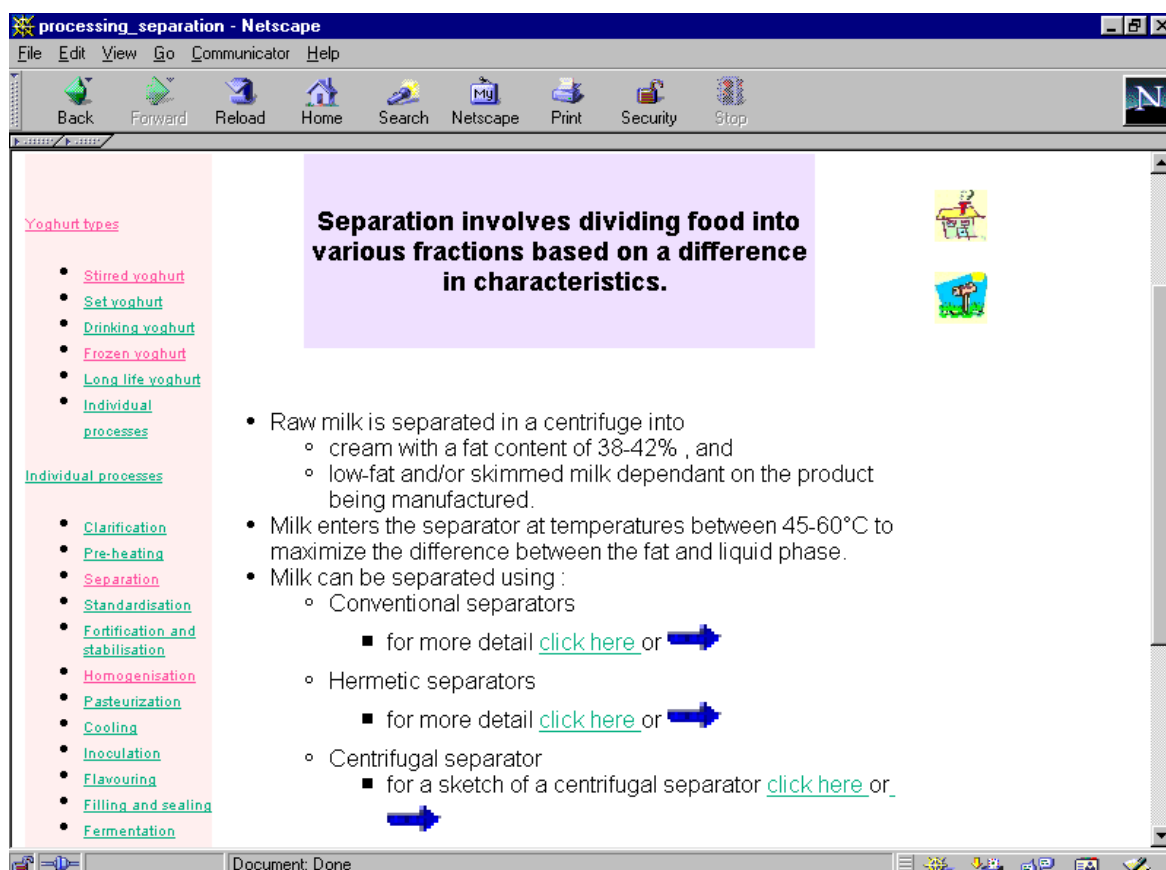
Figure 4.18 Diagram of drinking yoghurt processing



The diagrams contained a number of hot spots on most of the specific equipment in the diagram. By clicking on the specific piece of equipment appearing on the screen, the user should be taken to the process for which the equipment is used, eg by clicking on “fermentation tank” opened a new screen with the fermentation process (Figure 4.19).

The definitions of the individual processes were highlighted by a background in a different colour (figure 4.19). The individual processes also contained links to diagrams of equipment, where available (figure 4.19).

