

**FOOD STANDARDS AGENCY**

**A FEASIBILITY STUDY INTO  
HEALTHIER DRINKS VENDING IN  
SCHOOLS**

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Health Education Trust**

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*The views of the contractor expressed within this report are not necessarily those of the FSA.*

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## **LAY SUMMARY**

**Aim** - The aim of the study was to investigate the economic viability of healthier drinks vending provision in schools.

**Coverage** - Twelve schools participated, three from each of the following areas: Devon, Hertfordshire, Cumbria and Pembrokeshire. Schools were chosen to reflect both urban and rural locations and to offer an appropriate mix of size, area and character.

**Approach** - The study took a 'whole school' approach. In each school a small working party was set up including senior management, curriculum staff, catering personnel, and representatives from the student council. This group discussed the project and influenced the key decisions taken.

**Machines** – Two types (six of each) were used to assess their efficiency and appropriateness. Second hand Zanussi 'carousel' vendors and Dixie Narco BevMax' bottle and can' vendors. The carousel is more flexible in accepting different product shape and size, the bottle and can vendor has much greater product capacity. In the Zanussi machines the most popular items were

- 1) pure juices (orange most popular)
- 2) flavoured milks/milkshakes
- 3) semi-skimmed fresh milk.

In the Dixie Narco machines the favourites were as follows:

- 1) flavoured milk/milkshakes
- 2) semi-skimmed fresh milk
- 3) mineral water.

In the schools completing the project in the region of 70,000 units of product were sold, in excess of 35% of these were milk or milk products – around 25,000 in less than six months.

### **Operational Outcomes**

The results in commercial terms were that nine schools completed the project. After wage costs and a machine lease charge had been taken from gross profit, two made a small loss (over about 20 weeks), two made a small profit (over 10 and 19 weeks, respectively), three made respectable profits ranging from £300 - £520 (over 10, 15 and 15 weeks, respectively), and the last two achieved profits of £863 and £1283 (over 18 and 24 weeks, respectively). The variation in time over which profits were calculated is due to problems encountered by individual schools during operation, which affected periods of data collection.

Analysis of the results has shown that the overarching factors influencing the success of healthy vending are primarily practical issues and how the school deals with these. School size, geographical location (rural, rural town, or urban) and the degree of deprivation (such as percentage of free school meals), appear to have little bearing on the profits ultimately achieved. However, these conclusions are drawn from a relatively small sample size and thus can only be applied to this study. It is true however, as illustrated in this study, that healthy profits can be achieved at schools with a relatively high deprivation score.

### **Conclusions**

If just one in five of the 5,000+ secondary school headteachers in England and Wales placed a single healthier drinks machine into their school we would see approximately 14 million additional units of milk, milk products, pure juices and

waters vended to children every year. All the schools who completed the project, demonstrated that children will buy the range of healthier drinks products offered them from vending machines - milk products, pure juices and waters - and they described such vending as, '*an important part of the food service*', and '*of benefit to the whole school*'. But in the schools which were successful, what made the difference?

### **Characteristics of a Successful School**

**Location of machines** - In the dining area or a place very close by to make filling/maintaining/supervising as easy as possible to ensure service continuity.

**Machine/product harmony** - A match is achieved between the capability and characteristics of the machine and the product sourced to fill it. There are many different types of machine with differing characteristics. Some have high capacity others greater flexibility and so on. It is vital that considerable care is taken to ensure that the products and the machine are compatible.

**Staff commitment** - At both school and management levels the school and the caterer recognises that vending is an extension of the counter service and gives it similar priority in terms of ensuring service continuity and reliability. This happens when there is recognition of the benefits such a vending service can provide i.e. benefits to profits and quality of service combined with a movement towards sound educational practice.

**Customer care/best educational practice** - Pupils are involved in the discussion about the service as part of a 'whole school' approach, so it is designed with their tastes and needs in mind, links consistently to the messages in the taught curriculum, and they feel a part of the decision making process.

**Monitoring** - Good records are maintained to enable sound judgements to be made on the operation of the vending machine and its impact on other parts of the service.

FSA Toolkit - A practical guidance document will be produced by the FSA which will consider the points above and other aspects of healthier drinks vending in schools needed in order to deliver a successful, commercially sound service

# **FOOD STANDARDS AGENCY HEALTHIER DRINKS VENDING IN SCHOOLS PROJECT REPORT**

## **Background**

Against a background of increasing concern about the diets of children and rising levels of childhood obesity, secondary schools are increasingly supplying confectionary and soft drinks vending to pupils. These machines can make substantial profits and require little engagement from the school itself, thus being administratively convenient and commercially attractive. During the summer and early autumn of 2002, the Dairy Council and the Health Education Trust had been discussing the possibility of increasing the consumption of milk products, juices and water to secondary schools students via vending. In November 2002 the FSA joined in the debate and agreed to fund a study to investigate the viability of healthy drinks vending in schools. It appointed as contractor, Joe Harvey – Director of the Health Education Trust. The Dairy Council agreed to encourage the active participation of the major dairies and facilitate access to appropriate products and offered to support the dissemination of the findings of the report after publication.

## **Review of literature**

There have been many publicity and newspaper articles about healthy foods in vending machines but not much research has been published. A study in USA examined the effects of pricing and promotion strategies on purchases of low-fat snacks from vending machines. It concluded that reducing relative prices on low-fat snacks was effective in promoting their purchases from vending machines in both adult and adolescent populations<sup>1</sup>.

## **Review of current best practice**

It was because there was an apparent lack of examples of good practice that the FSA agreed this project should be commissioned. However, below are projects that seem to step outside the traditional soft drinks approach to vending in schools.

**1. West Dunbartonshire Healthy Vending Project** was set up under their Food Action Network, a multi-agency collaboration. The literature suggests it was set

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<sup>1</sup> Pricing and Promotion Effects on Low Fat Vending Snack Purchases: The CHIPS study. Simone et al, American Journal of Public Health 2001; 91:112-117

up to operate in a very similar way to the methodology we are adopting in terms of it being one facet of a 'whole school approach'. But it is set up as a 'one stop shop' with both food and drinks in the product mix and the emphasis being on food. Machines are supplied on a lease basis and the school, working with the caterer, agrees the machine content. Figures on the commercial success of the operation are not currently available. On a visit to the project in 2003, catering managers at the two sites confirmed the following

- the machines were very popular with pupils
- they made sound profits
- they were robust and had broken down only rarely
- machines had been in service for approx three years
- vending machines were seen as an additional arm to the catering service

There seemed little pupil involvement but the product mix was appropriate. The West Dunbartonshire project initially faced their fair share of barriers, mainly composed of concerns from caterers and senior management in schools. Most of all, there was the fear of sustainability, financial viability and the protection of status quo/inertia.

**2. The Italian Apple Vending Project** has been reported in the context of encouraging use of local produce and a more sustainable food service. It has not been possible to locate organisations or individuals who are associated with this project or who can give reliable information on its operation. Neither is it clear if it vended only fresh fruit or included locally pressed and packaged juices.

**3. The Green Machine** is a project currently backed by *Jordans* and *Yeo* and is run on the same lines as any other vending such as *Nestle/Coke/Cadbury's*. The machine is provided in order to sell products manufactured by the companies and the school has little say in the product mix. This concept is marketed on the benefits of the products being 'organic and healthier, however a number of these products are high in sugar and relatively expensive.

## Healthier Drinks Vending – Initiation

The timetable for the healthier drinks vending pilot was as follows:

- |                     |  |
|---------------------|--|
| December 2002       | <ul style="list-style-type: none"><li>• Contact catering organisations re pilot schools, AVA and vending machine contractors to discuss machine choices.</li></ul>   |
| January 2003        | <ul style="list-style-type: none"><li>• Contact pilot schools and set up preliminary meetings/agree commitment to project</li><li>• Meet to discuss product and contract management process with caterers.</li></ul> |
| February/March 2003 | <ul style="list-style-type: none"><li>• Full meetings of school working groups with school council involvement.</li></ul>  |
| April 2003          | <ul style="list-style-type: none"><li>• Placement of machines in schools with staff training.</li><li>• Linked programmes of awareness raising/marketing in schools by working parties.</li></ul>                    |
| May/July 2003       | <ul style="list-style-type: none"><li>• Progress meetings with the working groups/ongoing data collection</li></ul>  |
| November 2003       | <ul style="list-style-type: none"><li>• Final meetings with working groups/close data collection/gift machines to schools as required.</li></ul>   |
| December 2003       | <ul style="list-style-type: none"><li>• Draft report due</li></ul>   |
| March 2004          | <ul style="list-style-type: none"><li>• Final report delivered.</li></ul>  |
| April 2004          | <ul style="list-style-type: none"><li>• Guidelines on healthy vending/dissemination plan due.</li></ul>  |

## Equipment and Costs

Discussion about the choice and number of machines was undertaken with support from officers of the *Automotive Vending Association* (AVA) and policy staff from FSA. It was agreed that 12 schools would give a sufficiently large project sample. Such a sample size allowed for two different styles of vending machines to be trialled and after some discussion about the relative merits of each it was decided to use:

- 6 x refurbished second hand **Zanussi** 'carousel' vendors from 'Arabica Vending' @ £2,044/machine, and

- 6 x new glass fronted **Dixie Narco** Bev. Max. 'bottle and can' vendors from the 'Vending Corporation' @ £4,700

Both machines to be inclusive of coin mechanism and a 12 month service contract. This would allow the trial, not only of differing styles of machine, but also of sharply different leasing costs.

## **Pilot schools**

Twelve secondary schools were selected to be offered the opportunity to participate in the project. Three schools were chosen from within each of four catering contracts reflecting both urban and rural locations and offering a range of size, type and culture - list attached as **Appendix 1**.

