

**Project title:** A survey of approaches used to calculate the cost of production in HNS

**Project number:** HNS 136b

**Project leader:** Professor John Colvin  
Natural Resources Institute, University of Greenwich, Chatham Maritime, Kent ME4 4TB

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**Key staff:** Professor John Colvin  
Mr Will George

**Location of project:** University of Greenwich

**Industry Representatives:** Mr Dave Hooker, Hillier Nurseries  
Dr Bill Godfrey, Hook Mill Nursery  
Dr Steve Carter, Fleurie Nursery  
Mr John Richards, John Richards Nursery  
Mr Malcolm Dick, John Woods Nurseries  
Mr Ivan Clifton, Robin Tacchi Plants

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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

**AUTHENTICATION**

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Professor John Colvin  
Professor  
Natural Resources Institute, University of Greenwich.

Signature ..... Date .....11<sup>th</sup> August 2011.....

[Name]  
[Position]  
[Organisation]

Signature ..... Date .....

**Report authorised by:**

[Name]  
[Position]  
[Organisation]

Signature ..... Date .....

[Name]  
[Position]  
[Organisation]

Signature ..... Date .....

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## **Grower Summary**

### **Headline**

This project has revealed how nurseries cost production, manage space and estimate demand.

This information will be used to help develop tools to maximise profits and reduce business risk.

### **Background**

Production-based costing tools for individual HNS product lines were previously considered unnecessary by many businesses. External financial pressures and overproduction, however, have recently created harsher business conditions and this has meant that nurseries without a good understanding of their changing production costs have become vulnerable to making losses.

In order to address levy payer demand for help with this problem, the HDC commissioned project HNS 136a (ongoing) to develop decision support tools to help improve the profitability of HNS nurseries. A decision support tool is a computer-based program that can be used by nursery managers to generate information that aids them to make important decisions (e.g. about setting prices, managing space and estimating future demand).

To build the most useful tools for the largest number of levy payers, it was necessary to carry out an HNS industry-wide survey on the approaches currently used to cost production, manage space and forecast demand. The survey information was also necessary to identify contacts with interested nurseries. A further reason for this work was to enable the impact of the tools on the profitability of nurseries to be assessed. The collection of a 'base-line' data-set, therefore, was required in order to achieve this aim.

### **Summary**

A survey consisting of 20 questions was sent out to all of the HNS businesses registered with the HDC.

The survey generated substantial interest and 72 returns (approximately 20% of HNS businesses) were received from a broad spectrum of nurseries operating in the various HNS market sectors. All of the responding nurseries assessed financial performance and profitability in a variety of ways with the greatest percentage (64.8%) assessing it against a cost budget.

A large percentage (77.8%) of nurseries used production costs to set the price of product lines. Only half of the nurseries (53%) said that they used a computer to calculate the production costs of individual product lines, although many produced over 1500 different product lines. We define a plant, or product line as, "any

individual variety in a given cell/liner/pot size". For example, *Choisya ternata* 9 cm is one line, *Choisya ternata* 3L is another.

A few nurseries, however, do have well developed and relatively sophisticated computer-based costing systems. The most commonly used software for costing and profitability were "self-built" systems in Excel. There is no widely adopted commercial package for this task, although several different packages were mentioned by individual nurseries. There was also no industry-wide 'standard' method for calculating production costs accurately. In addition, some cost categories were often omitted from the calculations, suggesting that many of these methods under-cost production.

Due to the lack of an easy-to-use production costing tool, the majority of respondents (81.4%) said that they wanted to receive an HDC-funded costing tool to calculate plant costs. When the responses were analysed by nursery turnover, there was a clear majority in favour of developing a costing tool expressed by nurseries in all categories.

The survey data also showed that, for nurseries in all turnover categories, space management (fitting production into the available space) could be a highly important issue and that when turnover exceeds £2.0 million, the importance attached to space management increases substantially. Almost all nurseries (92.8%) also rated forecasting demand either a score of six or higher (out of 10). Demand forecasting, therefore, is clearly an issue of great interest to almost all HNS nurseries and, in general, ranks above space management in importance. However, it was recognised that demand management was a major challenge due to numerous factors permanently outside the control of HNS businesses (e.g. the weather). Despite this, it was felt that demand could be managed through a better analysis of historical trends, which in turn can help to minimise (but not eliminate) business risk.

When asked if their nursery (production or marketing managers) would be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC, 72% and 73% said "yes", respectively. These percentages are only slightly lower than the percentage in favour of building a costing tool.

The survey data were analysed to determine the percentages of respondents that requested none (15.3%), one (19.4%), two (9.7%) or all three (55.6%) of the proposed tools. 84.7% of the nurseries, therefore, said they would like to receive one or more of the tools.

The nurseries were also very generous in providing additional information and opinions concerning the key characteristic of the tools, amongst which included the ease of use and data capture, as well as the ability to simulate situations and to optimise (maximise) profits.

The full Final Report contains extensive analysis of the responses to the 20 survey questions and is available, on request, from the HDC.

## **Financial Benefits**

There are no immediate financial benefits of the survey. The longer-term goal of HNS 136a, however, is to help to improve the profitability of HNS nurseries by building tools that help management make financially-beneficial decisions. The survey data also provide a base-line with which to measure future financial impact of the project.

## **Action Points**

- Make sure that you are not inadvertently under-pricing products through developing a better understanding of all production costs.
- Collect up-to-date financial information on all production costs. These include the costs of: the plant starting material, compost, containers, agrochemicals, sundry items, crop density, type of plant-growth area, labour, distribution and marketing, overheads, and a category of all further costs not included under the other headings and the total annual costs for the nursery.
- Ensure records are kept of the initial number of plants present in each 'batch', the numbers that reach a 'saleable' standard, as well as the total numbers sold.
- Increase computer skills on the nursery. Send key personnel on a course(s) to update their computer skills, particularly in Excel.
- Obtain copies of the freely available decision support tools when they are released by the HDC.
- Attend the knowledge transfer workshops to support the release of the tools (these are currently being negotiated).
- Read the full Final Report which contains detailed analysis of the responses to the 20 survey questions.

## **Science Section**

### **Introduction**

HNS nurseries tended to be highly profitable prior to the 1990s, with the consequence that production-based costing systems for individual product lines were generally considered unnecessary. In the last 20 years, however, external financial pressures and overproduction have created a much harsher business environment. This has meant that nurseries without a good understanding of their changing production costs have become vulnerable to making losses.

An initial survey was carried out at the start of HNS 136a (“Management tools for optimising space use and production forecasting”) that found that only a very few nurseries had good systems for costing production. In the August 2010 HNS 136a project meeting, this finding was discussed and it was agreed that in order to manage space rationally, a good understanding of the profit, after the allocation of gross margin associated with each product line, was required. As a first step in this process, it was decided that the objectives of the first year should be changed and a robust costing tool should be built in the first year of HNS 136a. It is planned to make this freely available to HNS growers.

The long-term goal of HNS 136 is to provide decision support tools that can help improve the profitability of HNS nurseries. In order to build the most useful tools for the largest number of levy payers, it was decided that it would be extremely useful to carry out an HNS industry-wide survey on the approaches currently used to cost production, space management and demand forecasting. The intention was to complete and release the costing tool after the survey, because the survey data, the contacts with interested nurseries that would be made, and the conclusions drawn could be used to inform the building of these tools.

In order to be able to measure the future impact that a widely adopted costing tool and other decision support tools could have on the profitability of HNS businesses, it was essential to collect an industry-wide, pre-release data set, which could then be used to monitor improvements following uptake of the tool(s). The collection of a ‘base-line’ data-set, therefore, was the second important reason for carrying out this much larger survey. A proposal for this activity was therefore submitted to the HNS panel and subsequently approved. The content of this Final Report describes the survey’s findings and main conclusions.

### **Materials and methods**

The survey activities were designed to maximise the number of completed returns, so as to get an accurate and representative picture of the usage of different types of production costing information and tools currently used by industry. The survey activities were also designed to increase awareness amongst growers’ businesses of the potential increases in profitability that could be achieved by costing production accurately.

The survey questionnaire (Annex1) was split into three sections. The first dealt with approaches used to cost production and how nursery profitability is assessed currently. The second asked about the related issues of nursery space management (fitting production to available space) and how decisions are made on the quantities of each product line to produce (demand forecasting). The third provided an opportunity to provide any additional information. The questionnaire was composed of 20 questions in order to make it easy to complete. In addition, not all of these questions were relevant to all of the growers, also thereby reducing the time it took to complete the form. In order to assist growers with the completion of the questionnaire, notes on individual questions were provided for guidance at the end of the document.

Growers were asked to return the questionnaire, even if they had not answered all of the questions and, in order to maximise the number of returns, nurseries were sent the questionnaire both by email and as a paper copy by post. On several occasions during the project period, 'reminder' emails asking for questionnaire returns were sent out by the HDC to nurseries. In order to provide nurseries with every opportunity to respond, an option to download the survey form from the HDC website was also provided. This 'belt-and-braces' approach to sending out the survey questionnaire and 'reminder' emails ensured that all HNS levy payers were able to participate and respond with their information, views and opinions.

## **Results**

The survey was clearly of great interest to industry, because 72 completed survey questionnaires were returned before, or just after, the deadline of 18<sup>th</sup> March 2011. This level of return was more than twice the anticipated realistic target of 10% (35) of HNS businesses, which was agreed by the HNS Panel and considered the minimum number of returns required to make the survey conclusions robust. Fifty-three (73.6%) returns were received by post as hardcopy and 19 (26.4%) were sent electronically.

