
8.0 PESTICIDE TAXES AND CHARGES

8.1 Introduction

The environmental problems associated with the use of pesticides are widely discussed. Pesticides, however, are an extremely heterogeneous group of products. Their impacts are correspondingly heterogeneous, with some presenting problems in respect of water pollution, and others having impacts on target and non-target species, either through direct or indirect effects. In addition, because of this variability in their effects across different media, the impact of any one product will be location-specific depending upon which receptors are present, the climate, topography and hydrogeology.

In such circumstances, any attempt to design optimal instruments is likely to be seriously undermined. This does not necessarily condemn taxes to irrelevance in this debate. Indeed, there is great interest in the use of such taxes, not just as a mechanism for reducing pesticide use, but also for encouraging switches away from problematic products and towards those that are more environmentally benign. Indeed, because of the differing impacts and dose rates at which pesticides are applied, it remains a possibility that reducing the total amount of pesticide used in agriculture is not necessarily consistent with an improvement in the environmental situation.

In recognition of this, both in terms of design of taxes, and in the information provided to farmers, greater attention is being paid to the actual threat posed to the environment by pesticides. Taxes now being considered incorporate various bands that differentiate products according to some objective criteria intended to be a proxy for their potential to cause environmental harm. Norway has recently introduced a tax which bands products according to their expected environmental impact, and taxes them at differing rates to reflect this.

An interesting point is that the unit upon which the tax is based varies in the design of these taxes. Different countries have looked at taxes levied on dose, on kg of active ingredient (few, if any taxes address the issue of adjuvants which can have environmental impacts of their own¹), and ad valorem taxes. There is still much dispute around which of these constitutes the best base for the tax. In the future, it will be very important to consider the relationship between this base, and the objective rationale for any banding scheme.

In this chapter, we consider taxes in place in Sweden, Denmark and Belgium, presented in sections 8.2 to 8.4 respectively. These vary in their scope, application, and the base for the tax. The case of Belgium also highlights some of the problems faced when one seeks to introduce such a tax.

¹ Adjuvants are the 'carriers' of the active ingredient in the pesticide product. For example, some products make use paraffin as a wetting agent to ensure the active ingredient reaches the plant in the manner intended.

8.2 *The Swedish Pesticides Tax*

Introduction

The agricultural sector in Sweden is diverse due to climatic and geographical conditions. In Northern Sweden the use of pesticides is very limited, as the benefits of pesticide use are limited due to the climate. Ecological farming is attractive in these regions because of a relatively low crop output, low benefit from pesticides and the premium prices received for ecological products. In Southern Sweden farming is conventional with use of herbicides and fungicides. Consumption of insecticides is relatively low. Finally, Sweden joined the EU and the Common Agricultural Policy in 1995.

Process Development of the Tax

An environmental pesticide charge was introduced in 1984 in Sweden with the purpose of reducing environmental risk and health risks associated with the use of pesticides. The charge was part of a larger programme to reduce the risks including to halve the use of pesticides over the period 1986-1990 and to achieve a further 50 per cent reduction in pesticide consumption by 1996. (SEPA 1997a).

Previously the main effect of the charge was to finance the pesticide action programmes, though the revenue from the charge (and nitrogen and phosphorus charge) had also allowed other activities to be supported. Due to the 1994 increase in the rate, the revenues collected by the authorities increased significantly and a debate took place on charges compared to taxes. Finally it was decided to convert the charge into a tax in 1995. Instead of financing the pesticide action programme directly, as had previously been the case (with the charge), the tax contributes since 1995 to the general state budget. However, the pesticide action programmes remain financed via the state budget (SEPA 1997).

Design

The current Swedish pesticide is imposed as a fixed amount (20 SEK in 1999) applied to every kilogram of active ingredient in the pesticide. The tax is imposed on pesticide manufacturers and pesticide importers to reduce the administrative burden.

The level of the previous environmental charge was 4 SEK per active kilo substance (ECU 0.43) when it was introduced in 1984. It was then raised to 8 SEK (ECU 0.86) in 1988 and again to SEK 20 (ECU 2.15) in 1994. Wood preservatives are exempted from the tax. (RSV 1999).

Importers and manufactures of pesticides are to register with the Swedish National Tax Board. Every month the importers (no current pesticide production in Sweden) submit a return to the board. Pesticides are to be registered and approved by the National Chemical Inspection. (SEPA 1997a).

To complement what was then the pesticide charge, a price regulation charge was imposed in 1986. The price regulation charge took the form of a dose-based charge amounting to 29 SEK per dose in 1986 and was used to finance exports of agricultural products (see Table 24). A pesticide dose was determined in relation to the amount normally applied per hectare. The charge was abolished in 1992 due to deregulation of the Swedish agricultural sector abolishing the guaranteed prices applied to cereal crops (SEPA 1997a). Until 1992 Swedish Agricultural policy was based on a price support mechanism, with a higher level of price support than in the EU.

Table 24: Levels of the Swedish Pesticides Tax and Price Regulation Charge

| Rates | 1984 | 1986 | 1988 | 1990 | 1991 | July 1992 | Dec 1992 | 1994 –2000 |
|--|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|
| Environmental charge (until 1995) /tax (post 95) SEK/ kg (EUR/ kg) active substance | 4 (0.44) | 4 (0.44) | 8 (0.88) | 8 (0.88) | 8 (0.88) | 8 (0.88) | 8 (0.88) | 20* (2.2) |
| Price regulation charge SEK/dose (EUR/dose) | - | 29 (3.2) | 29 (3.2) | 38 (4.2) | 46 (5.1) | 29 (3.2) | abolis hed | - |

Source: SEPA 1997a; Note: (-) not applied

In addition to price regulation charge, a pesticide registration charge (SEPA 1997a) was introduced in 1986 and is still in place at present. The registration charge was designed to cover the costs of the National Chemical Inspection controlling pesticides. The revenues amounted to SEK 13.5 million in 1994/95 and went directly to the central state budget. The system consists of an annual charge and an application charge. The annual charge is 1.8% of sales during the approval period of the pesticide (maximum SEK 200 000, minimum SEK 2 000). The application charge is as follows:

- For each product (SEK 10 000)
- For any active ingredient not found in any other approved product (SEK 30 000)
- For change of permit conditions regarding name, size of package or non-active ingredient (SEK 5000)
- For extension of approval (SEK 6 000)
- For exemption (SEK 3 000)

There have been no problems in getting companies to pay the charges and the costs are low compared to pesticide development costs. The charge levied for registration could distort competition favouring large companies to small companies in terms of financial ability to pay the charge. However, the costs associated with the provision of extensive documentation required are much higher.