Commitment from the senior management of both the schools and the catering organisations was seen as crucial to the success of the project. Contact was made with these senior managers and initial meetings were set up in each of the schools during the latter part of January 2003 to explain the project and assess their response to it. The business of these meetings included briefings and discussion on the rationale and purpose, the process, the financing and the timetable. All the schools were very positive about the project and agreed to take part, though there were concerns and these fell into four main areas:

### **1. Finance**

The discussions underlined the sensitivity of schools to budget considerations and their need to ensure that they were not put at risk of unexpected losses. They wanted clear and categorical assurances that there would be no 'hidden' expenses or responsibilities accruing to them as schools or caterers. They argued that the project needed to demonstrate how this style of drinks vending could show an operating profit and if, because the nature of the project was experimental, there were occasional losses, they must be met by the project.

### **2. Staffing**

Because additional hours would be required to fill the machines and keep data on sales, catering managers emphasised both the need to cover their staffing costs, and the difficulty of finding additional staff hours where they are already stretched in running the existing service.

### **3. Product**

There was general discussion about the guidelines for the products – what did 'healthier' mean in terms of drinks? Would they be able source them from existing suppliers? Would the children purchase them if they were not the usual 'branded' product? This was new territory and they felt worried about testing the 'received wisdom' about pupils' drinks preferences.



#### 4. Location/litter

Schools are particularly sensitive to the impact that an untidy site has on their reputation. Additional debris from drinks packaging was a major concern for the senior management teams. The option of providing litter bins, to be placed alongside the drinks vendor, was considered for all schools in the project.

#### **Outcome of exploratory discussions**

It was agreed that working groups be set up in each school to ensure full consultation both prior to commissioning the project and during its operation. These groups would be based on the School Nutrition Action Group (SNAG) concept<sup>2</sup> and have representation from all key stakeholders:

- school management
- curriculum staff
- parent/governor (where possible)
- student council
- catering staff

The importance of involving pupils from the school councils relates both to educational and commercial 'best practice'. It is appropriate to encourage pupils to influence decisions relating to services provided specifically for their use in school, and it makes for good business practice to consult and listen to the 'customer' view about how the service be set up, located and managed. Pupils were recruited by each school through their school council to give a range of age and roughly equal numbers of boys and girls.

Meetings of the groups were arranged and took place during February and early March. Prior to these meetings contextual information was collected on each school (see **Appendix 2** for a copy of the school questionnaire). The collated results for all schools are as follows:

- School sizes range from three with nearly 1500 pupils down through two at circa 600 to the smallest at just under 400. They reflect a variety of location, culture and social class.
- Free school meal entitlement shows the diversity of the schools and ranges from 37% - 3%. Only one school has a significant difference between entitlement and uptake.
- Take-up of paid meals services in cash cafeterias, which also offer snacking services, in secondary schools are hard to assess. However, using a cash flow per pupil formula it appears it varies in our schools

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<sup>2</sup> Publication on setting up SNAG's – 'The Chips Are Down', author J. Harvey, available from [www.healthedtrust.com](http://www.healthedtrust.com)

between 28% - 75% with the higher figure representing schools who keep pupils on site at lunchtime.

- Six schools had a policy on remaining on site at midday:
- Breakfast service is available in four schools with all providing a break time service
- Vending is available on all sites with 16 soft drinks machines, 14 confectionary machines and 5 other (coffee etc).
- No mobile food vans allowed on site though 6 schools had local shops which were a point of sale for pupils
- All schools operated a school council and 9 schools consulted pupils on the food service. Despite this only 1 school has a food and nutrition policy.
- 2 schools use a smart card system for meals payment.
- 3 schools claim to monitor their food service compliance with government regulations via the governing body, the rest rely on the caterer to monitor the service they provide.

## **Pupil Consultation**

Considerable consultation with students and by students took place around all the main issues on which decisions were needed, prior to the commissioning of the vending machines. This was done in order to understand pupil perspectives on the principle of healthy drinks vending and listen to their ideas on products, sourcing, location of machines, accessibility, pricing and usage. These opinions were most influential in directing the commissioning process in each school. Particular attention was given to the products pupils might enjoy. The simple guidance they were given was that the product needed to be water, pure fruit juices or milk products – added sugars should be kept to a minimum (flavoured milk/milkshakes) and artificial sweeteners avoided.

The process involved formal discussion in the working groups, informal chatting with pupils at break and lunchtimes, their feedback from school council discussions and classroom ‘sampling’ by school council reps.

### **Summary of pupil consultation results**

#### *Product*

<b>Milks</b>	Must be cold Semi-skimmed fresh preferred to skimmed or full fat Flavoured milks or milk shakes very popular – perhaps a reflection of brands/marketing.
Favourite flavours:	Chocolate Strawberry Banana
<b>Pure fruit juices</b> Preferred flavours	These were popular Orange Apple Pineapple
<b>Water</b>	Requested in all schools (with a regular request that it come in sports bottles) - a reflection that still in a number of schools it is neither easy nor pleasant to access free, fresh drinking water.
<b>Smoothies</b>	Requested particularly where there was a 6 <sup>th</sup> form or the school had a relatively wealthy catchment area.

There was a preference for product that could be resealed so that it did not have to be all drunk at one time.

Local sourcing was an issue in several schools, and very high on the agenda in Wales, whether this be product produced locally (a local dairy) or packaged (juices/smoothies).

Perhaps surprisingly, there was little mention of 'organic' product as a requirement or consideration.

Size apparently does matter, and there was a good understanding of the relationship between the amount of a particular product and the purchase price. However this was tempered by the desire to have products available that could be drunk and disposed of in the length of a break period.

Labelling - there was however, considerable confusion caused by product descriptions. The different nature of products described severally as a 'fruit juice', a 'fruit drink', a 'fruit shoot' – were not understood and all benefited from an assumption that they were mostly or completely made of pure juice rather than less than 10% in some cases!

### *Location*

There were very mixed responses depending on size and layout of the school site. The debate was linked to accessibility with the key concerns being:

1. Access when canteen is closed – opportunities for breakfast or end of school/after school activities refuelling. Thus inside a dining room, if it closes at these times, not helpful.
2. The chance to avoid queues and get quick service when the canteen was open but very busy – break and lunchtime.

### *Price*

The range of responses reflected age range of pupils and catchment area. However, though some students were comfortable with a top end of £1 +, most identified an average spend per item of between 30p – 55p , effectively up to the cost of a can of Coke which is the easiest product most children have to compare other drinks with in their schools.

### *Usage*

There was unanimity throughout the schools that such an extension of the vending service to sell milks, juices and water would be welcomed by the pupils and, given the caveats of location and accessibility and cost, be well used.

## **Commissioning Machines**

Once the location of machines had been agreed by schools, dates and times were agreed for delivery and training for operational staff during early April. **It should be emphasised that no requirement was placed on project schools to remove or relocate existing vending. It was considered that for the trial to be realistic the healthier vending should co-exist alongside the traditional confectionary and soft drinks machines.**

### **Location**

There had been a lot of debate in each school over machine location in the preparation running up to commissioning. The advantages of locating in or very close to the dining hall were clear – easy access to fill and supervise and maintain. On the other hand several schools saw advantage in locating in ‘house’ or social areas away from the dining area as a way of making these areas more attractive to pupils and offering service points which were more accessible to pupils on a large campus. Initially 8 machines were placed in dining halls and four in house or social areas.

### **Bins**

A large, secure litter bin was provided to each school with a similar decal to encourage appropriate pupil behaviour and help meet the concerns of senior staff about increased litter.

### **Product**

The advice and information around pupil preference in each school guided the caterer in trying to source the desired product mix for each machine. Important aspects for the pupils were:

1. Type of product  
Semi-skimmed fresh milk, milk shakes, flavoured milks, pure juices, smoothies (particularly if the school had a 6<sup>th</sup> form) fizzy/still/flavoured waters.
2. Favourite flavours  
Milks: Chocolate, strawberry, banana.  
Juices: Orange, apple, pineapple.
3. Style and packaging  
Milks must be cold, water in sports bottles if possible, drinks resealable for future use.
4. Local sourcing  
Mentioned in several schools as an important issue (organic got little mention)

#### 5. The price range.

The price range suggested by pupils reflected the age range of pupils and relative wealth of the school's catchment area. It ran from a low of 25p to a high of £1.00, but in every school a range of product and prices was seen important to offer sufficient choices.

Product was to be sourced by the catering contractor through their usual main suppliers prior to the delivery of the machine. In the case of milk products, all major dairies had been contacted and meetings set up to discuss the possibility of such a vending project during the autumn of 2002. The Dairy Council had actively supported this program to assess product availability for schools across the country. It became clear from these discussions that no one dairy could supply all areas, though the range each dairy had varied enormously from one to another. It also emerged that there was very little fresh milk product designed with the 11-18 year old market in mind and as almost all of it was packaged in tetrapak of one kind or another, it made difficult to vend from the Dixie Narco machines. So catering contractors were generally limited to the fresh milk products from their local dairy, and flavoured milk/milkshakes either from the dairy or their usual beverage supplier.

Catering contractors usually have established links with a single supplier of beverages for administrative and commercial convenience. Because this sort of vending was new to schools catering and their suppliers, the products we were asking them to source were not always available in the range or price that schools required, and this did lead to some operational difficulties – see below under 'product'.

### **Marketing**

Each school undertook to raise awareness of the project and its rationale through a wide variety of means. Most used one or more of the following approaches:

1. Announcements in year assemblies, usually within the context of a broader food and nutrition message.
2. Raising awareness with pupils through discussion about the project and its rationale with their form teacher in tutor groups.
3. Work associated with the project in curriculum time for food technology and personal, social, health education (PSHE).
4. The creation of poster displays about the project with a countdown to 'launch' date

5. Student council activities with a focus on sampling opinions and attitudes from the pupil population.

6. Inclusion of the project description and timetable in parent newsletters.

7. 'Taster' sessions of proposed product over the counter – sample product available for comment.