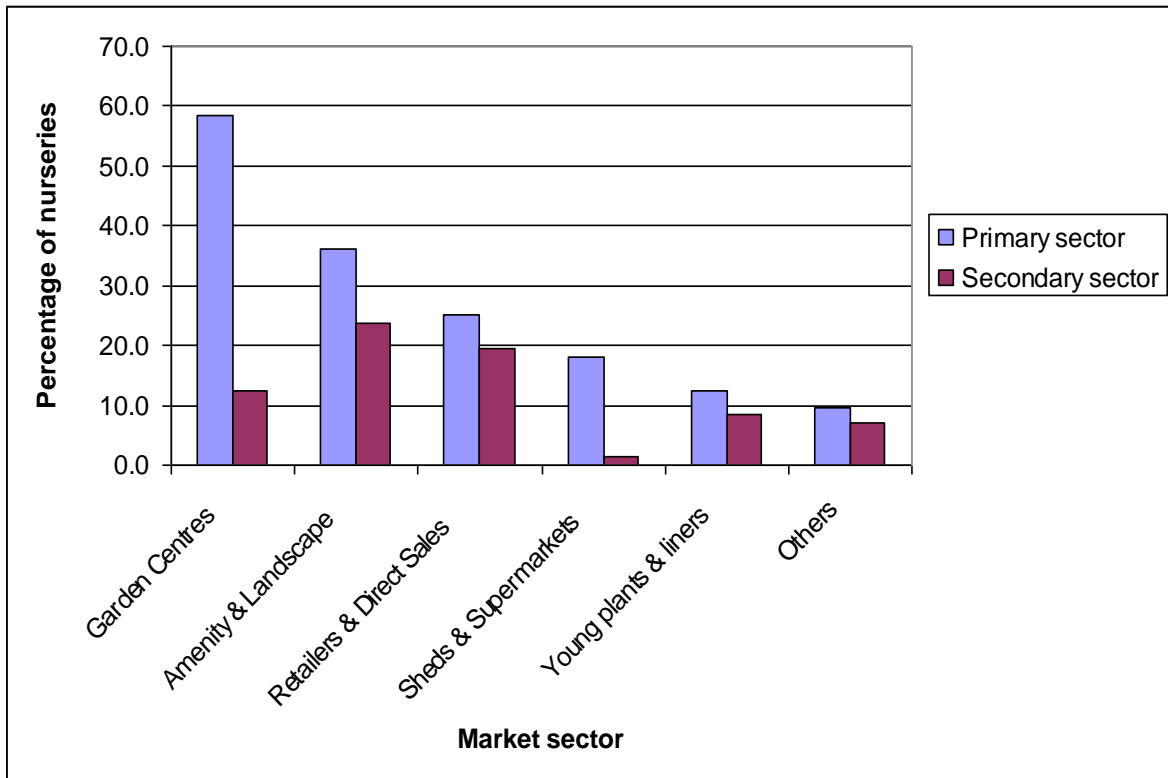
### **Approaches to costing production and nursery profitability**

**Question 1.** What HNS market sectors does the nursery supply? (Growers could select more than one sector, e.g. primary and secondary to the business).

The main market supplied by the nurseries is the garden centre sector, followed by the amenity and landscape sector (Figure 1). The young plant suppliers sector appeared to be under-represented, but this may also be an accurate reflection of this sector of the industry. Sectors mentioned in the 'others' category included cash and carry (3), internet sales (1), mail order (2) and fruit growers (1).

The most common secondary markets for nurseries were amenities and landscape, followed by retailers and direct sales (Figure 1). The number of returns and the sectors covered suggests that the survey captured a good representation of the nurseries supplying the various sectors.



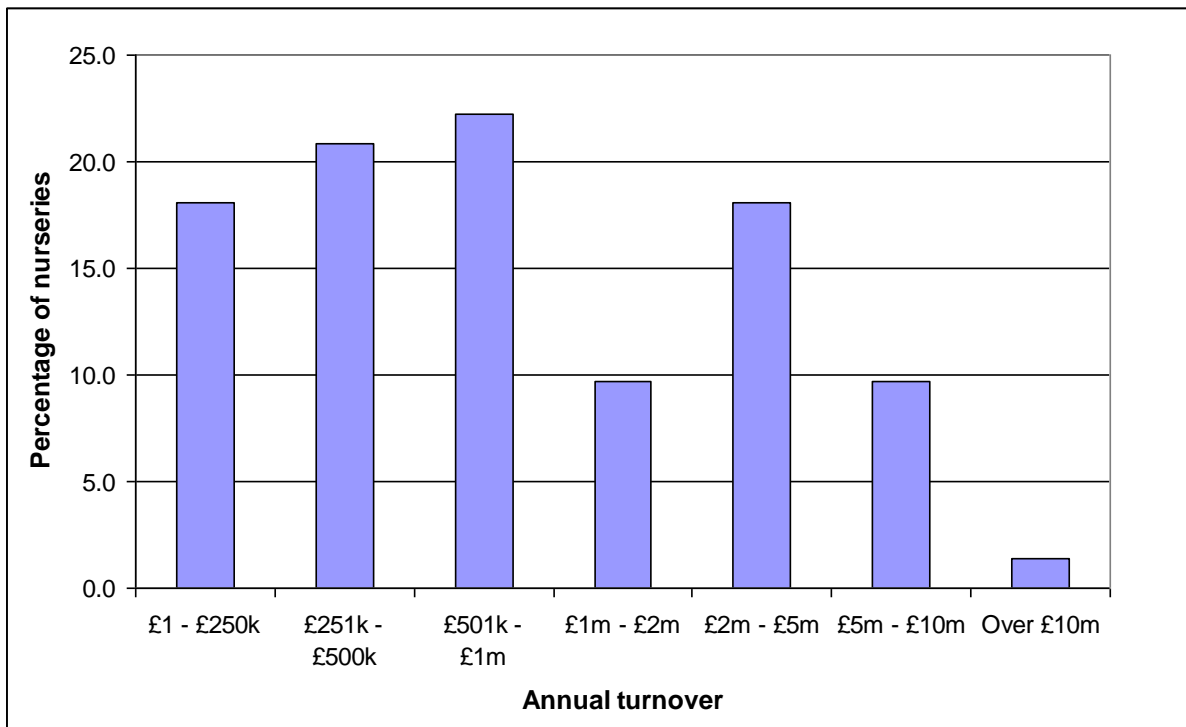


**Figure 1.** The percentage of respondents (N = 72) allocated according to their stated primary and secondary markets.

**Question 2.** *What is your nursery's annual turnover?*

In order to be able to analyse the survey data, it was considered important that the size of the business was taken into account, i.e. the potentially different answers provided by large and small businesses could be evaluated. Turnover was considered the simplest measure of this, rather than staff numbers or area and the distribution showed that a good cross section of the industry participated in the survey.

The greatest number of returns was obtained from nurseries in the £0.5 - £1 million turnover category. It was encouraging that a considerable proportion of the nurseries in the smallest turnover categories participated in the survey (Figure 2).



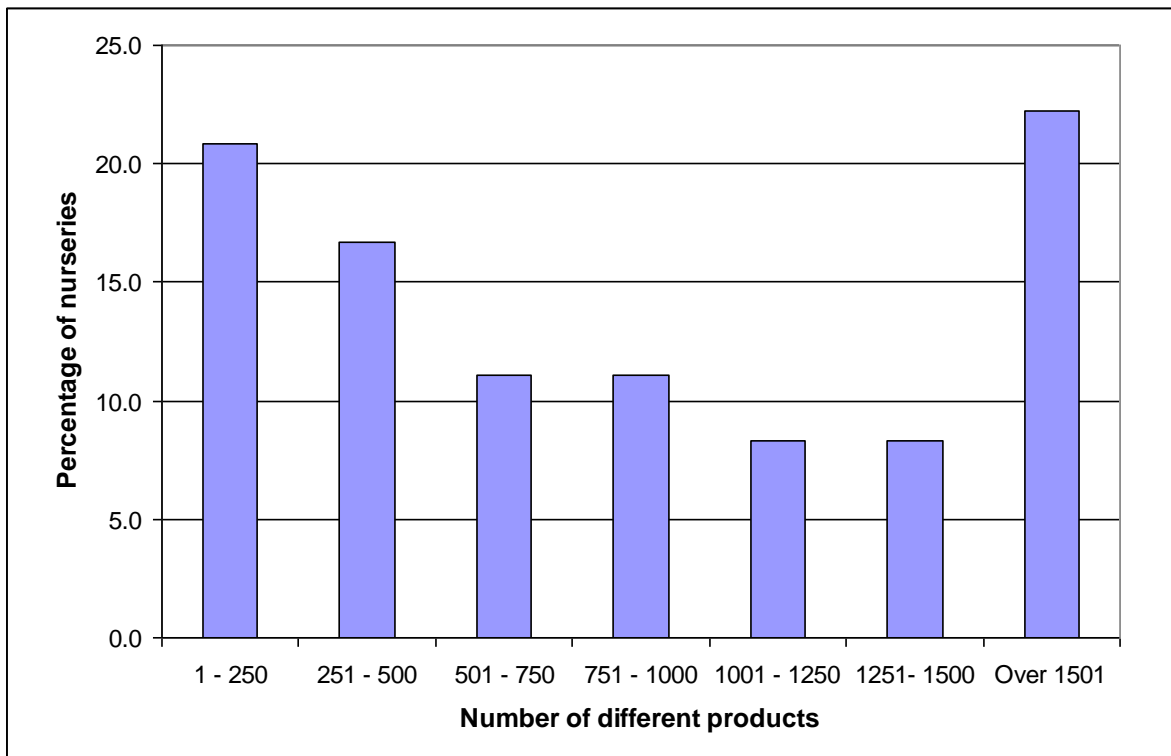
**Figure 2.** The distribution of turnover obtained from the nursery returns.

**Question 3.** *How many different product lines are grown on your nursery?*

The reason for this question was to assess the number of product lines grown by each nursery so that if a costing tool was developed the potential size of the tool in terms of product number could be estimated.

The distribution of number of lines per nursery was weighted towards either end of the scale with nurseries either specialising in a few lines or growing a wide range of crops (Figure 3).

When comparing the number of product lines to turnover there was only a very poor correlation ( $R^2 = 0.36$ ), i.e. it was possible for a nursery in the smallest turnover categories (< £0.25m and < £0.5m) to be in the category with the highest number of product lines (> 1500), as well as nurseries with high turnovers (5m – 10m) to be relatively specialised and to produce a very restricted number of product lines (1 – 250) (Table 1).



**Figure 3.** The distribution of the number of different product lines produced by nurseries.

**Table 1.** The distribution of nurseries in relation to turnover and the number of lines grown.

Turnover (£)	Number of lines						
	1-250	251-500	501-750	751-1000	1001-1250	1251-1500	>1500
<0.25m	5	6	0	0	0	0	1
0.25 - 0.5m	4	1	0	4	2	2	2
0.5 – 1m	2	2	3	1	2	2	4
1 – 2m	1	2	1	2	0	0	1
2 – 5m	2	1	4	1	1	0	4
5 – 10m	1	0	0	0	1	2	3
>10m	0	0	0	0	0	0	1

It is clear from these data that the costing tool must be able to cope with a range of plant lines in excess of 1,500.