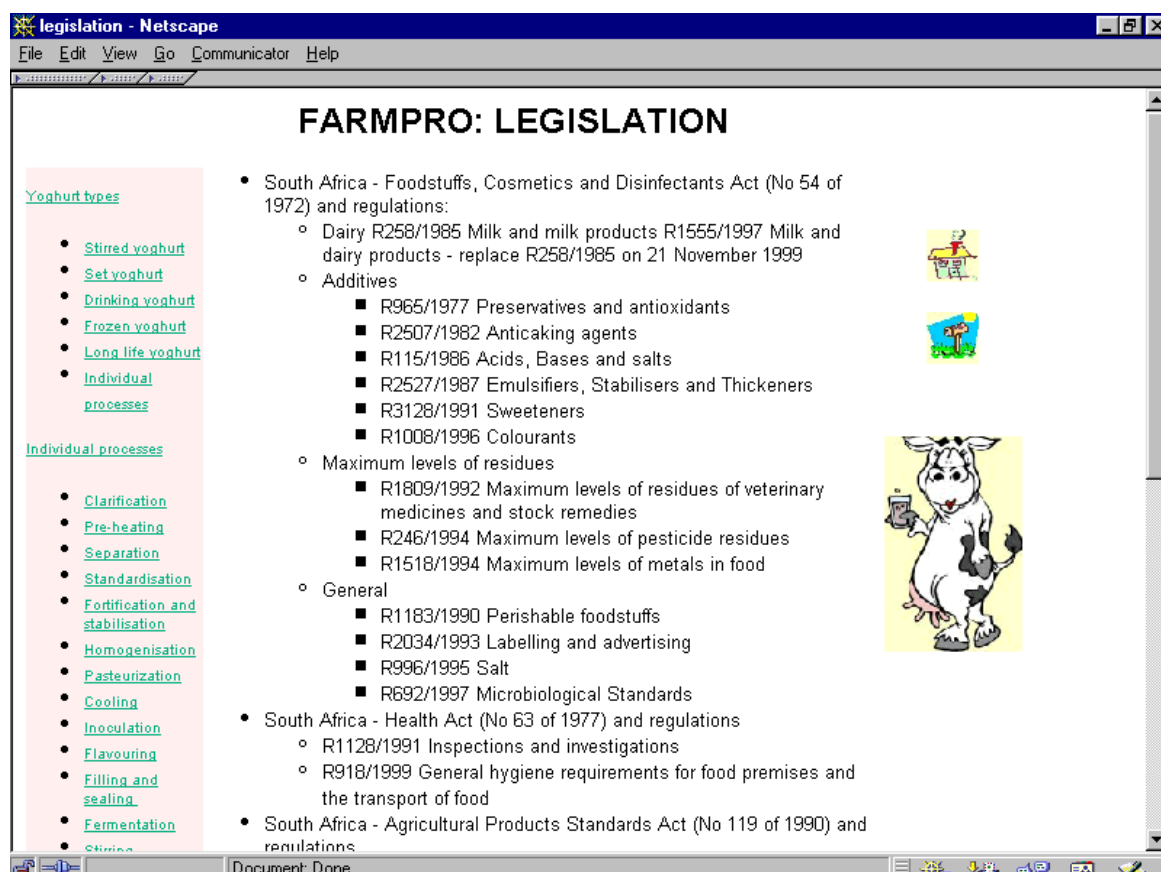
Figure 4.19 Individual processing - separation



4.5.12 Screens with other information of interest

The number of screens with other information of interest were increased. These screens contained less information in bulleted lists (figure 4.20). The list of legislative requirements was bulleted and included links to other web resources of possible interest to prospective yoghurt producers.

Figure 4.20 Legislation



4.5.13 Screens giving information on energy requirements

A summary of energy requirement was included to allow the farmer to determine how much electricity was needed for making a specific kind of yoghurt (figure 4.21).

Figure 4.21 A summary of the energy requirements for making long life yoghurt

The screenshot shows a Netscape browser window titled "energy_requirements_llset-summary - Netscape". The page content includes a navigation menu on the left, a main text area with two tables, and a cartoon cow illustration on the right.

1. Energy usage (kJ/kg yoghurt produced)


	Electrical	Other	Total
Process	98.56	344.24	442.89
Other	74.70	92.17	166.87
Total	173.35	436.42	609.76

This gives an estimate of actual energy required per kilogram of product processed as shown on the energy diagram. The figures are grouped to show the energy which is most usually provided electrically and that which is most usually provided by other sources. The figures may be converted to kilowatt hour per kg of product (kWh/kg) by dividing by 3600. The annual energy requirements (kWh per year) can be found by multiplying the factors given above by the total annual capacity (kg) and dividing by 3600.