These were all effective in raising awareness of the new service prior to commencement, particularly important in targeting those pupils who did not use the school canteen on a regular basis. Though there were good intentions to revisit these campaigns during the project the reality was that the busy life of the school dictated against this happening.

## Operational Outcomes

The results in commercial terms are shown below in **Appendix 3**. Nine schools completed the project. After wage costs and a machine lease charge had been taken from gross profit, over the course of the project, two made a small loss, two made a small profit, three made respectable profits ranging from £300 - £520, and the last two achieved profits of £863 and £1283 respectively.

Analysis of the results has shown that the overarching factors influencing the success of healthy vending are primarily practical issues and how the school deals with these. It is evident from the graphical analysis (see **Appendix 5**) that the school size, geographical location (rural, rural town, or urban) and the degree of deprivation (such as percentage of free school meals), have little bearing on the profits ultimately achieved. However, these conclusions are drawn from a relatively small sample size and thus can only be applied to this study. It is true however, as illustrated in this study, that healthy profits can be achieved at schools with a relatively high deprivation score.

Through the conduct of this project we have learned a considerable amount about the causes of this relative success or failure, and have a very much better idea about how to maximise the first and avoid the second! Though much of this is summarised below under 'characteristics of a successful school', the FSA will publish separately a 'guidance' document on delivering healthier drinks vending into secondary schools. What follows is a description of the challenges faced as the project ran its course, and some of the learning derived from facing them.

### Machine and Product Compatibility

#### The Machines

Different types of vending machines have different qualities and are built specifically to vend particular products. As noted above, after discussions with experts from the Automotive Vending Association (AVA), it was decided that we would trial two distinctly different types of machine to assess their appropriateness.

The **Dixie Narco Bev. Max.** (DN) vending machine is a specialist drinks vender. It has a very high capacity, and is able to hold up to 450 cans or bottles when full. One benefit of this high capacity is the lower labour costs for the DN machine as it has to be filled less frequently. It also offers excellent visibility to the products making the machine a good 'shop window'. It is widely used in the UK. However, it is designed to vend round, firm shapes, (cans and bottles), and is intolerant of any product with edges. It was built around the needs of the soft drinks industry in the UK and elsewhere and is highly efficient doing what it is designed for.



Carousel vending machines, such as the **Zanussi** (Z) we used, are designed primarily as food vendors. They have a more modest capacity, being able to hold for our purposes, between 108 – 162 drinks max (depending on product choice) and thus being relatively heavier on labour costs for filling. They are much more tolerant of different shapes and sizes and will vend almost any shape and most size of product including those with edges. It was with these variables in mind that both types of machines were included in the trial, and the trial demonstrated very clearly the impact of the strengths and weaknesses of the machines given the range of product commonly used and available in schools.

### **The Products**

Drinks generally are packaged in glass or plastic bottles, cans or tetrapak cartons - glass containers are not appropriate to school use. The large majority of low cost milk and juice drinks, even small 'smoothie' drinks are packaged in tetrapaks, either of the traditional 'brick' shape, or the more modern 'prisma'.

Though it was clear that brick shapes would not vend through a DN the assumption was that the upright and rounded prisma would. However pre-project discussion with the vending machine suppliers was ill-informed on both sides with the result that there was some misunderstanding on this issue. Though prisma tetrapak would vend most of the time, it could also stick from time to time and jam the machine. This naturally caused major difficulties when it was discovered. A jammed machine leads not just to loss of sales but pupil frustration and a loss of confidence in the machine. (Despite determined efforts throughout the length of the project to develop a shelf modification with the Vending Corporation and the manufacturers, nothing acceptable was achieved.) It was as a direct result of this that one school withdrew from the project and asked that the machine be taken out – this machine was taken back by the Vending Corporation and used to trial the newly modified shelves. What we had found out rather painfully is not to ask a machine to do something it was not designed for! As a result we then worked with the caterers in each of the 5 schools with these machines to adapt to a non tetrapak product range.

An examination of product in table 2 below shows the constraints of the DN machine. While it can offer a good range of products, it lacked fresh milks (with one notable exception - see school 2), and the juice is a canned or bottled product, generally more expensive. Examples of product in table 1 show that the Z machines, allow the tetrapak products to be used thus, enabling a fuller range of product, but requiring higher labour input.

Sourcing product revealed another potential difficulty. Each catering contractor is usually associated with a particular beverage supplier such as '**A-Z**', or '**3663**'. Each supplier has a specific product list on which the caterer bases his offer to the school. It is difficult, time consuming, and expensive for a contractor to go elsewhere for relatively small amounts of product. Thus when the DN's revealed they would not vend tetrapak product, the alternatives in bottles or cans were not easily found within the range of the relatively inexpensive product they were

replacing. Adding to this problem is the fact that some schools ban cans because of the damage they do to grass cutting equipment if discarded on playing fields. However, fruit juices, flavoured milks, milkshakes and waters were successfully sourced and vended, but the fresh semi-skimmed milk was not available from anywhere in vendable packaging.

## **Product Mix**

The guidance given to all schools' working groups at the start of the project was that the product was to be made up of three elements - water, juice and milk/milk products. Additional to that and arising from the discussion was agreement that flavoured water with artificial sweeteners should be avoided, juices should be pure juice rather than 'juice drinks, all machines should offer a fresh 'semi-skimmed milk,' and that flavoured milks and milkshakes should contain 10% or less added sugar. All school working parties designed a product plan with these elements in place. The complication with the DN machines meant that fresh semi-skimmed milk product could not be vended successfully however shakes and flavoured milks were sourced. Though the elements of the mix were the same in each school, product varied depending on:

- The children's preferences in terms of flavour (though there was surprising unanimity – see report from pupil consultation above)
- Their perception of the affordability of the products – so smoothies tended to be tried in the more affluent catchments and where there was a 6<sup>th</sup> form.
- The ability to source particular product by the caterer through their beverage supplier or dairy.
- The interest in, and availability of, locally supplied product i.e. in the case of a local dairy supplying fresh flavoured milks to one of the schools.

Volume of sales of product was effected by the run up to school holidays as machines were allowed to empty but did not vary greatly over the trial period for reasons other than machines being out of service through breakdown, relocation, or a failure to fill. The key influences on sales appeared to be the pupils' perception of the consistency, the reliability, and the efficiency of the service the machine offered. However individual product sales did vary, at times quite wildly, and this was almost always due to a failure or shortfall in supply - a problem that effected the fresh semi skimmed milk and a particular orange juice. Pupil comments at the working party review meetings illustrate this:

*'Stopped using it when drinks kept getting stuck, and then the queues get huge!*

*'They don't always keep it full - its no use if when you get to the machine and your favourite's run out! '*

On the other hand:

*'So different now, so many kids with juice and water.'*

*'Its brilliant, can get a decent drink when the canteen is closed - next thing should be food'.*

*'Time's precious, the new vending saves queuing just for a drink, and until now it was only coke in the vending machines.'*

## **Product Sales**

Because of the wide variety of product sourced in each of the four contracts and variations between schools of pupil taste and vending machine type, it is most significant to offer the list of most popular products by sales volume and draw a distinction between sales caused by the differences in the characteristics of the two types of machine(see table 1 & 2 and appendix 5).

Fresh milk product could only be found in tetrapak packaging and it was the same for pure juices in 200/250ml volumes. Thus in schools with Z Vendors, because they were able to regularly vend the tetrapak products, fresh milk and juices recorded significantly higher sales than in the DN's. In the DN's these sales were largely replaced by additional sales of flavoured milks which could be sourced in round plastic containers and so would vend successfully. However, 330ml cans of pure orange juice were sourced from Britvic but were both more expensive and not permitted in several schools because of potential hazards to grass cutting equipment.

The pattern of product sales was similar in all schools which had the same machine type. There was only one exception to this, where tetrapak fresh milk product was sold through a DN machine even though there were problems with this product sticking. This was made possible by the determination of the catering manager on site to continue stocking the product, despite these difficulties.

**Table 1**

Zanussi Product by Volume (largest first)	Unit Volume for 6 schools with detailed product data available
Juices – (orange the favourite)	3379
Flavoured milks/milkshakes- (chocolate the favourite).	2925
Fresh semi-skimmed milk	2882
Water – (still more popular than fizzy)	347
Smoothies - where available	32

**Table 2**

DN's Product by Volume (largest first)	Unit Volume for 6 schools with detailed product data available
Flavoured milk/milkshakes.	6094
Semi-skimmed fresh milk	3861
Waters – (still, the favourite)	1399
Juices – (orange the favourite, but all juices difficult to source in non tetrapak packaging in 200/250ml size).	1073
Smoothies – where available.	536

It is believed that there could be a much greater potential for 'Smoothies' in schools vending than has been shown in this trial. If manufacturers could supply a smaller size product aimed at the schools' market and thus reduce the selling price they would become more accessible to children's pockets.

The whole issue of product range and accessibility is one that that we hope to address in the 'guidance' document to be published by the FSA.

### **Machine location**

The location of the trial machines was a key indicator to success or failure. In each school the decision as to where to place the machine was taken with care, perhaps with a view to offering a facility to a particular age group, or to make a house social area more attractive and civilised for the children. But it became clear that the machines that were situated well away from the dining areas set a number of challenges to the catering staff, and all ended the trial with an operating loss. Continuity of service is essential for success and for this to be achieved, regular feedback is required on the status of a machine, and the machine needs to be secure against vandalism.

1. It is difficult and time consuming to keep a machine adequately stocked when busy staff have to leave the kitchen/dining room area to check what, if anything is needed to replenish it.
2. Breakdowns may occur and pupils may claim to have lost money. Such situations are difficult to assess and time consuming to correct when the machine is not to hand.