**Question 4.** *How do you assess the nursery's profitability / financial performance?*

This question was asked in order to find out how nurseries monitor their financial performance, as well as to determine the importance they placed on understanding plant production costs. All of the 71 respondents to this question assessed their nursery's profitability in at least one way, i.e. no questionnaires were returned with the choice "Don't assess nursery profitability" ticked.

Six nurseries (8.3%) described ways of assessing performance other than those listed in the questionnaire (Table 2). One respondent just answered, "Terribly, we are at the whim of garden centres, etc", another nursery compared production losses with costs and a third said they did this by paying close attention to sales. Only one nursery, which sold their plants through their own garden centre, used their Electronic Point Of Sale (EPOS) system to provide performance information and another built Key Performance Indicators (KPIs) into its monitoring, but further detail on this was not provided.

From the choices available on the questionnaire, the greatest percentage of nurseries (64.8%) assessed their financial performance against a cost budget (Table 2). An assessment of the business as a whole also ranked highly (56%).

A large percentage (47.9%) also said that they considered the profitability of individual plant lines and 40.9% looked at plant groups. The percentage that assessed performance against a sales budget was slightly lower (44%) and assessing departments or cost centres was the least common method (34%) and tended to be the domain of the larger nurseries.

**Table 2.** The different ways recorded of assessing the profitability / financial performance of nursery businesses.

	<b>Profitability as a whole</b>	<b>Departments /Cost Centres</b>	<b>Plant Groups</b>	<b>Individual Plant Lines</b>	<b>Costs Budgets</b>	<b>Sales Budgets</b>
Nos. (%)	40 (56.3)	24 (33.8)	29 (40.9)	34 (47.9)	46 (64.8)	31 (43.7)

Out of the 71 respondents to this question, 55 (77%) used two or more methods to assess profitability (Table 3), showing the high priority given to this topic. Nurseries most commonly used three different methods to achieve this aim (Table 3).

**Table 3.** The numbers of different methods used by individual nurseries to assess profitability.

<b>Number of methods</b>	<b>of</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Number of nurseries</b>	<b>of</b>	16	12	19	13	7	4

**Question 5.** *How do you set prices for your product (stock) lines?*

Most of the respondents used several of the criteria to set their prices. The largest number of respondents used their production costs as a basis for price setting, although a similar percentage said that they priced according to what the market could stand (Table 4). This probably involves assessing what the competitors are doing and this criterion was ticked by 63.9% of the respondents. The other methods included prices based on the “buying-in” price of the plant only and also the cost of heating oil.

**Table 4.** The criteria used by respondents to set prices for nursery stock.

<b>Criteria used for price setting</b>	<b>Frequency</b>	<b>%</b>
Look at your competitors	46	63.9
Estimate what the market can stand	51	70.8
Based on production costs	56	77.8
Bands reflecting production difficulty	25	34.7
Other methods	3	4.2

**Question 6.** *When you calculate or estimate the production cost of individual lines, are the calculations computer assisted?*

Sixty-eight nurseries answered this question and just under half of them (47%) said that they did not use a computer to calculate the production costs of individual plant lines (Table 5).

**Table 5.** The number of nurseries that use a computer to help cost product lines.

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<b>Response</b>	<b>Number (%)</b>
Yes	36 (52.9)
No	32 (47.1)

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This does seem a remarkable result given the numbers of product lines that the smallest nurseries can produce and the complexity of the task of costing production accurately. When the data are broken down according to turnover, however, there is a clear trend apparent (Table 6). A high percentage of the largest nurseries with a turnover of more than £5 million use a computer-assisted costing system (eight out of nine nurseries). At the other end of the turnover scale (< £0.5 million), only seven out of 23 nurseries used a computer. The somewhat surprising finding is that computer use for costing nursery lines is low (around 50%) in medium sized nurseries. These data suggest that a simple-to-use computer-based costing tool would be useful to many managers running nurseries with an annual turnover of up to £5 million.

**Table 6.** The use of computers to assist costing product lines in relation to turnover.

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<b>Turnover (£million)</b>	<b>band</b>	<b>Yes (%)</b>	<b>No (%)</b>
< 0.25		1 (9.1)	10 (90.9)
0.25 - 0.5		6 (50.0)	6 (50.0)
0.5 - 1.0		8 (50.0)	8 (50.0)
1.0 -2.0		4 (57.1)	3 (42.9)
2.0 -5.0		9 (69.2)	4 (30.8)
5.0 - 10.0		7 (87.5)	1 (12.5)
> 10.0		1 (100.0)	0 (0.0)

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**Question 7.** *Is the computer-based costing system built in Excel, Access, another package or a commercially available software package?*

The aim of this question was to find out if there are viable commercial package(s) available for costing production or whether nurseries build their own systems. We also wanted to discover whether or not those nurseries that used computers in this tasks, operated more than one system. Forty-four nurseries answered this question and the most commonly used software was Excel (64%) (Table 7). Only one nursery used Access and the other software packages used were: Growmaster (x2),

a bespoke programme using ProIV, Sage, dBase plus, Passfield (x2), Quickbooks, Wintree, Sap Business Corby and Fellows EPOS system, a bespoke programme with File Maker Pro, and two that were not named. Only a few nurseries used more than one software package.

**Table 7.** The type of computer software programs used to assist in the calculation of plant costs.

Software	Numbers (%)
Excel	28 (64)
Access	1 (2)
Other	9 (20)
Commercial packages	6 (14)

**Question 8.** *When you calculate or estimate the production cost of individual lines, which of the following data types are used in the calculations?*

The aim of this question was to identify the types of information used by nurseries in their costing exercises and software programs. Nurseries were given the opportunity to volunteer extra information not listed in the questionnaire tick boxes.

Sixty-six nurseries responded to this question and the most common items taken into account in the costing processes were compost cost (93.9%), plant cost (92.4%), pot cost (92.4%) and initial labour cost (87.9%) (Table 8). Of note was the somewhat disconcerting finding that 40.9% of respondents did not include a contribution to nursery overheads in their costings.

**Table 8.** The numbers of nurseries and the data types used to calculate product line costs.

Items	Numbers of nurseries (%)
Plant Cost	61 (92.4)
Number Potted	38 (57.5)
Amount of Waste / Yield	46 (69.7)
Pot Cost	61 (92.4)
Compost Cost	62 (93.9)
Initial labour cost	58 (87.8)
Care Labour Costs	56 (84.8)
Sundries	46 (69.7)
Lifting and Picking Costs	43 (65.1)

Time on Nursery	37 (56.1)
Area used by Crop	30 (45.5)
Overheads	39 (59.1)
Gross Margins	38 (57.6)
Residual costs	28 (42.4)
Other Items	8 (12.1)

The other items mentioned by nurseries that are sometimes used to calculate production costs are: risk of lost sales, water cost, contribution towards capital costs, rarity, sales cost (x2), discounts, credits, heating oil, development costs, fuel costs and advertising.

**Question 9.** *Would the nursery be interested in using a basic production costing system, if one were developed and distributed free by the HDC?*

This question was asked in order to estimate the level of industry interest in a basic production costing tool. The overwhelming majority of respondents (81.4%) were in favour of receiving an HDC-funded tool that would calculate plant production costs accurately (Table 9).

**Table 9.** Results of the question on demand for a costing tool.

Response	Number (%)
Yes	57 (81.4)
No	13 (18.6)

When the responses were analysed by turnover, there was a clear majority in favour of developing a costing tool expressed by nurseries in all categories (Table 9.1), indicating that demand for this tool is both independent of nursery size and industry wide. The highest number of negative responses (38.5%) came from the smallest turnover band and the reasons given were that they considered the tool unnecessary or that they did not have the time or computer skills to operate the tool. The other turnover band where there were some negative responses (33.3%) was in the £2-5 million category. The main reason given here was that they already had their own systems, with which they were happy.



**Table 9.1.** Demand from nurseries for a costing tool, broken down by nursery turnover.

Turnover (£million)	band	Yes (%)	No (%)
< 0.25		8 (61.5)	5 (38.5)
0.25 - 0.5		14 (100.0)	0 (0.0)
0.5 – 1.0		13 (81.3)	3 (18.7)
1.0 -2.0		6 (85.7)	1 (14.3)
2.0 -5.0		8 (66.7)	4 (33.3)
5.0 – 10.0		7 (100.0)	0 (0.0)
> 10.0		1 (100.0)	0 (0.0)

**Question 10.** Which of the following best describes the importance you would attach to collecting data for a production costing system?

This question was asked in order to provide another subjective way of assessing the demand for the costing system, as well as for determining how much time the nursery would be willing to put into implementing the costing system, once it was available. Only those respondents that had shown an interest in the costing tool (answered Q9 positively) were asked to respond to this question. The answers showed that as well as there being a large majority in favour of developing a costing tool, the positive responders were also prepared to invest a high (48.2%) or medium (44.6%) amount of effort, in order to make it operational (Table 10).

**Table 10.** A subjective assessment of the effort nurseries would put into getting a costing tool functional.

Effort and investment	Number of respondents (%)
None	0 (0.0)
Low	4 (7.1)
Medium	25 (44.6)
High	27 (48.2)

**Question 11.** Whether or not the nursery assesses the production costs of its product lines, which of the following types of information are recorded regularly (and the data stored)?

In order to design a system that will be easy to use by as many growers as possible, it was necessary to find out what sort of plant production records are normally kept

on the nursery and are available for use in a costing system. An opportunity was also provided to suggest other types of records that might be useful for a costing tool.

The majority of nurseries were found to be already collecting data that could be used in a costing programme. Those categories listed in Table 11 were those that most nurseries use. Of note were the replies of two nurseries that surprisingly do not keep any records at all. Neither of these were interested in receiving a costing tool.

An important point to come out of the data is that nurseries collect and store different categories of information and that no information category was collected by every nursery. It is important, therefore, that the costing tool is built to be flexible enough to cope with the variety of information and growing methods used by growers.