2. Installed electric power (excluding boiler)

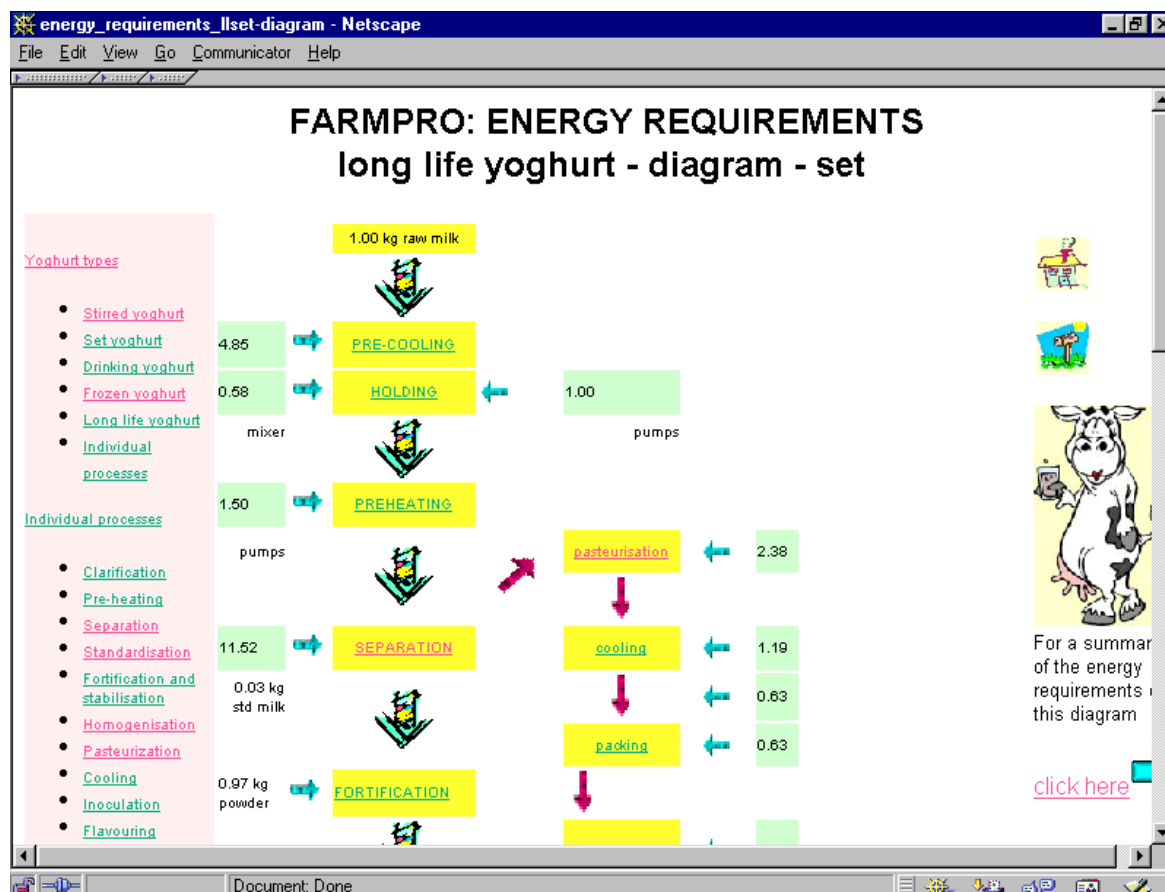
Plant capacity (l/day raw milk)	20000
Total installed power (kW)	59.03
Motors (kW)	51.03
Heating (kW)	6.00
Lighting (kW)	2.00

These figures give an estimate of the installed power for the factory at typical flow rates. These figures assume that the

For a diagram of the energy requirements of this summary [click here](#) 