Revenue and Use of Revenue

The annual revenue from the tax was 38 million SEK in 1998 collected at 44 registered taxpayers (RSV 1999). Tax revenues in 1994/1995 amounted to 30 million SEK and the estimated administrative costs to the National Tax Board were around 4000 SEK or 0.01% of the total pesticide tax revenues (SEPA 1997a).

Until 1995 the pesticide charge revenues were mainly earmarked for the pesticide action programme. From 1995 onwards the revenue raised from the pesticide tax is used within the general state budget (RSV 1999), and hence the charge become a tax. Actions under the pesticide programme continue at previous level funded within the general state budget. One explanation given for the decoupling the pesticide tax revenue and the pesticide action programme was that there were fears that once within the EU, Sweden would have less power to decide on the use of revenues.

Recent results from 1998 show increased revenues (see Table 25). This is based on an increased use of herbicides during that year. A major part of this increase is due to increased sale of glyphosate. The reasons for this increased sale can be (SBA 1999):

- The phasing out of the Swedish Conversion of Arable Land scheme;
- The set-aside requirement in the EU Compensatory Payment scheme;
- The recent requirements on autumn- and winter grown land; and
- It has also become financially more beneficial to use glyphosate instead of mechanical methods.²

Table 25: State Revenue from the Pesticide Tax, in Million SEK (MEUR), 1995-1998

| | 1995 | 1996 | 1997 | 1998 |
|---------------|-------------|-------------|-------------|-------------|
| Pesticide tax | 36 (4) | 37 (4.1) | 34 (3.8) | 38 (4.2) |

Source: SEPA 1997a. Note: 1996-1998 is prognoses

Organisational Roles and Administration

The Swedish National Tax Board administers and collects the pesticide charge.

Administration of the pesticide tax per kilogram of active ingredient has been simple and requires 2 to 4 person days per year. The per hectare dose instrument required more administration, perhaps 2-3 person months per year, and is regarded as a more complicated administrative task by the SEPA. (SEPA, 1997a). The reduced complexity of the revised system has led to a minuscule loss in administration-related employment.

² Note that the authors understand that glyphosate came 'off-patent' only relatively recently, and the presence of generic competitors may have reduced the price of the product.

Effects on Pesticides Sales

Pesticide sales underwent major changes between 1986 and 1987 and in 1994 (see Figure 4). Increased sales in 1986 were due to introduction of the price regulation charge that year increasing prices by 20%. Following this, pesticide use has fallen. In a report from 1992 the Sweden Board of Agriculture (Jordbruksverket) calculated that the use of pesticides was 4-10 per cent less than it would have been without the tax in place then (Jordbruksverket 1992).

It is estimated that 1,590 tonnes of pesticides were used in 1994, approximately 35% of the average consumption for the period 1981-1985. The reduction is attributed to the pesticide action programme which incorporates an advisory service, and research and development. It also reflects the development of low dose pesticides, especially where herbicides are concerned. Herbicides represent 75% of the pesticide use in Sweden. Fungicides and insecticides almost remained constant over the period with a slight tendency to decrease (SEPA 1997a).

The pesticide charge increased from 8 SEK per active ingredient to 20 SEK in December 1994. At first glance, this appears to have had a significant announcement effect on pesticide sales during that year because of discussions held before the increase came into effect (see Figure 4). It is difficult, however, to disentangle the effects of different influences on pesticide sales during this period:

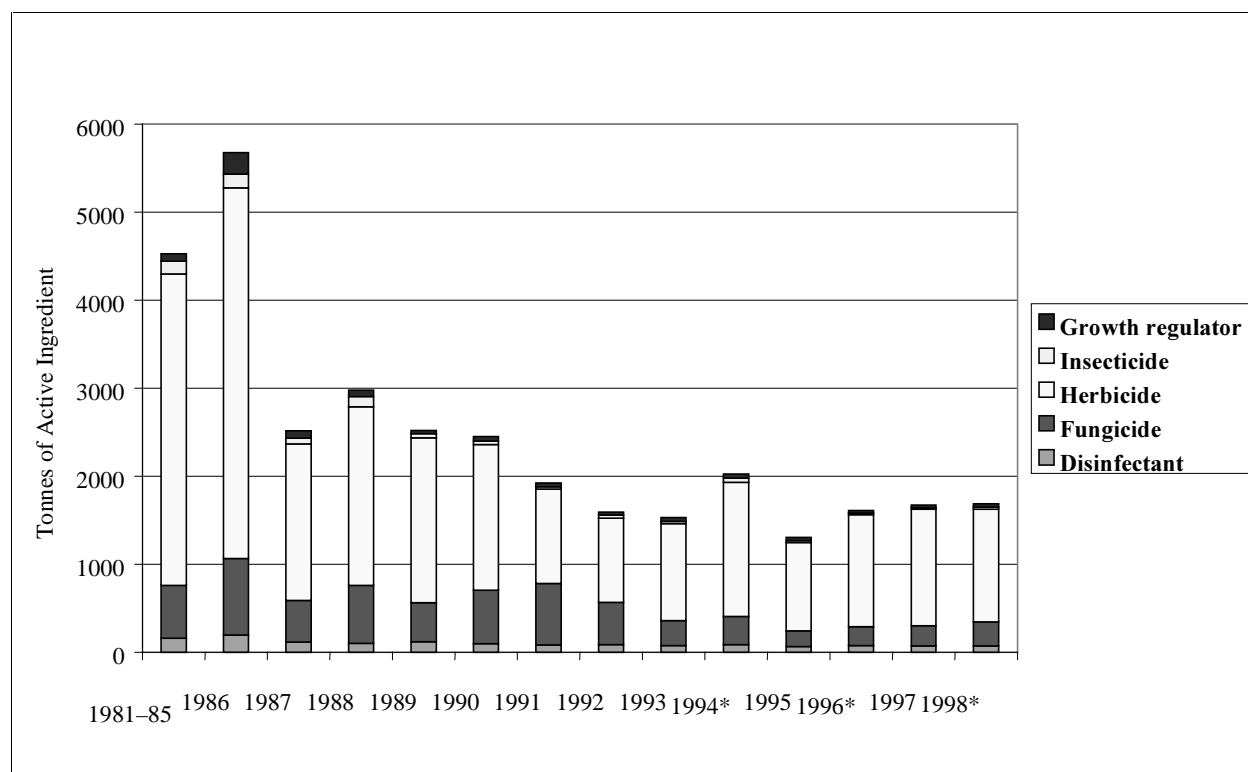
- 1) The ongoing changes to agricultural policy, especially support prices, affecting the structure of farm enterprises as well as the marginal value product of pesticide (and other input) use;
- 2) The abolition of the price regulation charge;
- 3) The ban of several pesticides from commercial use (in the same year as the charge was converted to the tax);
- 4) The effect of the announcement of the increase in tax rate
- 5) The level of the tax itself
- 6) The price effect from the tax itself; and
- 7) The climatic conditions experienced by the sector