3. The frustration if a machine malfunctions can irritate pupils. This, and a lack of proper supervision in such areas, is likely to increase the chances of vandalism or mischief as well as lowering sales significantly.
4. Staffing shortages in the school meals service are endemic. Getting the meals out comes well ahead of filling or maintaining a vending machine, and this is compounded when it is a distance from the kitchen.

## **Communications**

Maintaining good communications was paramount in keeping the project working smoothly. In several areas there were communications failures during the project which interrupted the smooth operation of the machines.

The relocation of machines due to unforeseen circumstances occurred in two cases where a machine was in an area which became due for building works. The work was either over a holiday period or initially only meant to take a couple of weeks and so the school judged no action was necessary. As can be the case, the work ran on and over the time allocated. The delays before alarm bells were rung and action could be taken to move the machines were considerable and, in both cases minor damage occurred to the machines necessitating repairs.

Maintenance and repairs were covered by both machine suppliers by specific service contracts. For the DN's this worked fairly well. As they were new machines there were few problems with breakdowns and those that occurred were swiftly resolved. The Z's were used machines and more liable to breakdown. The service agreement had been sub-contracted to a specialist company to cover the broad geographical spread of schools. They struggled to respond at an acceptable speed and parts were not always quickly available thus causing machines to be out of use, giving catering staff much frustration, and losing operational credibility with the pupils.

Data collection was agreed at the outset of the project and the focus of the data collection kept as simple as possible to minimise the additional time loading on the catering staff responsible. Description of product, cost and sale prices, numbers of each product sold, gross sales, gross profit labour costs and net profit were required to be kept and returned on a weekly summary sheet. It was requested that data be kept on other vending machines so changes in sales could be recorded – with one exception, (school 8), this was not achieved as either the data was not held by the school but by the supplying contractor, or the data was seen to be commercially sensitive. The regular collection and dispatch of this data was a casualty in several of our schools at one time or another during the trials. This was usually due to staff shortages in the schools, which increased pressure of work on both site catering managers and their area managers.

It was a combination of all these factors that led to insufficient data being available to include three schools in the project results and reduce the length of time data could be gathered in several others - see **Appendix 4** for details.

## Conclusions

All the schools who completed the project, demonstrated that children will buy the range of healthier drinks products offered them from vending machines - milk products, pure juices and waters - and they described such vending as, '*an important part of the food service*', and '*of benefit to the whole school*'. But in those schools which were commercially successful, what made the difference?

## Characteristics of a Successful School

### ✓ **Location of machines**

In the dining area or a place very close by to make filling/maintaining/supervising as easy as possible to ensure service continuity.

### ✓ **Machine/product harmony**

A match achieved between the capability and characteristics of the machine and the product sourced to fill it. (Though the second hand Z machines did have some maintenance problems, the flexibility of the 'carousel' style of vendor makes a modern version of such machines, with better capacity than those used in the trial, an attractive option for schools service until a better design appears).

### ✓ **Staff commitment**

At both school and management levels the school and the caterer recognises that vending is an extension of the counter service and gives it similar priority in terms of ensuring service continuity and reliability. This happens when there are **recognised benefits** apparent i.e. benefits to profits and quality of service combined with a movement towards sound educational practice – (descriptions and demonstrations of such benefits will form part of the FSA guidance document).

### ✓ **Customer care/Best educational practice**

Pupils are involved in the discussion about the service as part of a 'whole school' approach, so it is designed with their tastes and needs in mind, links consistently to the messages in the taught curriculum, and they feel a part of the decision making process.

### ✓ **Monitoring**

Good records are maintained to enable sound judgements to be made on the operation of the vending machine and its impact on other parts of the service. (Standard proforma will be available for use or adaptation in the FSA guidance document.)

## Future Developments

This is an exciting new market place for the vending industry and one it and suppliers are waking up to rapidly. Although the machines presently available have been designed to suit the products of the soft drinks industry, they are still capable of providing a commercially sound outlet for healthier products if used efficiently and appropriately. However new machines are presently being trialled that combine high capacity with product flexibility and if shown to be successful could transform the situation.

The potential revolution of vending in our schools is a massive opportunity for product manufacturers. It has been exciting to see the appetite children have for milk, milk products, juices and water. The most obvious hole in the market is the lack of attractively packaged fresh milk products in the 200ml – 330ml volumes targeted at the 11 – 18 year old market, a problem recognised by the Dairy Council, commented on by the children and the caterers, and one that needs to be addressed. Despite this, fresh milk and milk products were the ‘best sellers’ in our project. In the schools that completed the project, it is estimated that in the region of 70,000 units of product were sold during the trials. In excess of 35% were milk and milk products – around 25,000 units consumed in less than six months! There are over 5,000 secondary schools in England and Wales, if just one in five head teachers put a single healthier drinks machine into their school and replicated our results, approximately 14 million additional units of milk products, juices and water could be vended to children in schools every year.

It is clear that the time is right for rapid and substantial change to ensure children in schools have access to appropriate healthier choices not just over the counter but also through any service supplied via vending machines.



## Limitations of this study

The authors of this study recognise its limitations. The initial intention was to investigate the feasibility of healthier drinks vending in principle and not to conduct in-depth research. The study intended to explore whether healthier drinks vending could be successful in secondary schools and what the issues and influences were which could impact on sales. While the study has been in progress the interest in schools vending has increased greatly and so has the need to try to answer that interest with information. It is recognised that the data is incomplete from a number of schools due to the problems encountered during the study, as detailed above. This limits the quantitative conclusions that can be drawn in detailed comparisons between schools.

Sufficient data was not collected on the impact of healthier drinks vending on sales of soft drinks from other existing vending machines within the pilot schools. School 8 did collect data which showed that soft drinks sales were reduced during the project. However that does not allow conclusions to be drawn on whether the sales from healthier drinks vending reduced children's spending on other vended soft drinks, or were in addition to them, across the project as a whole.

## The Last Word

The children and staff of the schools in the project have proved the received wisdom that children will not buy anything from vending machines but fizzy soft drinks is a myth. Despite the problems we encountered during the project with machines and product mismatch and an infrastructure created to support a quite different service, it is abundantly plain that this style of vending is desperately needed, is popular with children, can be commercially viable – see **Appendix 3** and should be widely available. The children and staff in all the schools who completed the trial were keen to keep their machines and continue with the service – ‘there will be trouble if the machine is taken away’, said one youngster. The last word goes to the catering manager of the most successful school in the project who ended up filling the machine three times a day to keep up with sales. She said at our second review meeting in June 2003, ‘ I was certain this would not work, the kids would not be interested. I was so wrong – and I couldn't be happier!’

## **Acknowledgements**

On behalf of the FSA I would like to thank all those who took part in the project, giving their time, advice and skills without which the task would have been impossible. Special mention goes to the staff in the schools and catering contractors (see **Appendix 1** for the full lists) who took on yet another challenge when their lives are so busy and pressured already. It was their willingness and enthusiasm that enabled us to understand and overcome many of the difficulties that have to be faced when you are charting new territory. Thanks as well to all the pupils who sat on working groups, helped with the sampling of opinion in their school and most importantly, bought the drinks on offer with such eagerness! Finally, thanks to those umbrella organisations who lent support, particularly the Dairy Council and the Automotive Vending Association.

## **APPENDIX 1**

### **Drinks Vending Research Project**

#### **PARTICIPATING SCHOOLS**

<b>Cumbria</b>	<b>Kirby Stephen G.S North Cumbria Technology College Wyndham School</b>
<b>Devon</b>	<b>Kings School Exeter West Exe Tech. College St Cuthbert Mayne Catholic C of E School</b>
<b>Hertfordshire</b>	<b>St John Lawes Marriotts School Tring School</b>
<b>Pembrokeshire</b>	<b>Pembroke School Fishguard School Crymch (Preseli) School</b>

#### **CATERING ORGANISATIONS**

##### **Cumbria Contact Services**

Barras Lane  
Dalton  
Carlisle  
CA5 7NY

##### **Shire Catering**

The Old Court House  
St Albans Road East  
Hatfield  
Hertfordshire  
AL10 OEP

##### **Pembrokeshire C.C.**

(School Catering Division)  
Thornton Business Park  
Milford Haven  
Pembrokeshire

##### **Devon Direct Services**

Falcon Road  
Somton Industrial Estate  
Exeter  
EX2 7LB

## APPENDIX 2

### Copy of Contextual Questionnaire –

SCHOOL NAME.....

CATERING CONTRACTOR.....

1. Number of pupils on role
2. Number of pupils eligible for free school meals (FSM's)
3. % uptake of FSM's
4. Average number of pupils taking a paid meal each day
5. Length of lunch hour
6. Are children allowed off the premises at lunchtime
7. Does the school have a break time foodservice – please attach price list
8. Does the school offer breakfast – please attach price list
9. Does the school have vending machines – if yes please specify
10. Does the school allow mobile food service vans on site
11. Are there local food/drinks outlets in competition with the school food service
12. Does the school operate a school council
13. Does the school consult with pupils on its food service – please specify if yes
14. Does the school have a food and nutrition policy - please attach if yes
15. Does the school use a 'smart card' system
16. How does the school monitor its food service to ensure compliance with government regulations
17. Is the school taking part in the Healthy Schools Initiative
18. Please attach a lunchtime pricelist of items on sale in the canteen

Many thanks for your support in completing this questionnaire – all information given will only be used in a generalised/anonymous format unless permission is sought and given by the school and catering contractor to do otherwise.

## APPENDIX 3

# Data Collection From Schools

### Explanatory Information to analysis of results:

A full appreciation of the results must take account of the range and seriousness of problems encountered by each school during the operational period.

Information is therefore presented in Appendix 4 by individual school, describing the various factors influencing both the results and the performance of each school.

Results are presented in the table below, in summary form for all schools. Total and weekly profits are shown with an estimate of potential annual performance that could be expected for each school, based on school performance during the operational period.