A diagram (figure 4.22) of the energy requirements was also included

Figure 4.22 Diagram of the energy requirements for making long life yoghurt



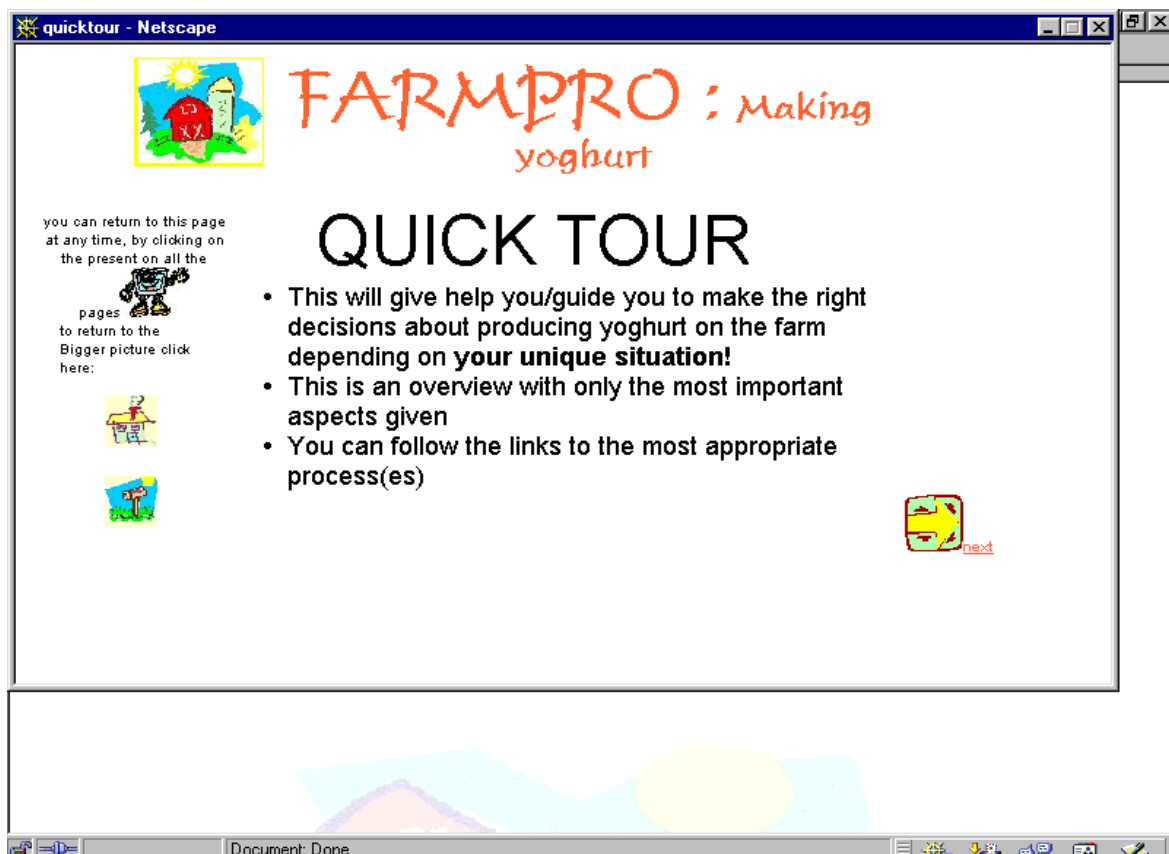
4.5.14 The development of a Quick tour

It became clear that the provision of an additional feature, namely a Quick tour would be advisable. Prospective users could then skip through this linear part of the web site quickly. It gave an overview of what is included in the Complete picture. The user could make only a few choices at the beginning of this part of the web site, selecting the type of yoghurt. The scale of processing could then be selected on this screen for

the type of yoghurt (figure 4.23). To eliminate the waste of screen space, the Quick tour also opened as a small screen as an overlay on the introductory screen (figure 4.23).