**Table 11.** The data categories recorded by nurseries.

Data categories recorded	Number of nurseries (%)
Production, Potting Figures	62 (86.1)
Waste or Yield	42 (58.3)
Sales per Batch	45 (62.5)
Labour per Task	37 (51.4)
Amount of Compost used	57 (79.2)
Cost of Sales	51 (70.8)
Cost of Distribution	50 (69.4)
Overhead Cost	51 (70.8)
None at all	2 (2.8)

**Question 12.** *Use of computers on the nursery.*

This question was asked to find out if there is a computer available on the nursery to run a costing tool and whether or not Excel is already loaded onto the computer. We requested information on the software version, because this will affect how the costing tool is built. We also wished to know if there was someone able and confident to use this spreadsheet package. All 72 (100%) nurseries owned a computer and 69 (95.8%) said that Excel was loaded on to it. Sixty-one respondents said they were familiar and confident with using Excel while eight said they were not. Twenty-eight (38.9%) and 35 (48.6%), respectively, said that they had Excel 97-2003 and Excel 2007. Although computer ownership is high, it appears that computers are not fully utilized in the costing process and so there is a need for further training on computer use on nurseries. It is proposed that when the costing tool is released, extension work in the form of grower workshops would be highly beneficial to growers so that they can get the most out of such a tool.

## Space management and demand forecasting

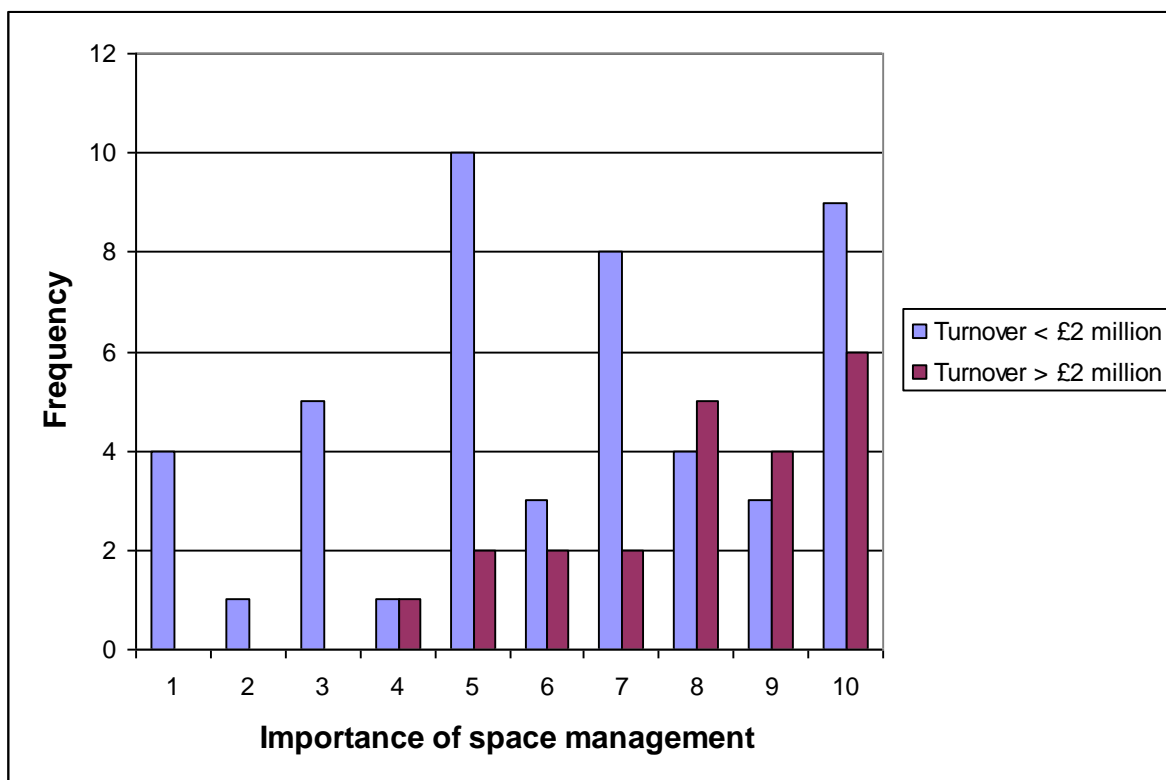
**Question 13.** *On a scale of 1 [low] to 10 [high], how big of an issue / problem is space management for your nursery?*

This question was asked to gain a subjective impression of the importance that nurseries attach to managing the different types of space they have available. The responses showed that for nurseries in all turnover categories, space management could be a highly important issue (Table 12).

**Table 12.** The importance assigned to space management by nurseries.

Turnover (£)	Frequency of importance value									
	1	2	3	4	5	6	7	8	9	10
<0.25m	0	0	3	0	4	0	2	0	1	1
0.25 - 0.5m	2	1	1	1	0	0	3	3	2	2
0.5 – 1m	1	0	1	0	3	1	3	0	0	6
1 – 2m	1	0	0	0	3	2	0	1	0	0
2 – 5m	0	0	0	1	2	1	2	3	1	3
5 – 10m	0	0	0	0	0	1	0	2	3	2
>10m	0	0	0	0	0	0	0	0	0	1

On closer inspection of the data, it appears that when nursery turnover exceeds £2.0 million, the importance attached to space management increases substantially (Figure 4).



**Figure 4.** The importance of space management to nurseries with turnovers of less than, and more than, £2 million.

The comments from nurseries provided on this question were along the lines that, 1) space management is particularly a problem for protected cropping space, glass and poly. It is especially critical for heated glass space, but it is also important to ensure plant types are allocated the correct facilities for optimal growth. 2) For the bedding market, it is important to make use of all heated areas. 3) It is a major consideration in the crop planning phase during the winter and in actual implementation of the plan between February and July. 4) Space problems usually are most acute during the peak growing season and are only relieved by sales vacating space 'in-the-nick-of-time' to enable further production. 3) Space management usually involves a certain amount of moving material, which is time consuming.

For one nursery that grows trees, the comment was that "spacing in containers for trees is generally the same for 85% of the trees on our nursery. Tree movement only occurs on an annualised basis so is not a key issue in production costing".

For another nursery, space management was a key issue to the extent that they had developed their own system to manage it - "space is a big issue as room is very tight at peak periods however calculating room available is not a problem as we have a system to forecast available space."

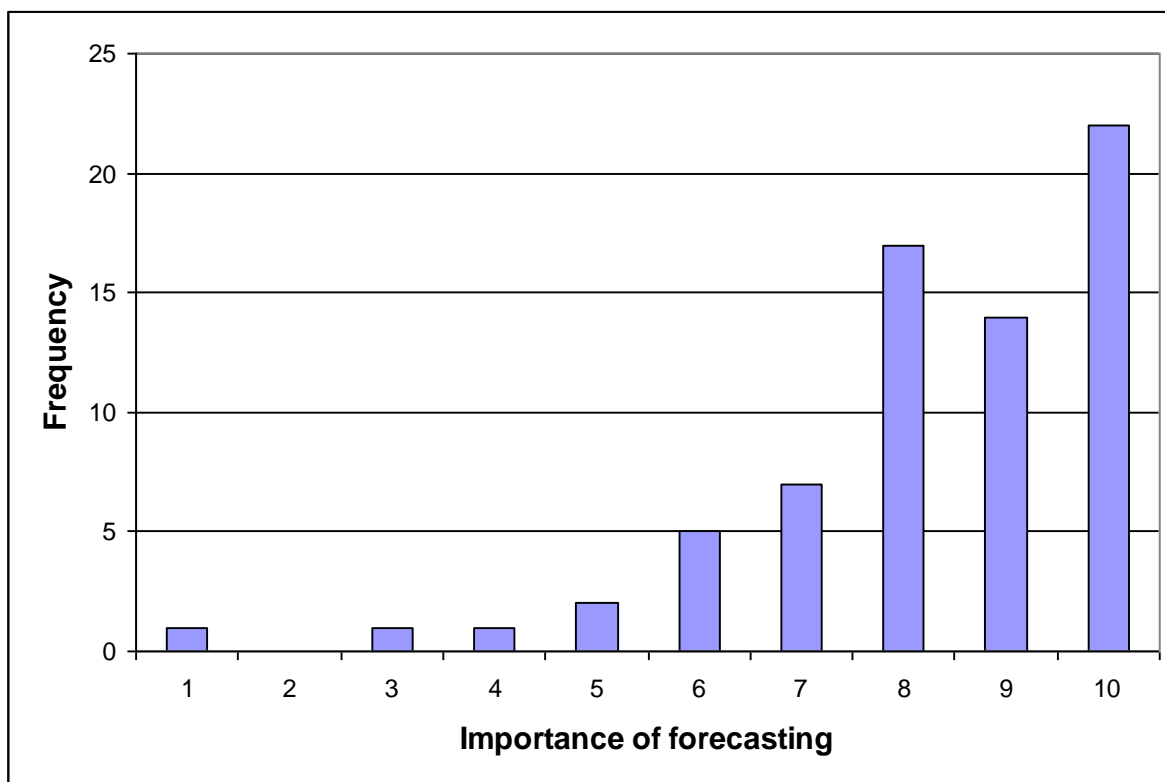
**Question 14.** *On a scale of 1 [low] to 10 [high], how important do you consider it is to forecast accurately the demand for different product lines?*

The intention of this question was to obtain a subjective indication of how much thought / planning is invested in deciding how many plants of each product line to attempt to produce. Linked to this is the idea that overproduction causes 'waste' or the need to discount, both of which directly reduce profitability.

Almost all nurseries (92.8%) rated forecasting demand either a score of six or higher (Figure 5), demonstrating that this is considered an extremely important management activity. Although this subject is considered so important, there were many comments about how difficult or impossible it was to achieve. The main reasons for this were that: 1) production schedules were longer than the lead time on customer forward orders, 2) demand may vary up to 15% from one year to the next, 3) the production process can take up to four years, and 4) nigh on impossible due to fashion changes, weather, Chelsea / Hampton Court Shows and so on, 5) it is impossible to get it right all the time because no-one can predict the weather during the selling period and therefore what plants will be most topical during periods of peak demand, but eventual profitability is hugely affected by ability to supply the right plant at the right time. Crop planning by sales analysis and efforts to identify trends in demand will be rewarded in some measure.

Also, it was suggested that forecasting was probably most important for bedding crops and this had to be done in consideration of the needs of the garden centre customers. Some of the steps taken to reduce unpredictability in demand were also suggested, such as moving towards production-to-contract and a careful understanding of regular customers' requirements.