### Key

#### Machine Type & Location

DN = Dixie Narco Vender    Z = Zanussi Vender

\* = Schools where the machines were sited in the corridor or social areas away from the dining area.

#### Deprivation Score

The score for each school is based on the approximate percentage of free school meal entitlement and is shown on a scale of 1 (low) to 5 (high).

#### School Location

The description of school location is based on 3 categories:

- Rural- away from any large conurbation – (R)
- Rural town- town situated in rural area – (RT)
- Urban- part of large conurbation – (U)

#### Level of Operational Difficulties

Four main issues were taken into account when establishing the varying levels of operational difficulties:

1. Machine-product incompatibility
2. Machine breakdown
3. Product delivery
4. Change of catering contractor during the pilot

Level 1=low

Level 5= high

#### Calculations used

Average profit margin on sales = 47%.

Machine costs are based on a pro rata five year lease cost: DN £30 per wk; Z £10 per week.

Labour costs per hour varied to a small extent between schools.

## Summary Table of Results by School (anonymised)

<b>School</b>	<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>	<b>11</b>	<b>12</b>		
<b>Number of Pupils</b>	1500	700	1000	1500	550	700	700	1450	700	900	1200	800		
<b>Location Type</b>	RT	R	R	U	U	R	RT	U	U	RT	U	RT		
<b>Deprivation Score</b>	4	1	1	4	5	1	3	3	3	4	2	3		
<b>Level of operational difficulties</b>	5	3	3	5	4	4	4	1	3	5	5	5		
<b>Machine Type</b>	Z	DN	DN	DN	Z	DN	Z	Z	Z	Z	DN	DN		
<b>Machine Location</b>	*		*	*			*		*					
<b>Operational Period(wks)</b>	20	18	15	<i>No sustainable data recorded</i>				19	10	10	24	15	<i>No sustainable data recorded</i>	
<b>Gross Profit for period</b>	512	1673	1149					572	760	281	2459	853		
<b>Profit for period (net of labour)</b>	192	1403	970					287	606	176	1529	557		
<b>Net Profit for period (net of labour &amp; machine cost)</b>	-8	863	520					97	306	76	1283	407		
<b>Ave. Total Wkly Net Profit</b>	-0.40	47.94	34.66					5.10	30.60	7.60	53.45	27.13		

**EXTRAPOLATED PROFITS FOR 40WK SCHOOL YEAR  
(based on results from feasibility study above)**

<b>Annual Projected Net Profit</b>	-16	1918	1386	Verbal data only	204	1224	304	2138	1085	Building works	Machine removed	-999
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## **APPENDIX 4**

### **Summary of issues effecting results at each individual school.**

#### **SCHOOL 1 - 20 weeks data supplied.**

*Zanussi machine, placed in external area away from dining room.*

This machine was placed in an area accessible to only one key stage group. As such it clearly limited the number of pupils able to access it. In addition because of its location, at a distance from the kitchens, the Catering staff found it difficult to keep it filled and to maintain it in regular working order. Lack of regular supervision also meant that it suffered some damage and was occasionally out of service because of this.

#### **SCHOOL 2 – 18 weeks data supplied.**

*Dixie Narco machine in dining/service area.*

Despite the difficulty of vending tetrapak product in DN machines the determination and enthusiasm of the Catering staff to ensure pupils enjoyed a full range of product and the location of the machine in the dining area meant that they were able to cope with the machine sticking from time to time.

## **SCHOOL 3 –15 weeks of data supplied.**

*Dixie Narco machine located in dining room area.*

Period 1: May – end July.

There were 7 weeks of operation between May and the end of July. There were some initial difficulties with tetrapak product sticking as was common to this type of vendor. During this period the contract for the school's catering was in the process of being switched from the local authority contract caterer to be taken on 'in-house' – that is to be run by the school itself. Data was only kept on gross sales and net profit and not the detail requested until the final three weeks of the summer term

Period 2: September – end October – 8 weeks of operation.

With the new contract came changes and additional pressures on catering staff. Detailed data collection was no better than the previous term with weekly gross sales figures available but just two weeks of completed detailed product sheets. The juice and fresh milk 250ml tetrapak product which had been liable to sticking from time to time, but were very popular, were from September sold over the counter. Alternative juice and smoothie products, reliable to vend but more expensive to purchase were introduced.



## **School 4 - insufficient data supplied to include.**

It is not possible to be clear how many complete weeks of operation there have been on this machine which, though popular with the pupils and apparently profitable when in operation, has been subject to a number of difficulties.

Initially it was sited in a social area away from the dining room and so was liable to problems with poor supervision exacerbated by product 'sticking'. It was the subject of 'tipping' and so was taken out of service while it was fixed to the floor to ensure pupil safety.

The school catering service was under severe staffing pressures during the trial. The catering manager changed between summer and autumn terms. Both these issues were influential in the failure to collect data both regularly and in sufficient detail.

The machine was moved to the dining area for the start of the September term which gave better opportunities to supervise and manage the machine efficiently.

Figures presented by the catering manager during September and October averaged gross sales of £400/week when the machine was working satisfactorily but no breakdown by product or timescale was available.

At the end of the trial period, the school management team, catering manager and pupil representatives were agreed that although there had been serious location and operational difficulties to overcome, the value it now offered in providing healthier choices was huge and it was very popular with the pupils who wanted it to stay. It had in addition sparked a wider debate with pupils asking for a healthier food service throughout the day.

## **School 5 – 19 weeks of data supplied.**

*Zanussi machine initially placed in hall, moved at end of June into dining hall.*

There were two periods of operation either side of the summer holidays. Though detailed weekly figures were not returned, individual product sales, gross sales and net profit figures for the two periods were.

The machine operated over 23 weeks but lost four weeks of sales to a series of location and mechanical problems which were not always sorted out quickly or first time.

- The power cable was not initially sited or secured sufficiently to prevent occasional pupil interference – a power cut requires an engineer to re start machine.
- Re – organisation of shelving and dividers was required to maximise product capacity.
- A malfunction of the coin change mechanism occurred.
- Machine re-location was necessary.

However, the response from the pupils, the senior management team and the catering manager was always positive. The machine, though neutral in terms of net income, was seen as an essential and popular service by offering accessible healthier drinks choices through vending.

The machine and the service have been retained.

## **School 6 – 10 weeks of data supplied.**

*Dixie Narco machine located in the dining area.*

This school changed its catering contractor between the summer and autumn terms.

Thus two periods of operation took place, the first with the original contractor, the second with his successor. The changes caused some difficulties for both contractors which effected data collection.

Period 1:

12/05 – 17/07 was managed under the original catering contractor and 3 weeks were lost during this time because the original tetrapak products sourced caused the machine to jam and it was taken out of commission while new vendable product was found. Gross sales figures only were made available with detailed figures for individual product volume.

Period 2:

The majority of the first half of the autumn term, from 3/09 – 17/10, was lost as the new contractor concentrated on commissioning the main food service under his management. The machine was successfully put back into service from 20/10 -21/11. – 4 weeks of data was made available for this period.

## **School 7 – 10 weeks of data supplied.**

*Zanussi machine initially placed in a 'house' social area, subsequently moved into a supervised admin area corridor.*

This school enjoyed a catalogue of misfortune during the course of the trial which led to a serious loss of operational time at the start of the autumn term. The start date was delayed in order to have additional wiring installed at the location in the 'house' area. This was a distance from the kitchens but suited the school's approach to offering social areas with facilities to the pupils, though it limited the number of pupils who had access. The machine then ran smoothly until the summer holidays.

Over the summer holidays the school had scheduled major building works in the area which included the 'house' social block where the machine was located. The building works overran to the end of September. When this was discovered there was an additional problem - the machine had suffered some damage during this time. At a site meeting first week in October, it was agreed that the machine be re-sited and repaired and instructions were immediately issued to the service contractors. The delays and mistakes that followed meant that the machine was re-commissioned in its new home in the administration area corridor early in November.

Despite the difficulties, the school remains convinced of the value of the healthier drinks vending for pupils and is continuing operation of the machine. The catering manager believes its new location is more convenient, better supervised and allows better pupil access.

## **School 8 – 24 weeks of data supplied.**

*Zanussi machine situated in the dining hall area.*

This machine was the most successful on the trial despite a very cautious welcome initially from the catering manager. It was in a prominent position, was stocked regularly 3 times a day, and was hugely popular with the pupils, 6<sup>th</sup> form and staff. The catering manager made the point that to maintain the turnover they had 'to work at it' and the labour costs were high. Weekly gross sales and profit figures only were kept for the period of operation. However this was a school where comparisons with other vending was collected. The detailed figures are not available as it was considered commercially sensitive, but it was found that there was a marked impact on *Pepsi Cola* sales to pupils, with a reduction of approximately £100 gross sales per week, worth £33 in profits.

There are 3 weeks of very low or negative figures within an otherwise profitable operation. The catering manager reports that in the summer period, the pupils had found that due to a fault of wear and tear the machine was giving 2 for 1 on three shelves. This was not discovered until an honest pupil reported it and the faults were fixed! The same problem occurred in September but was spotted more quickly.

The school has kept the machine and it continues to operate within similar sales volumes and profit margins.

## **SCHOOL 9 – 15 weeks of data supplied.**

*Zanussi Machine placed in social area away from school dining room*

Period 1: During wk/ending 16<sup>th</sup> May to wk/ending July 18<sup>th</sup> - there were 7 full weeks of operation.

Only gross sales figures were kept over this period despite requests for detailed accounts. The school was suffering acute staffing shortages and the priority was maintaining the main lunchtime food service. There were additional difficulties because the location of the machine was well away from the dining room which resulted in poor supervision, a failure to keep the machine full, and increased problems with breakdown due to mistreatment or failure of the equipment.