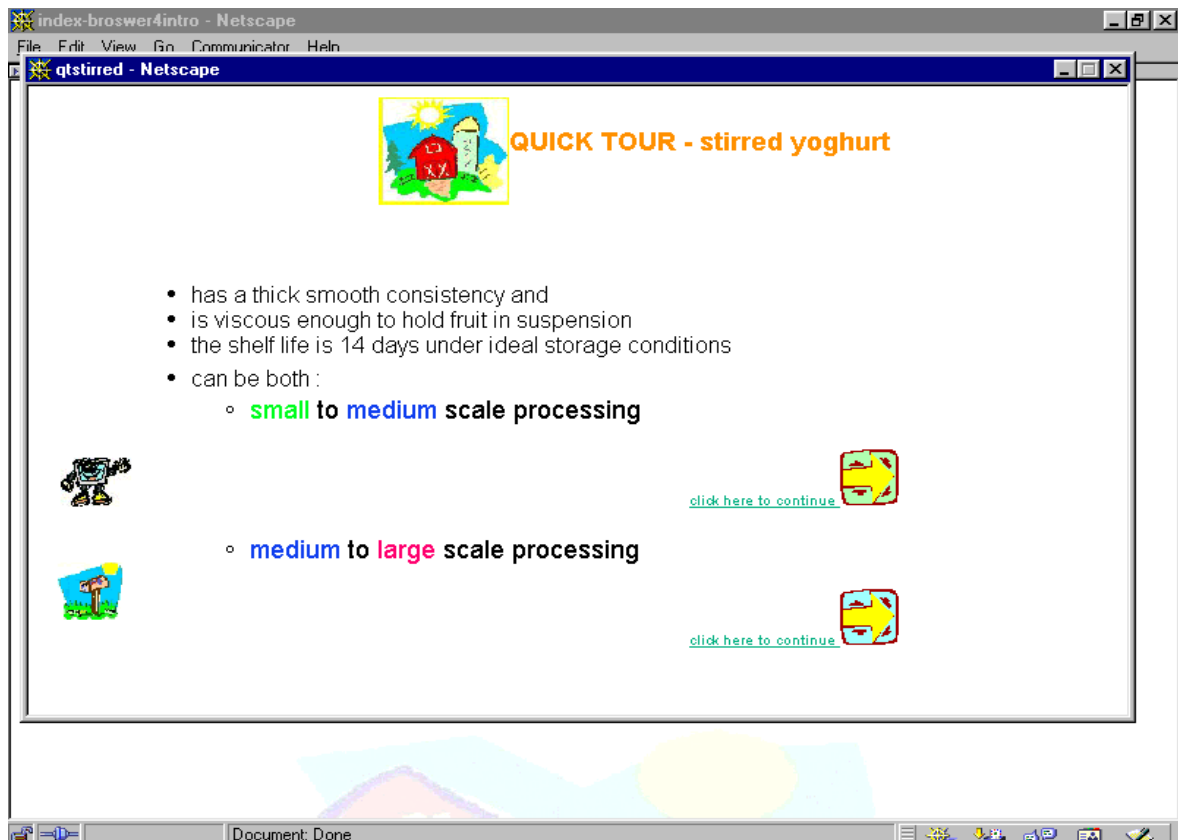
The Quick tour contained only definitions of the individual processes. For more information, the user had to return to the Complete picture. All screens of the Quick tour contained an icon for an e-mail message to the author of the web site and Quick tour home, where the user could return to the first screen of the Quick tour. On the first screen of the Quick tour, an icon was present to allow the user to return to the home page of the Complete picture (figure 4.13).