If one discounts 7), then prior to the conversion of the charge to a tax, one would perhaps have expected a fall in demand (from 1), but that this might have been reduced somewhat by the abolition of the price regulation charge (2). However, the effect of the former ('derived demand' effect) is clearly stronger than the latter, which might have been seen as 'noise' against the backdrop of wider policy changes. In 1994, purchases of pesticides increased significantly as farmers stockpiled pesticides (SEPA 1997a). This would appear to have been a reflection of both 3) and 6), but it is difficult to know the importance, in relative terms, of these changes. This is not unimportant. It suggests that either farmers are responsive to price, or alternatively, that they are responsive to the threat of elimination of specific (presumably, less benign) products. In the years that followed, an initial reduction in purchases was followed by a slight increase as these stocks were 'drawn down'.

The overall evaluation (SEPA 1997a) of the pesticide charge/tax reported that it was too low to impact upon long-term user behaviour. The current tax amounts to around 5% to 8% of the purchase price of pesticides. The report estimated that an increase in the tax to 25% of the price would reduce consumption by between 4% and 10% assuming pesticide consumption of 1900-2000 tonnes. One of the reasons why a high tax was believed necessary was the lack of compatible substitutes to pesticides.

However, the stockpiling of pesticides would be difficult to explain if one assumed no price response. The very fact that stockpiling has occurred suggests that farmers do respond to this tax, even at what may be considered relatively low levels. A possible explanation is that the stockpiling was the result of the banning of pesticides as discussed above. However, no such ban was in place in 1986 when the introduction of the price regulation led to stockpiling. On the other hand, this charge was equivalent to some 20% of the pre-charge price whereas the current tax represents around 5 to 8% of the pesticide price.

The level of pesticide consumption today is regarded by some as the lowest that can be achieved without influencing farm incomes significantly. These commentators perceive that it may be very difficult to reduce the use of pesticides from the current levels without incurring significant risks in terms of losses in production (SBA, 1996). However, it would seem that changes in cultivation techniques and greater conversion to organic farming would generate further reductions. The consequence may be reductions in yield, but this need not necessarily imply lower financial returns to the farmer (because of reduced outlays on variable inputs). Even so, the overall level of pesticide consumption per hectare of agricultural land is among the lowest in Europe amounting to an average 0.5 kg per hectare in 1996 (EU average was 2.2 kg per hectare).

Figure 4: Pesticide Sales in Sweden, 1981-1998

Source: SBA 1999.

As mentioned above, the quantity of pesticide used is only a relatively poor proxy for environmental harm, and it remains possible that the effect of the tax is to encourage switches from products applied at high dose rates (i.e. high amounts of active ingredient per hectare) to those applied at low rates. As such, it is extraordinarily difficult to know how closely the environmental benefit of any reduced use is correlated to quantities applied.

An assessment report in 1996 from the Swedish Board of Agriculture and the National Chemical Inspection concluded that the reduction in pesticide consumption over the past decade was due to a decrease in cultivated land, use of lower dosages and a changeover to low dose pesticides. The lower dosages and increased use of low dose pesticides are seen as a result of better advisor services and better spraying techniques. The pesticide charge in force over that period financed the measures taken. (SEPA, 1997a)

Environmental Effect and Effectiveness

The pesticide charge has had a marked effect, through direct and particularly indirect (revenue recycling) means, on pesticide consumption. Along with the price effect, it has helped to finance instruments such as advisory services, and research and development. These activities led to a decrease in the use of pesticides in Sweden. The pesticide charge itself is believed to be too low to have a direct impact on user behaviour (SEPA 1997a). This

is supported by most studies on pesticides which suggest relatively inelastic responses, and since the impact on price is an increase of only 8% or so, reductions in use of the order 2% at most might be expected.

As part of the pesticide regulation package training and information campaigns have informed farmers of optimal consumption, environmentally correct and health correct handling of pesticides. Optimal pesticide handling is likely to reduce the amount applied and reduce the overall costs of pesticide spraying. If there is no direct behavioural impact, the Swedish pesticide tax might have an indirect effect on users in terms of awareness.

A high tax will not necessarily deliver benefits for human health or the environment since the charge itself is not targeted at the potential risk of the substance (SBA 1996). Optimising pesticide use can decrease the amount applied per hectare. To the extent that the advisory services, and not the tax itself, have motivated changes / reductions in use, one would hope that such reductions as have been made have been consistent with the goals of environmental protection, and safeguarding human health (not least that of the users themselves).

In order to adapt the tax to reflect environmental goals more closely, it would be necessary to promote switching towards alternative products that are considered less hazardous. Sweden has acted to limit the availability of more hazardous products through its approvals process. Discussions since the charge was made a tax have included concerns about the basis of the tax. Using the weight of active ingredient is gradually becoming less appropriate as more low dose or high activity substances are authorised (this might be expected to reduce the percentage price increase of the products concerned, further reducing the impact on price of the tax).