Only two drinks products were sold in the summer term because of concern by catering staff that items sold over the counter should not appear in the vending machine or they could be fraudulently passed off by pupils as 'from the machine' when actually taken from the counter.

Period 2: September- November

Following discussion with the area and school catering managers, from the start of the autumn term milk shakes and water were added to product list as had originally been arranged. It was agreed that the machine would be filled twice a day and weekly accounts be kept.

## **School 10 – insufficient data supplied to include.**

*Zanussi machine placed initially in a social area away from the dining room.*

The difficulties in this school were a mixture of mechanical failure, very poor maintenance and a breakdown of communications. Though the machine proved unreliable and needed more than an acceptable amount of repair work this was exacerbated by the closure of the area the machine was in for major building works. The machine was not re-sited during this period and after the works were complete, the re-commissioning process was continuously frustrated and the machine was removed by mutual consent.

The area catering manager, though disappointed with the outcome, was clear that the project had been spoiled by problems that could be 'planned out', and not because children were not willing to buy healthier drinks. 'A healthier drinks vender would definitely pay its way in a senior school if run efficiently, and with many schools looking at their food service in a different light, it is time we were able to offer such a service wherever it is required.'

## **School 11 – insufficient data supplied to include.**

*Dixie Narco machine placed in dining room area.*

This machine highlighted the mismatch between a bottle and can vender and tetrapak products. The frustration was intense here as the school had been very keen to improve the quality of its vended service. Because of other concerns within the contract it was mutually agreed to remove the machine and use it to investigate the possibility of a shelf redesign to improve its flexibility. It was hoped to be able to vend prisma tetrapak product which would have considerably increased the range of product and price. Though the Vending Corporation made great efforts to solve the problems throughout the course of the project, and involved colleagues in the USA, the end result was an acceptance that the Dixie Narco machine was designed to vend cans and bottles and does that very well – it was not designed to vend tetrapak and it doesn't.



## **School 12 – 19 weeks of data supplied.**

*Dixie Narco machine placed in an area away from the dining room.*

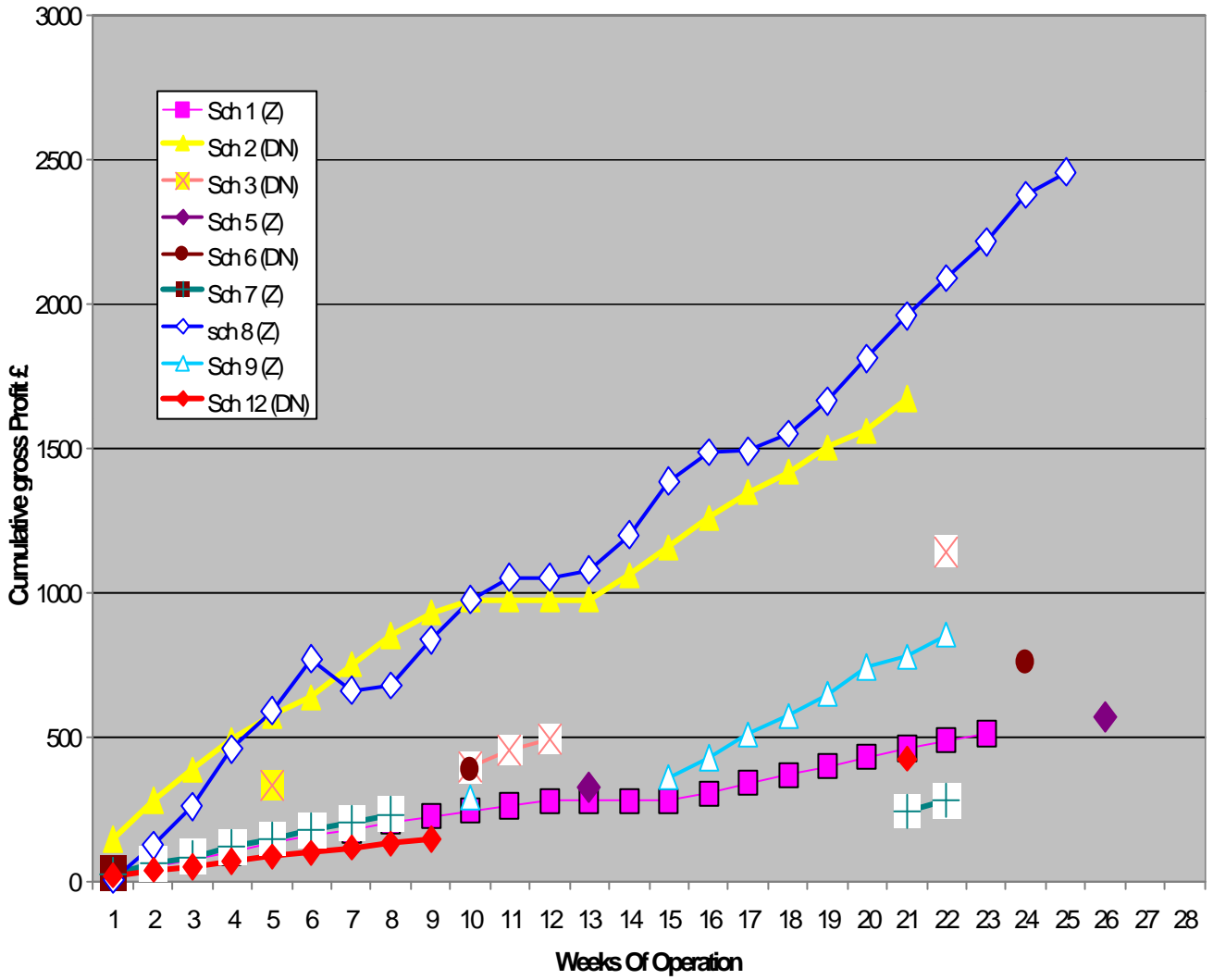
Though this school has persisted with the trial the results are disappointing. There has been a good deal of frustration with the original product sourced including tetrapak and causing 'sticking' - sourcing alternative product took a long time. The location of the machine meant that the management of filling and maintaining was neither, as efficient or effective as it needed to be. It was regularly out of action when a product stuck leading to pupils mistrusting its reliability and usefulness. The machine was moved to the dining area late in the autumn term and was out of action for a time both before and after that.

Again, as with school 10, the school and the caterer are convinced of the viability of the concept and its value to pupils but have been on the receiving end of a painful learning process which has helped lead towards an efficient management model.