Figure 4.23 Quick tour introductory screen



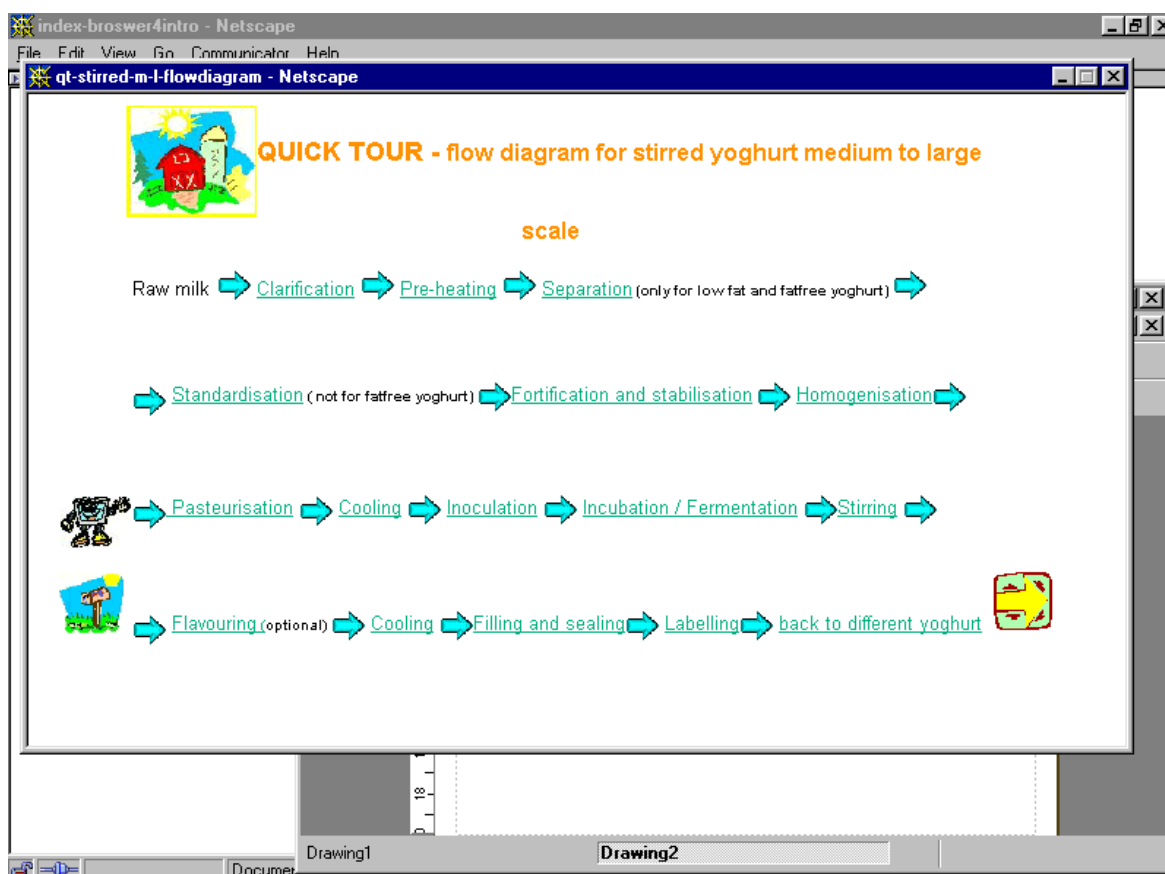
The introductory screen (fig 4.23) gave access to a screen where a brief definition of the specific yoghurt type was given (figure 4.24).

Figure 4.24 Quick tour - stirred yoghurt



The selection of one of the processes opened a screen with a flow diagram (figure 4.25). The user could continue linearly with either the process by clicking on the next button (arrow) or the individual process could be accessed. From there the user could continue in a linear manner through the rest of the web site.

Figure 4.25 Flow diagram for stirred yoghurt -medium to large scale



4.6 Summary

The guidelines discussed in the previous chapter provided a conceptual framework for organizing and designing effective user interfaces (Jones & Okey, 1995:9; Sloss, 1995:13-15). After consideration of all the requirements listed, a first prototype web site (first phase) was designed. This web site was peer evaluated and all problems encountered, comments and recommendations were taken into consideration for developing the second phase. This second phase web site was an extension of and improvement of the first phase web site.

The second phase web site was also evaluated. Problems were reported and suggestions made. The third phase web site was then developed and extended to include more information. Printable files of the processes were included as well as recipes for drinking yoghurt and yoghurt made in the microwave oven. A checklist for labelling was also included, which although not complete, included most of the major points regarding labelling legislation.

A brief outline of a business plan was also included, containing very basic information. Links were provided to online sources and institutions where help could be obtained. The business plan consisted of separate sections, namely:

- A feasibility study covering:
 - marketing aspects;
 - evaluation of the potential consumer;
 - evaluation of competitors;
 - estimate of the expected size of the market share;
 - technical aspects; and
 - financial and legal aspects.

- A business plan covering:
 - sales and marketing;
 - technical requirements;
 - legal considerations; and
 - finances.

- Sources of information:
 - business plans on the World Wide Web; and
 - banks.