One nursery that produces conifers said that they were able to forecast demand, but this required a schedule for different varieties within the total number of cuttings / grafts.



**Figure 5.** The importance of forecasting to nurseries (1 = low, 10 = high).

The frequency distribution of the answers to both questions 13 and 14 are highly skewed towards the highly important end of the scale (Figures 4 and 5) and so comparing the means (average scores) is inappropriate. The sum of the scores, however, allows a good comparison of the relative importance of these problems and for space management and demand forecasting, respectively, the totals were 464 and 579. Demand forecasting, therefore, is an issue of concern to almost all HNS nurseries and, in general, appears to rank above space management in importance.

**Question 15.** *Does your nursery already have a system (not necessarily a computer-based program) designed to help with these issues?*

This question was asked to obtain information on the types of space management system used. Sixty-five nurseries answered this question and 26 (40%) said “yes” they had a system and 39 (60%) ticked “no”. Of the “yes” responses, only seven said that their system was spreadsheet (usually Excel) based. Only two to three nurseries said that they had a production planning tool that takes account of growing times and shelf life. The amount of stock on the floor at any point in time could be determined and so [space] capacity requirements can be predicted. One nursery manager said that the basis of their system was “to identify and quantify proposed changes in cropping plan from the previous year and take note of any new buildings or loss of old structures and ask if it will still fit during the peak production period March – June”. Their programme was apparently less reliable when sales of overwintered crops out of protection were late to get going.

The descriptions of the other systems included the following comments: 1) management estimating area calculation and production planning combined, 2) use of a nursery map, 3) from previous year's sales or records, 4) tree lines are static and so there is little flexibility for space management, 5) manual calculations based on plants per m<sup>2</sup>, 6) monthly production plan that includes space factors, 7) requires considerable management time with input mostly manually, 8) manager's brain relying on previous experience, 9) make it up as you go along is an essential skill for a nursery.

For demand forecasting, the ratio of the responses was more evenly split. Sixty-nine respondents answered this question; 36 (52%) and 33 (48%) said "yes" and "no", respectively. Of the "yes" responses, only eight were computer assisted. The descriptions of these systems include the following comments: 1) historical sales records, trend analysis, customer feedback and assessment of new varieties in trial. Also, taking note of individual crop specific orders from a few major accounts, 2) in-house Excel system made in an "ad hoc" way, 3) data extracted and processed in Excel, 4) Valogix inventory planner (add-on to SAP and specialist package), 5) computer Access-based production control, stock and sales system that predicts shortages going forward for production planning, 6) use of Growmaster, 7) bespoke software on a mainframe using volume sold previously and at what % of full price, and 8) a weekly sales forecasting tool by product which is reviewed and updated regularly based on market conditions and current order load.

Some of the descriptions of the other systems included the following comments: 1) historical sales data, 2) based on forward orders, 3) annual meetings between sales and production staff, 4) looking at sales data previous 10 years to estimate next 3 years, 5) wastage is vital to assess accurately, 6) we understand and know our customers and market - we listen and talk to people in the know, 7) it is in my head so I cannot manage it, and 8) experienced guesswork.

**Question 16.** *Is this system linked to a product costing system?*

This question was asked to find out how 'joined-up' any management systems were and so, by "linked" we meant that the data outputs of the product costing system are used as inputs to the space management or demand forecasting systems.

Forty-two respondents answered this question. Only seven (17%) answered in the affirmative and 35 (83%) said "no". For those that answered "yes", the comments consisted of: 1) the production planning tool has an integrated product costing module, 2) manually entered by experience people, 3) SAP business one, 4) yes, all the products have a sales price (driven by latest order knowledge) and linked to cost model to provide margin analysis.

**Question 17.** *Would the nursery (production or marketing managers) be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC?*

In the same way as Q9, by asking this question we were trying to assess the potential level of interest and uptake by industry of tools that could help with management decisions about these issues.

For the space management component of the question, 61 respondents answered this question, of which 44 (72%) said “yes” and 17 (28%) said “no”. The comments associated with the “yes” answers were as follows: 1) yes as a high level planning tool if it was quick and easy to use. We have our own detailed system and 2) could be very useful but must be able to differentiate between a whole range of space types - outdoor beds with capillary watering, outdoor beds with overhead watering, unheated poly tunnels, frost protected glasshouse, etc, etc.

For those that answered “no”, the comments were as follows: 1) our current system is flexible to use and accurate, and 2) most of our containers are large so production on m<sup>2</sup> does not work.

With respect to demand forecasting, 64 respondents answered this component of the question. The ratio of responses was similar to the previous result, with 47 (73%) and 17 (27%) answering “yes” and “no”, respectively. The comments associated with the “yes” answers were as follows: 1) yes if better than the current and could be integrated into our system, 2) Yes as a high level planning tool, if it was quick and easy to use. We have our own detailed system, and 3) could be very useful, especially if it can adapt to availability of data. Ideally, it would not want to be too prescriptive in terms of the type of data that is needed to be gathered to work the system successfully.

For those that answered “no”, the comments were as follows: 1) our current system is flexible to use and accurate, and 2) unable to see how this could work, based on other nurseries decisions unknown to us.

The survey data were also analysed to determine the percentages of respondents that requested none (15.3%), one (19.4%), two (9.7%) or all three (55.6%) of the proposed tools. 84.7% of the nurseries said they would like to receive one or more of the tools.

**Question 18.** *Please include any additional information, comments or feedback that you think may be useful in the design of nursery management tools.*

The nurseries were very generous in providing additional information and opinions in response to this question. Their replies can be categorised and summarised into the following broad areas.

➤ SIGNIFICANCE OF THE RESEARCH TO HNS NURSERIES AND TOOL(S) DEVELOPMENT

Supportive comments include the following:

“Both these tools are probably the most important tools that our nursery hasn't got. We have tried developing our own but not successfully.”



“Forward planning is perceived as critical in our business. The ability to simulate the production plan and mimic its impact on the wider business plan is essential. Traditionally, HNS businesses agree and embark on a production plan based on historical data only - once committed the "die is cast" Forward planning and simulation would de-risk this!!”

“I am very aware that our business needs to 'professionalise' the whole area of costing and pricing and needs to be able to set clear pricing guidelines to the sales team and be able to justify variances between groups of plants and between different types of customer.”

“There is a lot more to demand forecasting than how many you sold last year! Fashions and demand change, pest and diseases can destroy demand very quickly (eg Chestnuts). Bad weather can destroy crops and drive the price up due to a shortage one year; demand forecasting is accurate data collection combined with knowledge following market trends & savy / gut feeling.”

“We would be interested in a cost analysis system to illustrate product group profitability and product contribution to the company. We have our own version which we use as a health check about every 3 years.”

“This is an area of significant development activity within this company / group where we have encountered a number of issues requiring bespoke solutions.”

“We grow mostly for multiples, so we have a programme to work to already. Space is an issue mainly because I always say yes to a contract when we are already full.”

“For a small nursery we will only grow what can be sold through our own garden centre so any room on site is a premium, sometimes a case of prioritizing.”

“We keep records of production and look at sales on the garden centre to try to increase / decrease production. Plant numbers tend to be adjusted each year by small amounts unless a marketing campaign can be pushed”

“I would be interested as a high level planning tool, to do “what if” scenarios on.”

Only two nurseries held the following negative opinions on the proposed work.

“We do not believe this to be a suitable area for HDC activity, because it has been an area of commercial development both by nurseries like ourselves and companies like Passfield.”

“What’s the point with cheap imports. The trade in this sphere is very mercurial and you cannot budget in this climate and market place.”

➤ COMPLEXITY OF THE TOOL(S)

All the comments on this point stressed that the tools must be simple to use.

“Must be simple and usable, even at the expense of best functionality. Keep stressing that this stuff is done by everybody all the time, they just don’t know it.”

“I have answered yes to Q9 if it’s quick and simple to use.”

“In all cases information required must be as simple and easy to gather as possible.”

“We grow nursery stock what we grow fits in with trading plants in order to fulfil customers orders - all the orders. These orders are sometimes complex in the variety of plants and sizes requested and call off dates.”

“I think it is important that any model is simple to use. Other production planning modules I have seen appear over complicated or in appropriate when applied to nurseries with a large range of products.”

➤ DATA CAPTURE AND INTEGRATION WITH OTHER SOFTWARE.

Comments in this area concerned accuracy and compatibility with other software.

“Any development of this type also has to be integrated with a number of bespoke and off the shelf systems including Passfield.”

“Cost / time of adding new software all this REALLY NEEDS to be added onto existing stock controls / sales order system - Greenfield Software Growmaster otherwise it creates a lot of extra Admin.”

“We find data capture the biggest issue on a large nursery with a lot of employees and products. You should take this into account when trying to development a model that can be distributed for free. Entry of incorrect data can lead to bad decision making.”

➤ DECISION SUPPORT TOOL DESIGN

One nursery suggested that the tools were built as ‘stand-alone’ modules.

“I would prefer that Space management, Costing and Demand forecasting tools are all separate stand alone entities - possibly with an ability if necessary to copy and paste data from one to the other, but with each one

being capable of use alone and without necessarily using the other two tools.”

➤ OVERHEAD ALLOCATION

Overheads and how to allocate them was an area of great interest to some nurseries. It is of note, however, that overheads were not considered in the production costings on 40.9% of the nursery returns. It is therefore highly unlikely that the calculations for these nurseries are providing accurate or realistic answers.

“We need to be competitive in all the markets we are involved in and struggle / wrestle with issues such as differential overhead apportionment to take account of scale. For example:- a DIY store orders 10,000 of a particular crop while 150 other retail customers take a total of 3000 of the same crop. A single batch of 13000 plants (+ a few for grade out) is grown. It is relatively easy to quantify the differences between the actual selling costs, actual marketing costs & actual despatch costs associated with serving the DIY customer compared with the other retailers and that can justify some pricing difference, but not enough difference to remain competitive in the DIY sector. My costing dilemma is how much one should differentiate the apportionment of overheads to account for scale of production. If the business didn't have the DIY order, the crop would only be 3000 plants and the management overhead per plant would be much more costly than for a batch of 13000 plants, so even though the 13000 plants are grown as one batch, there is strong argument that overhead costs should not be distributed evenly over all the plants in the batch if one is to remain competitive in all markets, but how much differential should there be? These are the sort of arbitrary? reasoned? decisions that any costing scheme must inevitably address.”