Under the new pesticides reduction plan (which began in 1997), there is renewed interest in ensuring that the tax to take better account of the relative environmental risk or impact. The main difficulty is finding an appropriate base for setting the tax to reflect environmental risk. The Ministry of Agriculture investigated using the standard dose for pesticide products as the base in 1995. The main barrier is the above-mentioned legal requirement for individual environmental tax rates to be set by parliament, which would require the parliament to consider each of the many pesticide products in turn, to determine the official standard dose (and this is particularly complex for products with multiple uses since different doses may be recommended for different crops).

Economic Efficiency

There has been no attempt to link the tax to any externality valuation. As the introduction to this chapter suggested, this would be very difficult to do. In terms of efficiency, the instrument is a long way from being a “first best” one, but the general effect of the price signal conveyed will have an impact on use. Furthermore, the financing of advice programmes and R&D should assist farmers in optimising levels of pesticide use, and in selecting relatively benign products. As such, the combined package may lead to a more

optimal use of pesticides, although exactly what ‘optimal use’ is will always be subject to scientific as well as economic debate.

Impacts on Competitiveness and Trade

Indeed, the current pesticide tax amounts to an average 8% of the pesticide price and is unlikely to have any significant competitiveness impact. The current tax level can rather be seen as state revenue raising instrument as the behaviour response is a shift towards low dose products (due to the low rates, the incentive effect to reduce use is small). Purchasing low content (active ingredient) pesticides, less pesticides or low dose pesticides might save costs to farmers.

Cross-border trade is seen as rather unlikely by the Swedish authorities because the charges and taxes in the surrounding countries are significantly higher. An example is Denmark where the pesticide tax amounts to 37% of the retail price compared with the average 8% in Sweden. Furthermore, such imports would be illegal if not registered with the authorities.

Different taxes within the agricultural sector can be counter-effective. For instance, higher energy taxes can have a negative impact on the usage of mechanical techniques of administering pesticides (which may be required for effective use of pesticides). (SBA 1996)

Internal Market Effects

Sweden’s entry to the European Union in 1995 imposed certain restrictions on the freedom of action in various areas of policy including the environment. Since Sweden joined the EU, border control has ceased and farmers have more opportunities to purchase pesticides for their own use in other Member States. Control of pesticide imports and tax collection is now done within the country’s border where previously the customs authorities could do it. The tax is paid by importers who have to register imports.

The Swedish market for pesticides is such that all pesticides are imported. As such, the issue of protecting domestic producers through this tax does not arise. The only concern that could arise relates to the approval process for imports. If there is no specific directive applying to a product the main principle in the EU is that a product approved in one country may freely be sold in all the other Member States. Council Directive 92/12 on taxes and charges does not prevent Member States from introducing taxes or charge for environmental policy reasons. Lastly, since the tax is levied on the amount of active ingredient, there are no obvious new labelling requirements imposed by the tax. Pesticides will routinely present this information to the user.

Impact on Employment

There is no information available on the employment impact of the pesticide tax. The current tax level is seen as too low to have an impact on farm behaviour or a significant impact on farm incomes. The overall impact of the current Swedish pesticide tax is unlikely to be significant in terms of employment.

The use of revenue to fund advisory services and research and development (at first directly, now indirectly through the general budget) will have had an impact on employment. This may have been offset by reduced employment in pesticide distribution. We have no figures to confirm the magnitude of these effects.

Equity and Distributional Effects

No particular impact has been found. The overall change towards lower doses has also led to lower costs for the users. The overall costs for the agricultural sector and the effects on pesticide usage with regard to the pesticide tax have been low. (SBA 1998).

8.3 *The Pesticides Tax in Denmark*

Introduction

The Danish National Pesticide Action Plan was introduced in 1986, with the objective of protecting human health and the environment. The two main aims were to reduce the use of pesticides and to tighten up pesticide approval procedures.

Process Development of the Tax

The current pesticide tax is part of a larger pesticide regulation first launched under the National Pesticide Action Plan in 1986. A wholesale pesticide charge used to finance administration of registration of pesticides was raised to 3% in 1986 to finance the activities of the Plan. Despite several consecutive amendments, the main objectives remain:

- To reduce pesticide consumption by 50% (both measured as amount of active ingredient and as treatment frequency) within a period of ten years (i.e., by 1997);
- To shift consumption towards less harmful pesticides.

In 1997 the Danish Parliament unanimously adopted a resolution calling on the government to establish a committee of independent experts (the Bichel Committee) to assess the overall consequences of a phase-out of pesticides in agriculture, horticulture and forestry. The committee recommended a reduction in the use of pesticides, and found that optimisation of the use of pesticides could reduce the treatment frequency by 30 - 40% within 5 to 10 years without significant socio-economic losses. The committee also concluded that the treatment frequency should be considered as the best available indicator of environmental effects. This is reflected in the new Pesticide Action Plan II implemented in 2000.

The action plan aims at as low a treatment frequency as possible on treated acreage. The target for reduction in treatment frequency will be set in stages. A target will be set for the year 2002 and will be followed by a new target every three years. The first reduction target is to reduce treatment frequency from the current figure of 2.5 to below 2.0 by the year 2002 through regulation, advice and research (MEM 1999a,b). Every year treatment frequency, pesticide consumption and approval procedures are monitored and in year 2002 an overall evaluation will determine whether additional measures (quotas and/or tax increases) are necessary to meet the treatment frequency goal of 2.0. Also as a follow-up on the recommendations from the committee The Ministry of Taxation has investigated the possibilities to use treatment frequency as tax base instead of the current ad valorem pesticide tax. Due to the foreseen administrative problems the government has decided not to change the tax base to treatment frequency. Instead the government will propose a further differentiation of the tax-rates as a further approximation to a tax based at treatment frequency.