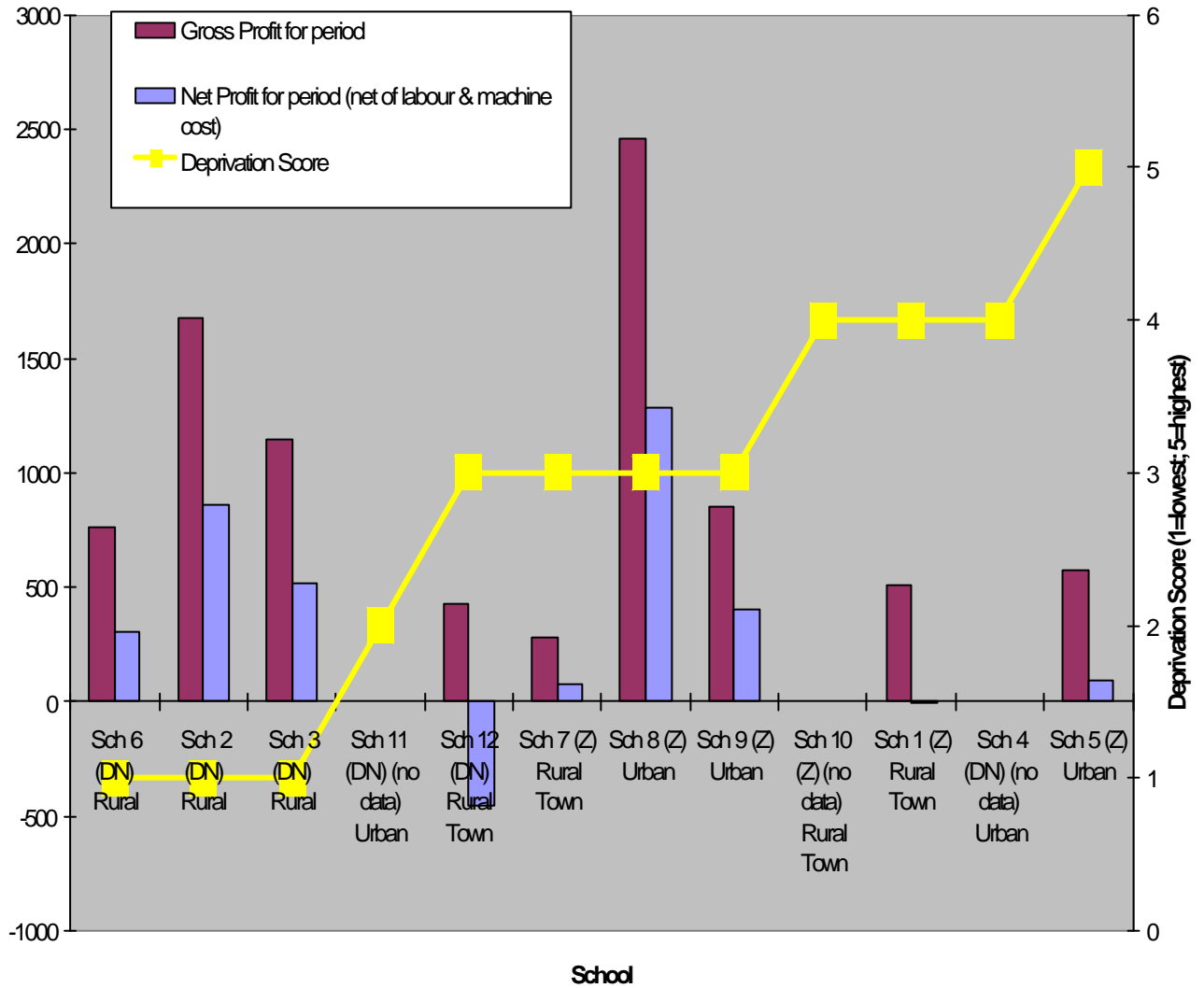
# APPENDIX 5

## Graphical Results

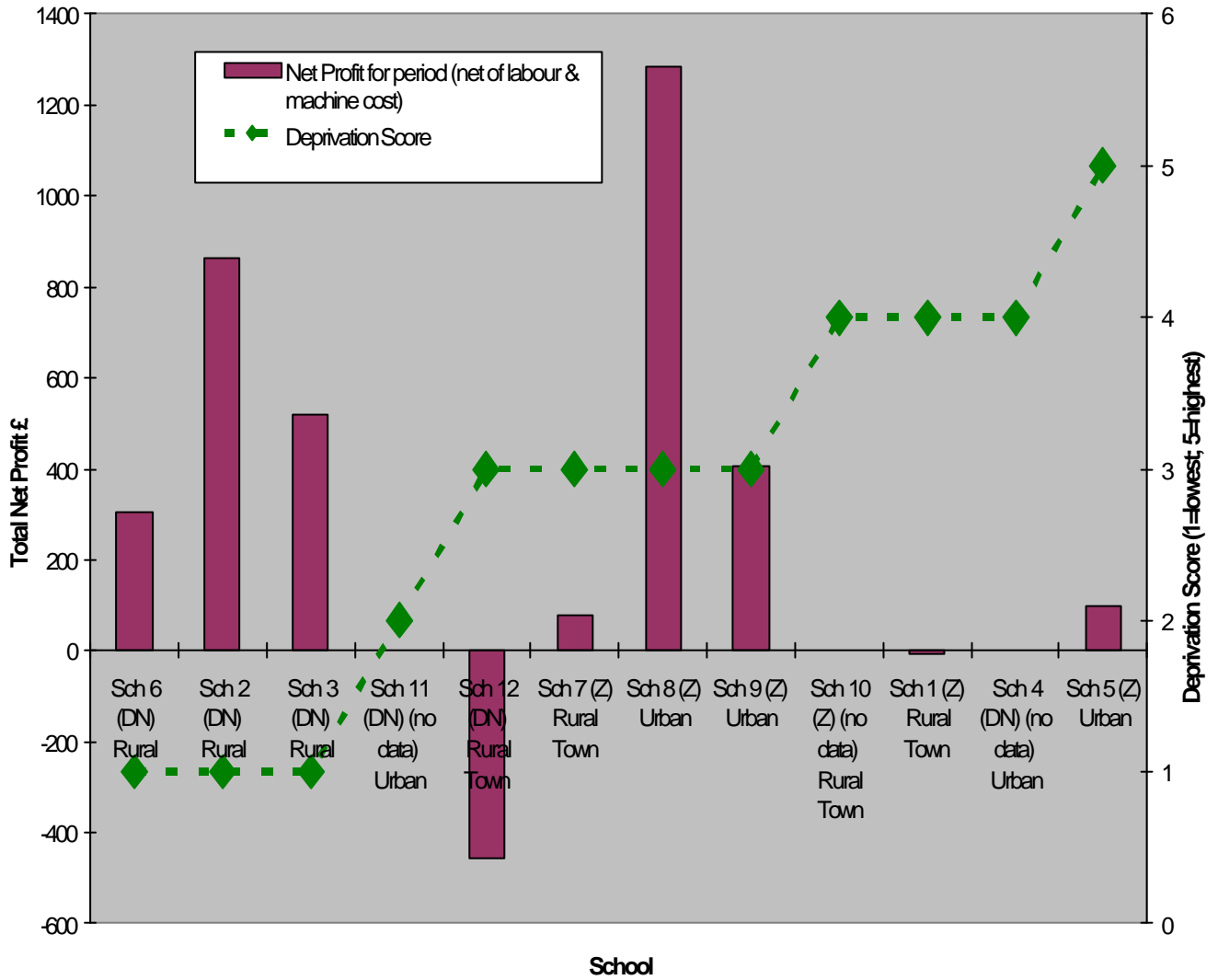
Cumulative Gross Profit by Operational Week



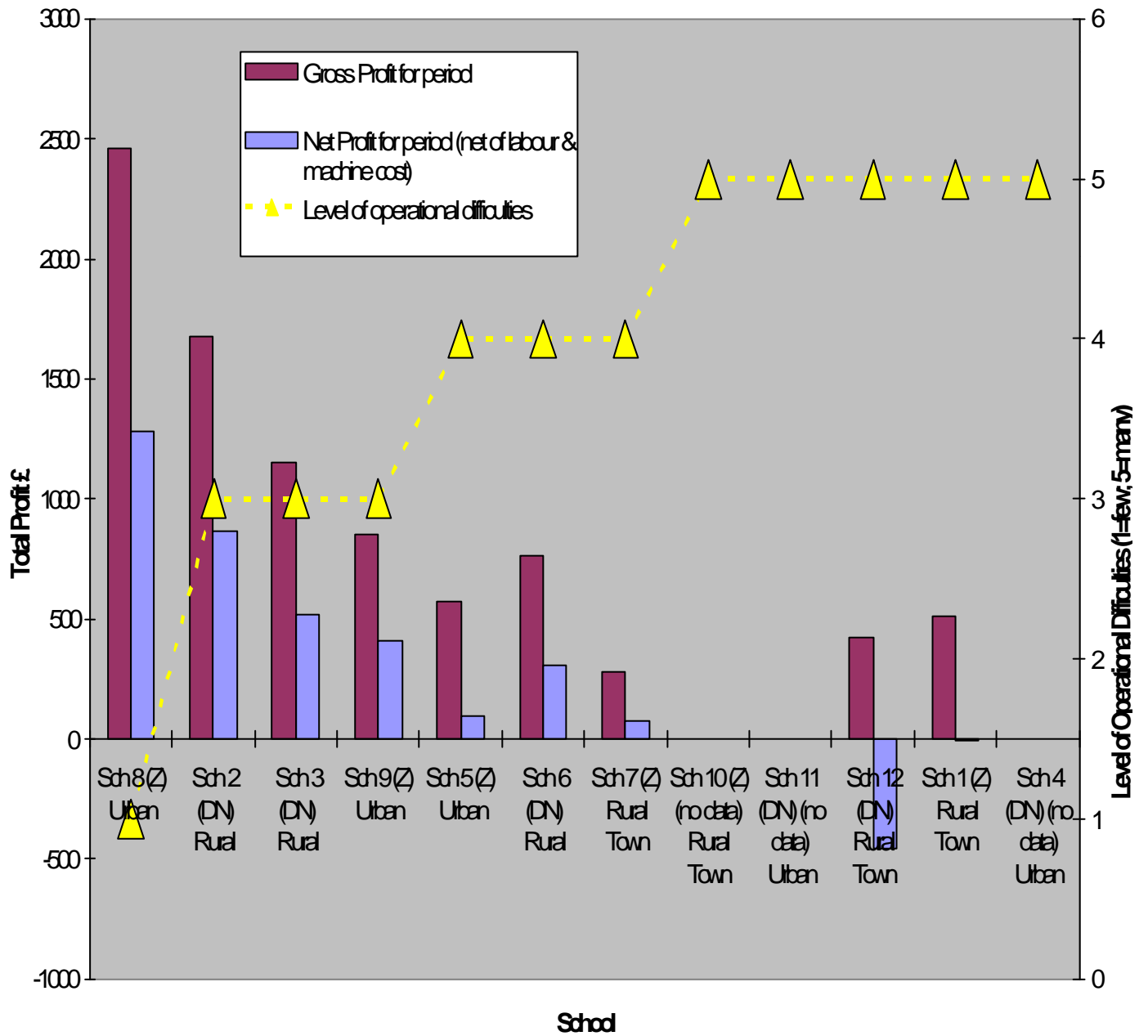
### Profit by School and Deprivation Score