“How to allocate overheads and on what crop lines, together with how to allocate them depending on time on the ground.”

“Each year, costs are looked at differently. Three and a half years ago the nursery was full so space was the cost. Now it is 25% empty! So how are overheads apportioned?”

➤ SIMULATION, OPTIMISATION AND DECISION MAKING

Opinion in this area suggests that the tool(s) need to be able to simulate situations and help optimise profits.

“After doing all the above costs, still have to take into account what the market will stand. If still no money in it stop growing it.”

“What makes best use of a given area e.g. are two less profitable crops better than 1 more profitable one? How space can be related to time on the

ground when not all of crop goes out at the same time. How best to batch crops to meet demand.”

“What is best volume to start with? How quickly to increase and decrease numbers for given line? What is the optimum number for maximum profitability?”

➤ TIMINGS

The biological constraints of growing plants were raised in relation to space management.

“Space management would need to take account of differing growing times for the same crop grown at different times of the year.”

“Timing of growing related to sales period seasonality ie Production for certain plant sales windows”

➤ RELEVANCE TO TREE PRODUCTION

Nurseries involved in tree production were particularly concerned about the long time-frame under which production occurs.

“Tree production has a static spacing, which is difficult to alter from year to year. We also have a field production department where spacings are inflexible. Demand forecasting is too far in advance of marketing to be particularly accurate & forever the greatest challenge.”

“We grow trees to semi-maturity and so all is long term. We also contract grow which is short term. Space allocation is a challenge. Over-run of space usage is a real problem. Having no defined future crop requirements as in architectural trends and fashion. Also, worries that over time, global warming will affect the trees business.”

“Conifer prices dictated (held down) by large producers UK and Dutch for 20 yrs. No choice but to follow 2yr graft. In 1989 = £4.25 (2 l pot) same in 2009 £4.75. I wanted a computer generated schedule 15 - 20 years ago, ie how many of each variety in a total of say 100,000 cuttings or 15,000 grafts.”

## Discussion

The survey generated considerable interest, resulting in the return of 72 completed survey forms. This was more than twice the anticipated realistic target of 10% (35) of HNS businesses. Somewhat surprisingly, 73.6% of the returns were received by post as hardcopy, rather than electronically. Both the number of returns and the

market sectors represented, suggest that the survey captured a broad spectrum of the nurseries operating in the various market sectors.

When comparing the number of product lines to turnover it was apparent that there was no clear relationship, i.e. nurseries in the smallest turnover categories (< £0.25m and < £0.5m) could be in the category with the highest number of product lines (> 1500). It is clear from these data that the costing and other tools must be able to cope with a range of plant lines, probably well in excess of 1,500 per year.

When interpreting the survey results, it became apparent that “product line” may have been interpreted differently by some of the respondents. The meaning intended by this term has now been defined in the Glossary and is “any individual variety in a given cell/liner/pot size, e.g *Choisya ternata* 9 cm is one line, *Choisya ternata* 3L is another”.

As expected, all respondents were extremely interested in assessing their nursery’s financial performance and profitability. The greatest percentage of nurseries (64.8%) assessed their financial performance against a cost budget. An assessment of the business as a whole also ranked highly (56%). A large percentage (46%) also said that they considered the profitability of individual plant lines and 40% looked at plant groups. Out of the 71 respondents to this question, 55 (77%) used two or more methods to assess profitability, showing the high priority given to this topic. Nurseries most commonly used three different methods to achieve this aim.

The largest number of respondents used their production costs as a basis for price setting, although a similar percentage said that they priced according to what the market could stand. This probably involves assessing what the competitors are doing and this criterion was ticked by 63.9% of the respondents.

Although these issues are clearly extremely important to nurseries, just under half of them (47%) said that they did not use a computer to calculate the production costs of individual plant lines. This does seem a remarkable result given the numbers of product lines that even the smallest nurseries can produce and the complexity of the task of costing production accurately. When the data are broken down according to turnover, there was a clear trend apparent. A high percentage of the largest nurseries with a turnover of more than 5 million used a computer-assisted costing system (eight out of nine nurseries). At the other end of the turnover scale (< £0.5 million), only seven out of 23 nurseries used a computer. The somewhat surprising finding is that computer use for costing product lines is low (around 50%) in medium sized nurseries. These data suggest that a simple-to-use computer-based costing tool would be useful to many managers running nurseries with an annual turnover of up to £5 million.

A related and interesting finding was that the most commonly used software for costings and profitability was Excel and there does not appear to be a commercial package that is widely used.

When calculating the production costs of individual product lines, the most common items taken into account were compost cost (93.9%), plant cost (92.4%), pot cost

(92.4%) and initial labour cost (87.9%). Of note was the interesting finding that 40.9% of respondents did not include a contribution to nursery overheads in their costings and that no item was common to all costing systems. There also does not appear to be a standard way of calculating production costs. These data also suggest strongly that for many nurseries, their production cost calculations are not as accurate as they might be and that they may be significantly underestimating them.

Almost certainly as a result of the situation described above, the overwhelming majority of respondents (81.4%) were in favour of receiving an HDC-funded program (costing tool) to calculate plant costs. Also, when the responses were analysed by turnover, there was a clear majority in favour of developing a costing tool expressed by nurseries in all categories. As well as there being a large majority in favour of the HDC developing a costing tool, the nurseries were also prepared to invest a high (48.2%) or medium (44.6%) amount of effort, in order to make it operational on their nurseries. In later questions, the encouraging finding was also made that the majority of nurseries are already collecting the types of data that could be used in a costing programme and that all 72 (100%) nurseries owned a computer and 69 (95.8%) said that Excel was loaded on to it. Sixty-one respondents said they were familiar and confident with using Excel and so it is clear that Excel (and Visual Basic) are the correct environments in which to build the tool(s).

The survey also showed that for nurseries all turnover categories, space management could be a highly important issue and that when nursery turnover exceeds £2.0 million, the importance attached to space management increases substantially. Forty percent said that they had a system for managing space, but only seven said that this was computer assisted / spread-sheet (usually Excel) based.

Almost all nurseries (92.8%) rated forecasting demand either a score of six or higher, demonstrating that this is considered an extremely important management activity. Fifty-two nurseries said that they had a demand forecasting system, but only eight were computer assisted.

Only seven nurseries had "linked" systems where data outputs of the product costing system were used as inputs to the space management or demand forecasting systems.

The sum of the scores allows a good comparison of the relative importance of space management and demand forecasting problems and the totals were 464 and 579, respectively. Demand forecasting, therefore, is clearly an issue of great interest to almost all HNS nurseries and, in general, ranks above space management in importance.

When asked if their nursery (production or marketing managers) would be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC, 72% and 73% said "yes", respectively. These percentages are only slightly lower than the percentage in favour of building a costing tool, which was 81.4%.

The survey data were also analysed to determine the percentages of respondents that requested none (15.3%), one (19.4%), two (9.7%) or all three (55.6%) of the proposed tools. 84.7% of the nurseries said they would like to receive one or more of the tools. As more than half of the nurseries asked for all three tools, this provides evidence of a clear demand for these products.

The nurseries were very generous in providing additional information and opinions concerning these tools. The key attributes of the tools should be that: 1) they must be simple to use; 2) data capture should be made as easy as possible (able to accept data from other software programs) with built-in error checking; 3) the costing tool needs to be able to have different methods of allocating overheads; 4) the tool(s) need to be able to simulate situations and to help optimise (maximise) profits; 5) the space management tool should take account of the biological constraints of growing plants; 6) tree growing nurseries may need modified versions of the tool(s) due to their extended production times and other individual requirements.

In common with many new technologies, decision support tools themselves require a level of support to help them get established and accepted by users. Given the initial low level of computer use by nurseries apparent from this survey, when dealing with these various issues, it is clear that some 'extension' effort will need to be made in the future, probably in the form of workshops to support those nurseries interested in adopting the tools.

## **Conclusions**

The survey generated 72 returns from a broad spectrum of nurseries operating in the various HNS market sectors, showing that there is considerable demand for the proposed work.

As expected, financial performance and profitability were subjects of intense interest to nurseries and many used up to three different methods to assess this.

A large percentage (77.8%) of nurseries used production costs to set the price of product lines. Only half of the nurseries (53%), however, said that they used a computer to calculate the production costs of individual plant lines, although many produced over 1500 different ones. In addition, 40.9% said that they did not include overheads in their calculations and so they are probably underestimating them significantly.

There is no widely adopted commercial package for costing production of individual varieties, although several different packages were mentioned by individual nurseries. A few nurseries, however, do have well developed and relatively sophisticated computer-based costing systems. The most commonly used software for costings and profitability were "self-built" systems in Excel. Due to the lack of an easy-to-use production costing tool, the overwhelming majority of respondents (81.4%) said that they wanted to receive an HDC-funded costing tool to calculate

plant costs and there was a clear majority in favour of developing a costing tool expressed by nurseries in all turnover categories.

The survey data also showed that for nurseries in all turnover categories, space management could be a highly important issue and that when turnover exceeds £2.0 million, the importance attached to space management increases substantially.

Almost all nurseries (92.8%) also rated forecasting demand either a score of six or higher (out of 10), demonstrating that this too is one of the most important management activities. Demand forecasting, therefore, is clearly an issue of great interest to almost all HNS nurseries and, in general, ranks above space management in importance.

When asked if their nursery (production or marketing managers) would be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC, 72% and 73% said “yes”, respectively. 84.7% of the nurseries, therefore, said they would like to receive one or more of the tools.

The nurseries were also very generous in providing additional information and opinions concerning the key characteristic of the tools, amongst which included the ease of use and data capture, as well as the ability to simulate situations and to optimise (maximise) profits.

## **Knowledge and Technology Transfer**

This survey provided strong evidence from industry voicing a clear demand for the development of decision support tools for HNS nurseries.

At least two articles are planned for publication in HDC News and the ‘bronze’ version of the costing tool will be released at the end of this year.

In common with many new technologies, decision support tools themselves require a level of knowledge-transfer support in order to help them get established and accepted by users. Given the initial low level of computer use by nurseries apparent from this survey, when dealing with these various issues, it is essential that some ‘extension’ effort will need to be made in the future, probably in the form of workshops to support the high percentage of nurseries interested in adopting the tools.