Design of the Tax

The pesticide tax was introduced as a percentage of the retail price to stimulate the aims of the 1986 action plan towards meeting the 1997 target. Due to difficulties of measurement, the tax is not differentiated according to toxicity or other indicators of the relative health and environmental impacts of the different pesticides (DEPA 2000). The use of pesticides in Denmark is measured through the amount of active ingredients used (measured in kg); and the number of doses applied per hectare of cultivated land ('treatment intensity' or 'treatment frequency') (DEPA 2000). The tax is imposed on domestic manufacturers where the pesticide is sold for use in agriculture, and on importers when the product is sold for use in agriculture. Importers may import the pesticide free of tax, but the tax is applied as soon as the product is sold for use in Danish agriculture. Exports are exempt from the tax.

Table 26 below shows the pesticides tax rates by pesticide as from 1998. The 1998 tax adjustment to 37% of the pesticide retail price still applies. The evaluation foreseen for the year 2002 will determine future levels.

Table 26: Development in the Danish Pesticide Tax Rates 1986-2000

| Year | Tax Development | Change in Average Pesticide Tax level (% of retail sales price) |
|-------------|---|--|
| 1986 | Introduction | 3% of the wholesale price of all pesticides |
| 1996 | Rate increase | Pesticide tax increased to an average 15% of the retail price. <i>Insecticides: 27% of retail price, fungicides, herbicides and growth regulators: 13% of retail price; microbiological agents: 3% of the wholesale price.</i> |
| 1998 | Rate increase | Pesticide tax increase to an average 37% of the retail price. <i>Insecticides: 35% including the tax but excluding VAT; fungicides, herbicides and growth regulators: 25% including the tax but excluding VAT; and microbiological agents: 3% of the wholesale price.</i> |
| 2000 | Implementation of the Pesticide Action Plan II, | Further tax increases will be considered if the action plan' objective is not met by year 2002. |

Source: Various numbers of Faktuel, MEM; (Bichel 1998, Main report).

Revenue and Use of Revenue

Pesticide tax revenues increased from 44 million DKK in 1994 to 298 million DKK in 1998 or from 0.11% of total environmental related taxes in 1994 to 0.52% in 1998 (see Table 27). The increase in revenues reflects the increase in the level of the initial charge of 3% in 1994 to the average tax rate of 35% in 1998. As discussed above, for the pesticide tax, funds are/were redirected to agriculture through property tax reductions and the pesticide policy package includes advice to farmers and research funded by the Danish authorities. Pesticide

research expenditures were 13.7 million DKK in 1998, and similar amounts are budgeted for 1999 and 2000.

Table 27: Revenue Trend from Environmental Taxes, 1994-2000 in DKK (EUR) Million

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Pesticide tax | 44 (5.9) | 31 (4.2) | 282 (37.8) | 235 (31.5) | 298 (40.0) | 445 (59.8) | 375 (50.3) |
| Environmental protection taxes, total | 4860 (651) | 5234 (701) | 6589 (883) | 7599 (1018) | 8595 (1152) | 9281 (1248) | 9321 (1250) |
| Environmental related taxes, total | 43940 (5888) | 43772 (5865) | 48206 (6460) | 51648 (6921) | 56910 (7629) | 60818 (8179) | 60629 (8134) |
| Pesticides as % of total environmental related taxes | 0.11% | 0.7% | 0.58% | 0.46% | 0.52% | 0.73% | 0.62% |

Source: The Danish public accounts

Initially 55% of the pesticide tax revenue was used to reduce county land tax while around 10% of the tax revenue was channelled back to farmers via support to organic farming. The remaining 35% of the revenue was used on research and on monitoring of pesticides in the environment. A minor part of the tax yield is used on administration of the approval system for pesticides (OECD 1999 April).

Intentionality of the Tax

The intention of the pesticide tax is to increase the incentives to optimise pesticide use at farm level and thereby reduce total pesticide consumption.. Although the pesticide tax is targeted at agriculture it applies to all plant protection products covered by the Danish authorisation schemes for pesticides.

Complementarity within Portfolio of Policy Instruments

To implement the Action Plan, the Danish policy-mix includes:

- Regulation (approval for sale, and consumption,
- Economic instruments such as charges/taxes on pesticide sales,
- Voluntary agreements between the Ministry of Environment and local authorities (to phase out the public use of pesticides by 2003), and finally,
- ‘Soft’ measures (education for pesticide users, including advice to farmers on reducing pesticide consumption).

Organisational Roles and Administration

The application of the tax at the sale point reduces the costs of control and administration. The number of registered companies at this level is significantly lower than at the retail level. Pesticides producers and importers must register with the customs authorities (MEM 2000).

Impacts On Costs and Prices

The tax base for the most important pesticides - insecticides, herbicides, and fungicides - is the retail price of the pesticides. This is defined as the maximum retail price for every single pesticide. The fact that the tax is based on retail prices requires a strong monitoring of retail prices. This is achieved through a price label system, which indicates a maximum selling price. Then pesticides must not be sold at prices that exceed the maximum price, and retailers who sell at a price lower than the maximum price, or offer a rebate, will not be entitled to corresponding tax refunds. This design of the tax setting prevents or reduces price speculation from importers.

Duties on pesticides were increased in 1996 to 15%, for herbicides and fungicides, and 37% for insecticides and soil disinfectants. Spot checks showed that the retail prices of fungicides and herbicides increased by 13% to 14%, respectively, from 1995 to 1996, whereas the prices of insecticides increased to around 48% (OECD 1998 January). According to the Danish Plant Protection Organisation pesticide producers absorbed some of the increases due to the pesticide tax, but the majority of the tax is being passed through to farmers.

In 1996, expenditure on pesticides amounted to 7.7% of the value of crop production in the agricultural sector. These costs have increased since 1994, when they amounted to 6.8% of the value of crop production. It also appears that the prices of some of the plant protection substances that are widely used today have dropped markedly during the course of the past 10 years (OECD 1998 January). According to the Danish Plant Protection Association price drops reflect new products, increased competition, and patents expiring. There is also a view that prices have dropped a little (no figures are available) due to the pesticide tax (see above).