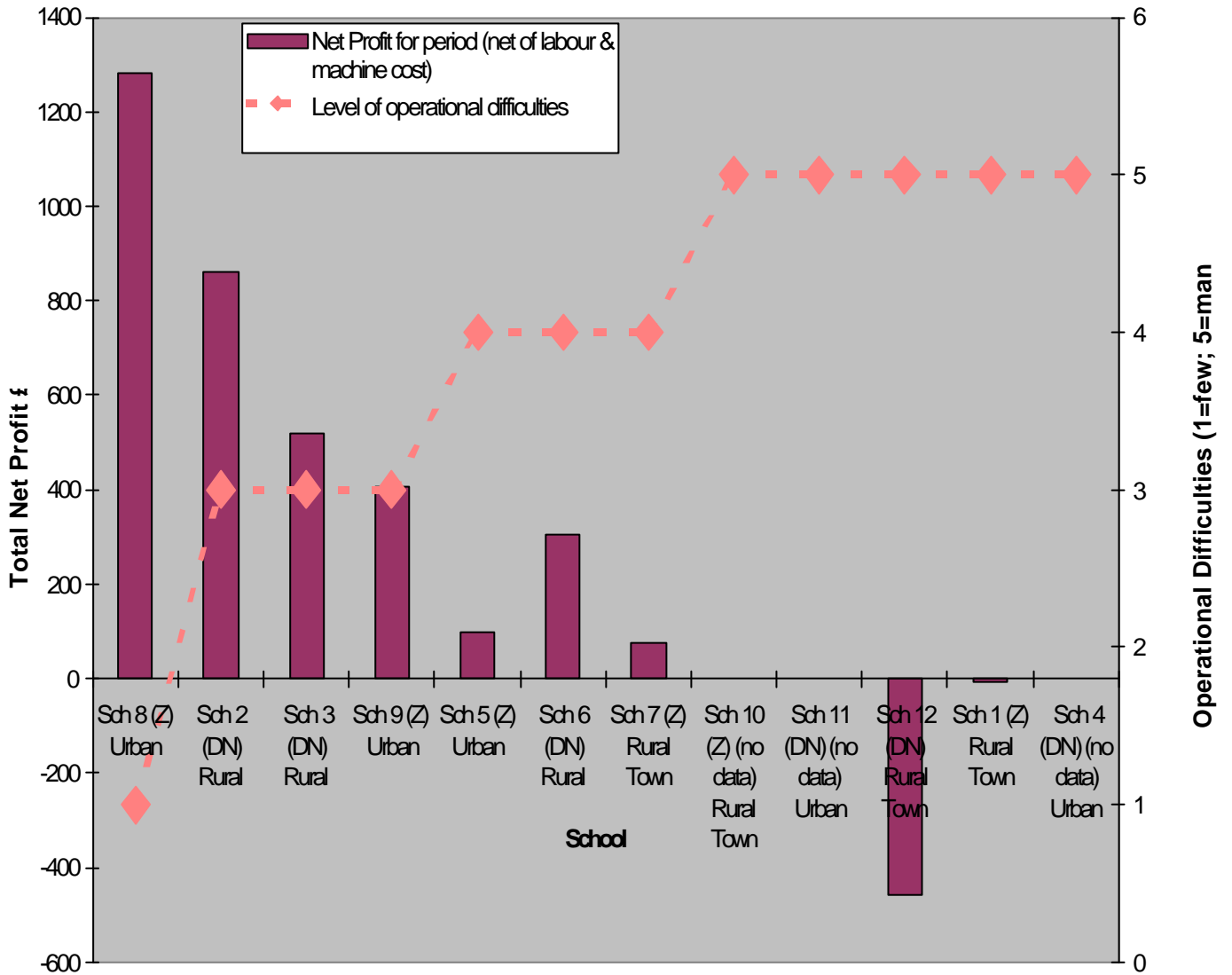
### Net Profit for Operational Period and Measure of Deprivation



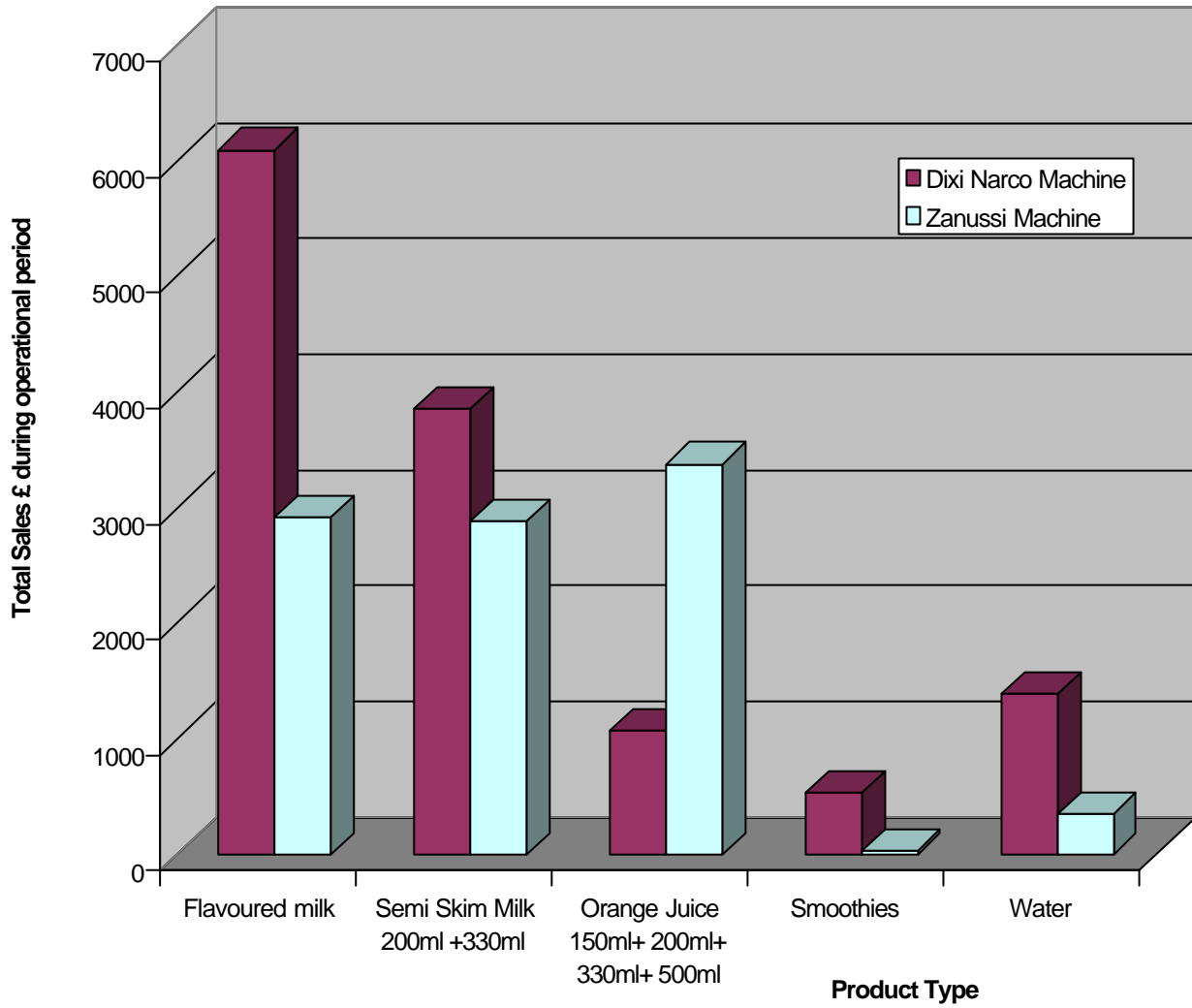
### Profit by School and Level of Operational Difficulties



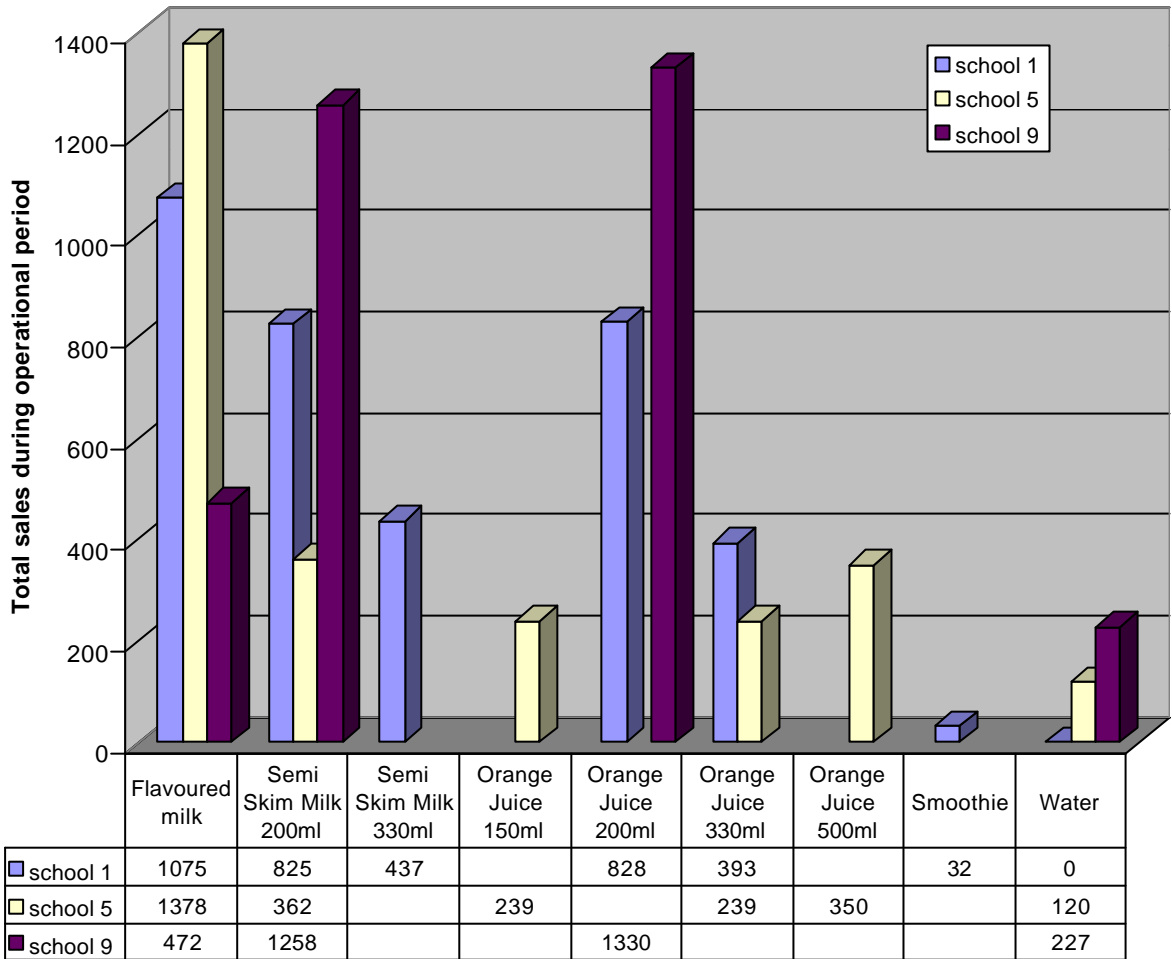
Net Profit for Operational Period by school and Level of Operational Difficulties



## Product Sales by Machine Type



### Zanussi Product Sales: 3 Schools



Product Type