As part of an ongoing process of modernization for HNS nurseries, the training of key staff in the use of the latest Excel package would be highly beneficial.

## **Glossary**



Wherever possible, an attempt has been made to avoid jargon and use plain English. There are some words in the report, however, that may need some additional explanation. These are:

**Decision support tool** – a computer-based program that can be used by nursery managers to generate information that aids them to make important decisions (e.g. about setting prices, managing space and estimating future demand).

**Costing tool** – a computer-based decision support tool designed to be easy to use and to generate production costs for particular products sold by the nursery.

**Product line** – a "product line" is any individual variety in a given cell/liner/pot size, e.g *Choisya ternata* 9 cm is one line, *Choisya ternata* 3L is another.

**Product groups** - Any grouping of lines that have the same production and costing criteria are "product groups".

**Model** – the mathematical calculations made to generate answers to specific questions.

**Annex 1 - The survey questionnaire form.**



## Hardy & Ornamental Nursery Stock (HNS) Research Survey Questionnaire

<b>Prepared by:</b>	<b>Professor John Colvin and Mr Will George</b>
<b>Survey return date:</b>	<b>Friday 18<sup>th</sup> March 2011</b>
<b>Email addresses:</b>	<a href="mailto:j.colvin@greenwich.ac.uk">j.colvin@greenwich.ac.uk</a> <a href="mailto:Will.George@adas.co.uk">Will.George@adas.co.uk</a>
<b>Phone numbers:</b>	01634-883310 (J. Colvin) 01403-823275 (W. George)

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### Background

This survey was commissioned by the HDC with the long-term goal of helping to improve the profitability of HNS nurseries. Its main objective is to collect information on approaches to costing production in order to help build an easy-to-use costing tool, which will become available to levy payers through the HDC at the end of the project.

This questionnaire is split into three sections. The first deals with approaches used to cost production and how nursery profitability is assessed. The second asks about the related issues of nursery space management and how decisions are made on the quantities of each product line to produce. The third provides an opportunity to provide any additional information. The questionnaire has 20 questions, not all of which will be relevant to your nursery. For guidance on individual questions, please read the Notes section at the end of this questionnaire. Even if you have not answered all of the questions, please return the questionnaire.

Please save your responses regularly to avoid inadvertent loss of information. If you do not use Word or have an earlier version than 97-2003, please print out the questionnaire and post your responses to the HDC c/o Jason Pole. Alternatively, you may complete and return the paper copy, which is being posted out by mail to ensure that all levy payers get an opportunity to participate.

We look forward to receiving your replies and thank you in anticipation of your generous provision of information and valuable time.

**Section One (Questions 1 – 12).** The following questions deal with the different approaches used to costing production and how nursery profitability is assessed.

**1) What HNS market sectors does the nursery supply? If more than one, please click on all those applicable to your nursery.**

Market sector	Main Market Sector	Other Sectors Supplied
Garden Centres	<input type="checkbox"/>	<input type="checkbox"/>
Amenity & Landscape	<input type="checkbox"/>	<input type="checkbox"/>
Sheds & Supermarkets	<input type="checkbox"/>	<input type="checkbox"/>
Retailers and Direct Sales	<input type="checkbox"/>	<input type="checkbox"/>
Young plants & liners	<input type="checkbox"/>	<input type="checkbox"/>
<i>Others (please list below)</i>		
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

**2) What is your annual turnover?**

£1 - £250k	£251k £-500k	£501k - £1m	£1 - £2m	£2 - £5m	£5 -£10m	Over £10m
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**3) How many different product lines are grown on your nursery?**

1 - 250	251 -500	501 - 750	751 - 1000	1001 - 1250	1251- 1500	Over 1501
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**4) How do you assess the nursery's profitability / financial**

**performance? Do you:**

Options	Click on those that apply
A ) only look at the profitability of the nursery as a whole?	<input type="checkbox"/>
B ) Look at departments, sectors, divisions or cost centres?	<input type="checkbox"/>
C ) Look at groups of plants?	<input type="checkbox"/>
D ) Look at individual plant lines or varieties?	<input type="checkbox"/>
E ) Look at costs / budgets?	<input type="checkbox"/>
F ) Look at sales budgets / forecasts?	<input type="checkbox"/>
G) Don't assess nursery profitability	<input type="checkbox"/>
H) None of the above, but do assess the nursery's profitability / performance	<input type="checkbox"/>
<b>If you answered yes to option H, how do you assess nursery performance?</b>	

**5) How do you set prices for your product (stock) lines?**

Options	Click on those that apply
A ) Look at your competitors	<input type="checkbox"/>
B ) Estimate what the market can stand	<input type="checkbox"/>
C ) Calculate or estimate the production cost of individual lines and use this as a basis for prices	<input type="checkbox"/>
D ) Bands reflecting / estimating the 'difficulty of production'	<input type="checkbox"/>
E ) If none of the above, please state method in the box opposite	

**If you answered "Yes" to option 5C, continue with Q6, otherwise go to Q9.**

**6) When you calculate or estimate the production cost of individual**

**lines, are the calculations computer assisted?**

	<b>Tick box and go to next appropriate question</b>
<b>YES</b> (Now go to Q7)	<input type="checkbox"/>
<b>No</b> (Now go to Q8)	<input type="checkbox"/>

**7) Is the computer-based costing system:**

	<b>Tick correct option(s)</b>	
<b>A) built in Excel?</b>	<input type="checkbox"/>	
<b>B) built in Access?</b>	<input type="checkbox"/>	
<b>C) other package. Please state what this is called in the response box.</b>	<input type="checkbox"/>	<b>Name of package:</b>
<b>D) a commercial package? If so, please provide the name in the response box.</b>	<input type="checkbox"/>	<b>Name of package:</b>

**8) When you calculate or estimate the production cost of individual lines, which of the following data types are used in the calculations?**

<b>Options</b>	<b>Tick those that apply</b>
Plant or seed cost	<input type="checkbox"/>
Number potted	<input type="checkbox"/>
Waste or yield	<input type="checkbox"/>
Pot cost	<input type="checkbox"/>
Compost cost	<input type="checkbox"/>
Labour cost (initial)	<input type="checkbox"/>
Care cost (labour for trimming, watering etc)	<input type="checkbox"/>
Sundries (eg canes etc)	<input type="checkbox"/>
Lifting cost (labour)	<input type="checkbox"/>
Marketing costs (labels)	<input type="checkbox"/>
Distribution costs	<input type="checkbox"/>
Time of crop on nursery	<input type="checkbox"/>
Area utilised by crop	<input type="checkbox"/>

Overhead	<input type="checkbox"/>
Gross profit margin	<input type="checkbox"/>
Any residual costs	<input type="checkbox"/>
<b>Please continue with others not listed above</b>	
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

**9) Would the nursery be interested in using a basic production costing system, if one were developed and distributed free by the HDC?**

Options	Tick box and go to next appropriate question
Yes (Now go to Q10)	<input type="checkbox"/>
No (Now go to Q11)	<input type="checkbox"/>

**10) Which of the following best describes the importance you would attach to collecting data for a production costing system?**

None	Low	Medium	High
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The next set of questions should be answered by all respondents. They are intended to find out what data and records are collected on nurseries that could be used for a costing system.

**11) Whether or not the nursery assesses the production costs of its product lines, which of the following types of information are recorded regularly (and the data stored)?**

Options	Tick those that apply
Production figures	<input type="checkbox"/>
Associated waste (losses)	<input type="checkbox"/>
Sales / Output per batch	<input type="checkbox"/>
Labour cost per task or crop	<input type="checkbox"/>
Quantity of compost used	<input type="checkbox"/>

Sales and marketing (including labelling costs)	<input type="checkbox"/>
Distribution costs	<input type="checkbox"/>
Annual overhead costs	<input type="checkbox"/>
None of the above	<input type="checkbox"/>
None at all	<input type="checkbox"/>
<b>Please continue with others not listed above</b>	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

12) Use of computers on the nursery		
	Yes	No
A) Do you have access to a computer at work?	<input type="checkbox"/>	<input type="checkbox"/>
B) Is the spreadsheet package Excel loaded onto this computer?	<input type="checkbox"/>	<input type="checkbox"/>
C) Are you familiar with and confident using the spreadsheet package Excel?	<input type="checkbox"/>	<input type="checkbox"/>
D) If you have ticked YES to 12B above, which version of Excel is it?	<input type="checkbox"/> <b>Excel 97-2003</b> <input type="checkbox"/> <b>Excel 2007</b>	

**Section two (Questions 13 - 17)** The questions in this section deal with the interconnected problems of nursery space management and demand forecasting. These terms are defined broadly as:

*Space management* - the process of deciding how to allocate the available nursery space to the production of the different product lines.

*Demand forecasting* – planning how many plants of a particular product line the nursery will be able to sell, when the usual sale period arrives. For example, last year we sold 2000 *Photinia* in May, so how many should we pot and plan to sell next year?

If you consider these management problems to be unimportant on your nursery, please go to Section three, otherwise continue with question 13.



**13) On a scale of 1 [low] to 10 [high], how big of an issue / problem is space management for your nursery?**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

**14) On a scale of 1 [ low] to 10 [ high], how important do you consider it is to forecast accurately the demand for different product lines?**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional comments:

**15) Does your nursery already have a system (not necessarily a computer-based program) designed to help with these issues?**

**If either of your answers is “Yes”, please briefly describe the system(s), then go to Q16. If the answers were NO, please go to Q17.**

	<b>YES</b>	<b>NO</b>	<b>Description</b>
Space management	<input type="checkbox"/>	<input type="checkbox"/>	
Demand forecasting	<input type="checkbox"/>	<input type="checkbox"/>	

**16) Is this system linked to a product costing system?**

	YES	NO	Description
Space Management	<input type="checkbox"/>	<input type="checkbox"/>	
Demand forecasting	<input type="checkbox"/>	<input type="checkbox"/>	

**17) Would the nursery (production or marketing managers) be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC?**

	YES	NO	Comments
Space Management	<input type="checkbox"/>	<input type="checkbox"/>	
Demand forecasting	<input type="checkbox"/>	<input type="checkbox"/>	

**Section three (questions 18 – 20).** This section is to provide you with an opportunity to provide any additional information, as well as the option to provide your contact details.