Environmental Effects and Effectiveness (Effect on Pesticide Usage)

The treatment frequency (doses/hectare of cultivated land) in agriculture did not drop in line with the goals of the Action Plan. The average crop-specific treatment frequency has dropped by 15-20% in recent years (See Table 29), mainly due to a 53% decrease in demand for fungicides (See Table 28). However, this drop is offset by a shift towards crops requiring more intense pesticide spraying. Note also that the stockpiling effect observed in the 1995 data prior to the introduction of the tax (Tables 31 & 29).

Sales of active ingredients dropped from 6,972 tonnes in 1981/85 to 4,238 tonnes in 1996 or 40% over the whole period. This decrease not only reflects the measures under the Pesticide Action Plan but also a 11% reduction of cultivated arable land in rotation and an increased use of low-dose products. (OECD 1998 January).

Table 28 Sold Quantities of Active Ingredients for Agricultural Purposes, Tonnes

| | 81-85 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 95-96 | Goal: 97 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Herbicides | 4636 | 3128 | 2867 | 2824 | 3632 | 2685 | 3281 | 2915 | 3098 | 2318 |
| Fungicides | 1779 | 1396 | 1426 | 1333 | 1033 | 892 | 1055 | 631 | 843 | 890 |
| Insecticides | 319 | 259 | 146 | 128 | 107 | 95 | 163 | 36 | 99 | 160 |
| Growth reg. | 238 | 867 | 189 | 281 | 331 | 247 | 310 | 87 | 198 | 119 |
| Total | 6972 | 5650 | 4628 | 4566 | 4103 | 3919 | 4809 | 3669 | 4238 | 3487 |

Source: OECD 1998 January

In the Ministry of Environment / EPA a review leading up to the introduction of the tax in 1996, assumed a demand elasticity of -0.5 for pesticide use in general, but it was accepted that there is great uncertainty about this estimate. When the tax was altered in 1996, the expected reduction in consumption was estimated at between 5% and 10%. The actual effect can only be judged over a number of years. Early data suggests this prediction may be accurate as treatment frequencies appear to be falling.

Table 29: Treatment Frequency (dose/ha of cultivated land) (1990-1998)

| Pesticide Type | 81-85 | 1995 | 1996 | 95-96 | 1997 | 1998 | Goal 97 |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Herbicides | 1.27 | 1.72 | 1.28 | 1.50 | 1.66 | 1.47 | 0.64 |
| Fungicides | 0.81 | 0.58 | 0.38 | 0.48 | 0.59 | 0.58 | 0.40 |
| Insecticides | 0.45 | 1.04 | 0.21 | 0.63 | 0.32 | 0.26 | 0.23 |
| Growth reg. | 0.14 | 0.15 | 0.04 | 0.10 | 0.05 | 0.09 | 0.07 |
| All | 2.67 | 3.49 | 1.92 | 2.71 | 2.63 | 2.40 | 1.34 |

Source: Statistics Denmark, 1999, Miljø og energi nr. 24.

No great health improvements are to be expected by total elimination of pesticides. However, people working with pesticides will no longer be exposed to them. Consumers will still be exposed to pesticides from imported fruit and vegetables, but the level is expected to be below what is harmful ("FAKTUELT" NO. 21 of March 23. 1999). Fruit, vegetables and berries contribute 84% of human pesticide intake, crops 15% and drinking water, animal products and fish 1%. Sixty percent of the intake originates from imports and the general public intake is believed to amount to 1% of the estimated daily acceptable intake. Pesticides are found in one third of the groundwater tests and in 10% of the tests the pesticide values are above the limit for drinking consumption. (Bichel 1998, Main report)

The Bichel Committee arrived at the following recommendations regarding Danish pesticides and environmental policy:

- Further protection of certain biotopes by establishing a 10-12m wide no-spray boundary zone towards wet natural areas (targeted watercourses and lakes of more than 100 m²). It recommended that farmers should be compensated for reduced output;
- The use of pesticides is regulated within sensitive drinking water catchment areas;

- A market based changeover to organic farming be furthered as much as possible as a tool to simultaneously further the goals of environmental and agricultural policy;
- Market gardening, fruit growing and private forestry become part of a future strategy for the reduction of pesticides; and
- Increased dissemination of knowledge and development and research with a view to reducing the use of pesticides.

Impacts on Competitiveness and Trade

The Danish Farm Organisation (Landboforeningerne) is opposed to the Danish pesticide tax since it is implemented unilaterally, creating unfavourable conditions for Danish farmers compared to competitors in other Members States. This organisation sees the revenue recycling mechanisms (reducing land taxes and dissemination of information and research) as insufficient compensation for farmers. Farmers also fear that politicians will raise the tax simply to increase budget revenues as opposed to seeking to meet the tax's objectives of protecting human health and the environment.

The goal of the Pesticide Action Plan II is to reduce treatment frequency below 2 doses per hectare, which would not have any significant impacts on farmers nor the Danish GDP. The reduction would be obtained through optimised pesticide use aimed at reducing today's consumption by 40% to 50% without any significant economic impact on farmers.. A complete phasing out of pesticides however would have severe impact to the agricultural sector if done bilaterally by the Danish farmers. Competitiveness would decline and agricultural exports and employment would decline significant.

The enterprises most affected by the pesticide tax are potatoes, sugar beets and seed producers due to high spraying frequency and pesticide dependence. For these farmers there are fewer economically efficient substitutes to pesticides and the production risk of not using pesticides is large. Production of these products in Denmark will continue to depend on access to pesticides as long as the production techniques remain similar to those in place today. These are the areas about which concerns have been raised in respect of competitiveness.

The pesticide manufacturing industry in Denmark exports the majority of production. Given that exports are not subject to the tax (as the goal is to reduce pesticide use in Denmark), there is no effect on manufacturers in terms of international competitiveness.

Illegal cross-border trade is an issue in relation to the pesticide tax, but the amounts smuggled are not believed to be significant, and certainly not enough to disturb the overall picture. Imports and parallel imports of pesticides have to be registered at Danish Authorities for VAT reasons and for approval reasons under the Danish Chemical law. With retail tax prices up to 58% illegal cross-border trade or illegal imports of banned pesticides is imaginable. Farm Unions state that higher taxes increase the potential for cross-border trade and that the Danish unilateral implementation of the tax is harmful and unfair to Danish farmers.

Also farmers are concerned they cannot use the same pesticides due to the Danish approval procedure as their European neighbours, especially the Dutch. Denmark has banned a number of products from use. It may be this, as much as the price differentials, that encourages farmers to import products for their own use. It has been suggested to us that the presence of banned pesticides in groundwater has been detected, and that this constitutes evidence of such illegal smuggling.

Internal Market Effects

The Danish pesticide tax was subject to an EC state aid case in 1995 on the basis of the use of revenue derived from domestic and foreign products for addressing domestic problems. However; the Commission considered that the revenue was being distributed according to objective criteria to address the problem which the levy is intended to address, without supporting domestic producers of the taxed product.

As from year 2003 the Danish pesticide regulation will have to comply with internal market procedures with free trade of pesticide products approved in any Member State. The question then arises as to whether it is possible to keep the present system through exemptions, or whether the EU will adopt the stricter Danish rules after 2003. As mentioned above, farmers may be motivated to smuggle by the bans on the use of certain products in Denmark which are freely used elsewhere.

Impact On Employment

The Bichel Committee estimated the employment impact of four different pesticide scenarios. Banning the use of pesticides in Denmark would reduce the employment in the agricultural sector by 16000 employees. Reducing pesticide consumption by 80% would reduce employment by 8000 employees. The optimisation scenario 3 (30-50% reduction) would have no or very limited employment effect given a 10 year implementation period.

Note that since, as we understand the situation, the majority of Danish production of pesticides is exported, the employment impact on domestic industry of any tax-related reduction in use may be small. The effects on distribution may be greater.

Equity and Distributional Effects

The pesticide tax is targeted at the agricultural sector, which consumes approximately 90% the pesticides in Denmark. Farmers are compensated in part through the reduced county land tax targeted at all farmers and subsidies for organic farming (see Revenue Use).

The government review prior to the 1986 introduction of the tax considered distributional impacts which depend on the distributional impacts of county land taxes. Smaller agricultural holdings tend to have the highest land values, but the lowest pesticide consumption. However, the horticultural sector, which has high pesticide use, was estimated to be likely to suffer a significant compensation deficit. Estimates for the forestry sector were dependent on

the classification of the land for land tax purposes. It also appears that land prices are relatively higher on small farms than on large farms and land prices are generally higher closer to cities. These groups will benefit (in relative terms) more from the county tax deductions. Reduced property taxes are likely to become capitalised as increased land prices, hence benefiting the current landowners.

Furthermore, the pesticide tax influences regions that are dependent on crop production rather than livestock farming regions (Jensen & Stryg 1996). In the Danish case, the economy and the farmers of the eastern region would be affected more than others, due to the type of farming predominant in the east. The regional impact of the redistribution scheme, on the other hand, is more closely related to land prices than land uses.

The overall political and public climate in Denmark is in favour of pesticide reductions. This is especially true in the wake of Bichel Committee's finding that farm incomes would be unaffected if pesticide use was reduced by 30% percent through optimal pesticide use, with a 10 year optimisation period (treatment frequency target: 1.3 to 1.7).

8.4 *The Belgian Pesticides Tax*

Introduction

The Belgian Pesticide Ecotax is covered by the federal Ecotax laws and regulations. The first law on ecotaxes was passed on 16th July 1993 (Pesticides are covered under article 381 of this original Ecotax legislation). The legislation was modified by the law of the 7th March 1996, and is also the subject of a Ministerial Decree from 2nd May 1996. The measures came into force on 2nd July 1996. The pesticide ecotax has not been implemented nor levied yet, because of the long exemption list and the administrative and political difficulties associated with implementation. Consequently, the impact of the ecotax cannot be assessed, but the design and development process will be reviewed in greater detail to ensure that lessons from the process are identified.

An important aspect for this study is the implementation, since 1998, of a new charge on pesticides for agricultural use, covered by Article 2, paragraph 7 of the Arrêté Royal of 19th September 1998. It is presented briefly at the end of this section.

Design of the Tax

In the first version of the Ecotax Law in 1993, the ecotax consisted of three differentiated rates, applied respectively to substances classified in three ‘toxicity’ categories. An ecotax of 10 BEF/gram would be applied to very toxic substances, 5 BEF/gr. to toxic substances, and a rate of 2 BEF/gram to less toxic substances. The 1996 Ecotax Law reduced the three different rates to two rates differentiating between two categories of pesticides and phyto-pharmaceutical substances, according to more detailed criteria (see below).

The pesticide ecotax consists of two rates, both expressed per unit of active ingredient (a.i.) contained in the pesticide put on the market. The two rates, 10 BEF and 2 BEF/gram of active ingredient(a.i.), differ with respect to the level of toxicity of the a.i..

The tax rate of 10 BF (or 0.25 EUR/gr) per gram is applied to a ‘positive list’ of active ingredients, selected because of their environmental impact or risk (Annex 16 of the 1993 Ecotax Law). After several attempts and some criticism, the Ecotax Follow-up Commission adopted the following approach in 1995 to determine the ‘positive list’ of a.i.’s to be affected by the ecotax. It includes substances for which at least 3% of sample measurements show:

- In groundwater samples, a concentration exceeding the toxic limit value of 0.1 µg/l for drinking water
- In surface water samples, concentration exceeding 1 µg/l or the minimum toxic concentration value for the most sensitive aquatic organism in this environment
- If the outcome of measurements in a specific environment shows that a significant number of measurements exceed the legal toxic limit for the a.i., then the a.i. is

categorised as “highly toxic” for the environment: a rate of 10 BEF/gr is applied to the substance in question.

- If the outcome of measurements in a specific environment shows a lower frequency of exceedence but close enough to the frequency found for the 10 BEF/gr.rate list, the rate of 2 BEF/gr. is applied to the a.i. in question.

The basis for determining the applicable tax rate for the product is the concentration of one of the several a.i.'s in the final pesticide product, and the tax rate applied depends on the level of toxicity (ecotoxicity or genotoxicity) determined for the a.i.. The toxicity is determined by the occurrence and concentration in ground and surface water. The toxic legal limit for an a.i. is equal to the concentration range of values set as 'critical toxicity level for the aquatic organism most sensitive to this substance' (contained in surface and drinking water legislation).