**18) Please include any additional information, comments or feedback that**

**you think may be useful in the design of nursery management tools.**

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**19) Your HDC membership number (leave blank if you wish to remain anonymous).**

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**20) We would like to follow up some of these questionnaires with a short telephone interview. If you are willing to take part in this please give your contact details below?**

I am willing to be contacted for a follow-up to this questionnaire.	<input type="checkbox"/>
Contact Name	
Telephone Number	

**Thank you.**



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## **Notes to help with completion of the survey questionnaire**

These notes are intended to provide additional background information and to explain the purpose of the questions.

The main purpose of the questionnaire is to find out if a simple-to-use tool that calculates the costs of individual plant lines or groups would be useful to growers.

We also wish to know if growers are already using any methods to cost their plant production. Whether this is by simple manual calculations or by sophisticated bespoke computer programmes

If this proposed costing tool is taken up by the industry, we would expect it to be used to help monitor the profitability of the business and set prices. We are therefore interested to understand how nurseries monitor their profitability and financial performance, as well as how they set prices each year.

We need to know what computer facilities and skills are available to operate a simple costing tool and the type of records that are regularly kept and retained that could be used to produce accurate costs.

The collection of this survey data is governed by the University of Greenwich's ethics procedures, which ensures that the data collected from the questionnaire will be treated confidentially, ethically and impartially.

Please don't hesitate to contact us if you still find it difficult to answer a question or understand what we are asking for.

## **SECTION ONE**

**Q1) What HNS market sectors does the nursery supply? If more than one, please tick those applicable to your nursery. Please mark your main markets.**  
Recent work has shown that the market a nursery operates in greatly affects its profitability, as well as factors involved in its financial management. We are therefore interested to understand which are your main market outlets and these should be marked in the first column. There should only be one, two or possibly three in this column. Other minor markets should be ticked in the second column.

**Q2) What is your annual turnover?**

We would like to get an idea of the approximate size of your business. This is so that we can compare differences in the responses between large and small nurseries. We think that turnover is the best indicator of business size, because area and staff numbers can be misleading. Please mark the box which corresponds to your turnover.

**Q3) How many different product lines are grown on your nursery?**

We need to know the number of lines (products) that are produced each year on the nursery. This includes the same variety of plant grown in different sized containers. Each size would be a different line because its cost of production will be different. Please mark the box which corresponds to the number of lines.

**Q4) How do you assess your nursery profitability / financial performance?**

We wish to know what methods you use to monitor the financial performance of your business. This is likely to be a combination of some of the methods listed below. The list is not exhaustive and so there may be other methods that we may not have listed. Please add these or mark yes or no to the listed possibilities.

**Do you:**

**A ) Only look at the profitability of the nursery as a whole?**

Do you just look at the overall profitability of the nursery as a whole using the accountant's annual accounts or management accounts?

**B ) Look at departments, sectors, divisions or cost centres?**

Do you break the nursery down into various departments such as sales, propagation, production, transport etc and study the performance of each department?

**C ) Look at groups of plants?**

Do you look at how plant groups such as trees, or shrubs or herbaceous etc affect the profitability of the business?

**D ) Look at individual plant lines or varieties?**

Do you look at individual plant varieties and assess whether or not they make a profit?

**E ) Look at costs / budgets?**

Do you set a budget based on proposed purchases for the nursery and then monitor the actual performance on a regular basis (monthly or quarterly)

**F ) Look at sales budgets/forecasts?**

Do you set a sales forecast or sales budget and then monitor the actual performance on a regular basis (monthly or quarterly)

**G) Don't assess nursery profitability.**

If you do not have procedures for assessing the profitability of your nursery answer yes to this question.

**H) None of the above, but do assess nursery profitability / performance**

If you use another method either alone or in combination with items A to F answer yes to this question and write the method in the box.

**Q5) How do you set prices for your product (stock) lines?**

We wish to know how you set your prices for plants each year. Answer yes or no to all parts of this question

**A ) Look at your competitors**

Do you analyse your competitors' prices before setting your own. This could be done either by reading catalogues, looking at the internet etc?

**B ) Estimate what the market can stand**

Do you set prices according to what the market can stand, with plants that have a higher demand having higher prices?

**C ) Calculate or estimate the production cost of individual lines and use this as a basis for prices**

Do you calculate the cost of individual plant lines or groups of plants and then use this to help set your prices? This can either be a simple manual system or a complex computer programme or something in between.

**D ) Bands reflecting / estimating the 'difficulty of production'**

If certain plants are found to be more difficult to produce i.e. have high losses or a longer production time, do you increase the price of these?

**E ) If none of the above, please state method in the box opposite**

If you use another method of setting prices such as adding a percentage to last years prices or something else, please write your method in this box.

**Q6) When you calculate or estimate the production cost of individual lines, are the calculations computer assisted?**

This question is for those nurseries that are already using a system that calculates the production costs of plant lines or groups of plants. If the system is computer aided then answer "yes" and go to Q7 if you are using a manual calculation answer "no" and go to Q8.

**Q7) Is the computer-based costing system:**

**A) built in Excel**

**B) built in Access?**

**C) Other.**

**D) a commercial package? If so, please provide the name in the response box.**

We wish to know if there is a viable commercial package available or the nursery has commissioned or built their own. Only tick or provide information on those that apply. If you have more than one system, tick the appropriate boxes.

**Q8) When you calculate or estimate the production cost of individual lines, which of the data types listed below are used in the calculations?**

We wish to know the sort of data that you or your programme uses. Could you please tick those boxes that the programme uses and add any other categories that are not listed.

**Q9) Would the nursery be interested in using a basic production costing system, if one were developed and distributed free by the HDC?**

We are building a simple-to-use costing system, which will incorporate some of the information collected during this survey. We are trying to estimate the level of potential industry interest in such a product.

**Q10) Which of the following best describes the importance you would attach to collecting data for a production costing system?**

This is a purely subjective way of assessing the demand for the costing system and how much time the grower would be willing to put into implementing the costing system, once it was available.

**Q11) Whether or not the nursery assesses the production costs of its product lines, which of the following types of information are recorded regularly (and the data stored)?**

In order to design a system that will be easy to use by as many growers as possible we need to know what sort of plant production records are normally kept on the nursery and are available for use in a costing system. Answer yes or no if these kinds of records are kept and stored. If you keep other records that you think might be useful please add these below.

### **Production figures**

This is the record of what is produced i.e. that which is potted or planted. It should include the numbers produced at each stage, eg cuttings, liners, final potting etc.

### **Associated waste (losses)**

Do you record the losses at each stage of the production cycle or is it possible to easily calculate them by subtracting the initial production from the next stage in the production cycle (e.g. by taking the number of liners potted from the number of cuttings struck to give the losses in cutting production)?

### **Sales / Output per batch**

Do you know how many of each variety of plant you sell in a year? Do you know how many of each batch you sell, when the plants are produced in several batches throughout the year?

**Labour cost per task or crop**

Do you collect labour data or allocate labour to a particular crop? Collecting labour data would include timing certain tasks such as potting or sticking cuttings, which could then be allocated a specific cost.

**Quantity of compost used**

Do you know how much compost you use in each of the range of trays and pots you use on the nursery?

**Sales and marketing costs**

Do you record or would it be easy to calculate your sales and marketing costs? This includes extra labelling costs incurred to differentiate your products.

**Distribution costs**

Do you record or would it be easy to calculate your distribution and delivery costs?

**Annual overhead costs**

Do you record or would it be easy to calculate your annual overhead costs?

**None of the above**

If you are recording none of the above but are keeping other records, tick this box and enter the records you are keeping under “**Please continue with others not listed above**”

**None at all**

If you keep no records at all please tick this box.

**Please continue with others not listed above**

Please list, in the spaces provide, any other records you keep that could be used in accurately costing nursery stock.

**Q12) Use of computers on the nursery**

We need to know if there is a computer available to run a costing tool and if “Excel” is loaded onto the computer. If it is, we would also like to know which version it is, because this will affect how the costing tool is built. We also wish to know if there is someone who is able and confident to use this spreadsheet package. Only the minimum of knowledge would be required.

**SECTION TWO (Q13 – Q17)**



**Q13) On a scale of 1 [low] to 10 [high], how big of an issue / problem is space management for your nursery?**

We wish to get a subjective impression of the importance the nursery attaches to managing the different types of space it has available. If, for instance, you have heated glass, do you assess how this cost is justified in terms of the product lines it is used to produce?

**Q14) On a scale of 1 [ low] to 10 [ high], how important do you consider it is to forecast accurately the demand for different product lines?**

We wish to get a subjective indication of how much thought / planning is invested in deciding how many plants of each product line to attempt to produce. Linked to this is the idea that overproduction causes 'waste' or the need to discount, both of which directly reduce profitability.

**Q15) Does your nursery already have a system (not necessarily a computer-based program) designed to help with these issues?**

Please tick the appropriate boxes and if you have answered YES to either question, describe the system in your own words.

**Q16) Is this system linked to a product costing system?**

By "linked" we mean that the data outputs of the product costing system are used as inputs to the space management or demand forecasting systems. If you just have a "gut feeling" about these things, please answer NO.

**Q17) Would the nursery be interested in using space management and demand forecasting tools, if they were developed and distributed free by the HDC?**

In the same way as Q9, we are trying to assess the potential level of interest and uptake by industry of tools that could help with management decisions about these issues.

**SECTION THREE (Q18-20)**

**Q18) Please include any additional information, comments or feedback that you think may be useful in the design of nursery management tools.**

If you wish to comment or suggest ideas for other management tools that would help your nursery's profitability, please include them here.

**Q19) Your HDC membership number (leave blank if you wish to remain anonymous).**

We would like you to put in your HDC number so that we can monitor who has responded to the survey. If you can't find your number, please put your nursery's name. If you wish to remain completely anonymous please leave this section blank. We wish to reassure you that all information will be treated confidentially and it is only the statistics and conclusions of the survey that will be disseminated through HDC News.

**Q20) We would like to follow up some of these surveys with a short telephone interview. If you are willing to take part in this please give your contact details below?**

As part of this survey we would like to follow up on some of the topics in more detail and would like to interview a sub-section of respondents, either by telephone or possibly a short visit. If you are willing to participate in this follow-up to the survey, please tick the box and give your name and contact details.