The positive list currently contains 5 a.i.'s for which a 10 BEF/gr ecotax was designated: diuron, atropine isoproturon pentachlorophenol simazine. Note that so far, the list of active ingredients to which the 2 BEF/gr. rate should apply has not been defined, i.e. the only applicable tax rate – if the ecotax was implemented – would be of 10 BEF/gr.

A tax based on ecotoxicity classification might create an incentive to buy older untaxed products whose eco-toxicity has not been assessed. Hence, this adverse effect questions the environmental effectiveness of an ecotax if it was effectively levied on newer products only, while potentially harmful substances were unaffected by the ecotax.

There has been no externality evaluation to support the design of the tax. The ecotax law development process was led rather by the political debate across the different groups. This was led by the Greens, and kept the economic and social rationales to the sidelines. However, an ‘ex-ante assessment’ (discussions with scientists and producers mainly), has been carried out within the Ecotax Follow-up Commission. Discussions related to the possible socio-economic effects of the tax, but no quantitative results, have been communicated to the public.

Other criticisms related to the design included:

- The taxation of substances is assessed on the toxicity of the active ingredient in the environment, whilst the formulation in final pesticide products can (because of adjuvants) also be even more harmful when applied to the crops.
- the combination of several a.i.'s in the final product: the wood preserving industry uses a very concentrated combination of 3 different a.i.'s whose cumulative effect on the environment is more toxic than when used separately.

These side effects have not been taken into account in the ecotax design. This gap, in turn, questions the effectiveness of a general instrument such as an ecotax to tackle soil and water pollution. However, it is recognised that such a tax would be extraordinarily difficult to design.

More recently, interest in risk assessment – if not in externality evaluation - seems to have grown among the authorities. The Federal Office of the Prime Minister for Scientific, Technical and Cultural Affairs has commissioned some research³ on the development of an evaluation methodology for pesticide environmental risk assessment (development of pesticide risk indicators and risk scale as a basis for a future pesticide levy) and the socio-economic consequences of such a potential levy on pesticide users (both agricultural and non-agricultural) through a consultation and simulation process. The study estimates what would be the appropriate tax level and the expected reduction in purchase and use (see later).

Process Development of the Tax

The pesticide tax, along with the other six ecotaxes, was first demanded by the Greens from Wallonia and Flanders in the early 90s, in return for their support for government proposals for reform of the Belgian constitution. An agreement was made between the Prime Minister and members of the Green Party, the so-called ‘green taxes for green votes’ agreement, under which the green party was allowed to prepare a proposal for a range of Ecotaxes in 1992.

The original proposal was for an ecotax on all pesticides for non-agricultural uses, with a few exemptions for cases where no alternatives existed or where pesticides have small environmental impacts. This reflects the intent of the tax which is to reduce use of harmful pesticides, not eliminate them per se. From the first proposals, agricultural sector lobbying was successful in ensuring that agricultural pesticides were exempted.

Over time, following the comments of the government departments and committees, the proposal was amended to impose a tax on certain pesticides only.. The administration was not given much opportunity to refuse proposals for ecotaxes, including a tax on pesticides. The decision to proceed with the proposal for ecotaxes was political.

As a result, the pesticide ecotax was never implemented in practice. The urge to reduce pesticides’ presence in soil and water partly pushed the federal government to propose a charge on the purchase of pesticides for agricultural purposes (see below).

Exemptions

All agricultural uses are exempt from the tax. According to the 1999 Tax Survey of the Ministry of Finance, five types of pesticide-based exemptions are in place. They apply to the following situations:

³ Full reference of the study see footnote 6.

- pesticides allowed exclusively for applications for which there is no allowed or approved alternative which is not liable for the ecotax and whose cost is bearable from a social and economic point of view;
- pesticides for agricultural use where they are sold to agricultural and horticultural firms, to recognised users (except to market-gardeners) (Law of 1996), to stockbreeders and to companies involved in seeds disinfecting;
- pesticides for non-agricultural use, where they are allowed and used as disinfectants;
- pesticides for non-agricultural use, where they are allowed and used to fight true dry rot;
- an exemption from the tax is possible for certain substances, on the condition that a reduction in percentages of the quantities brought on the market are achieved by agricultural and non-agricultural users together. This percentage reduction must be set by a Royal Decree around 15% - 20%. According to the Ministry of Finance, Section Customs and Excises, agricultural users for simazine and diuron would achieve the percentage reductions.

As a result, all pesticides users, whether agricultural or non-agricultural users, are or have been exempted.

Revenue and Use of Revenue

The net revenue from the ecotax, once levied, would be redistributed to the 3 Belgian regions (Wallonia, the Flemish region and Brussels) according to population. Revenues will not be earmarked. All Belgian ecotaxes are intended to be revenue-neutral. However, the reallocation of revenues to the regions raised suspicion among industry as to the intentionality of the ecotax as a pure “incentive” based tax. Industry feared that the hidden agenda for the ecotax was purely fiscal. However, the tax structure of exemptions reflected the strength of the agricultural lobby and the concerns of government about the potential impact of such a tax on one of the country’s key economic sectors.

Although the pesticide ecotax was not implemented (hence no revenue) , the total ecotax revenue (including the whole set of 6 ecotax) presented in Table 30 suggests the following:

- The revenue of the whole set of ecotaxes accounted for 2% of GDP and 5% of total tax revenue (no split between the different taxes available) in 1995.
- The total revenue from the 6 ecotaxes amounted to 8 Millions BEF in 1995. If these figures are taken as a benchmark for a potential pesticide ecotax weakened by exemptions, it suggests that the revenue would not have been very significant (assuming equal share of total revenue across the 6 ecotaxes, around 2.6 BEF Million).

Table 30: Total Ecotax Revenue in Belgium (all ecotaxes)

| Year | 1994 | 1995 | 1996 | 1997 |
|-----------------------------|--------|---------|---------|---------|
| Total revenue (BEF Million) | 3 | 8 | 5 | 15 |
| (EUR) | 75 000 | 200 000 | 125 000 | 375 000 |

Source: EUROSTAT, 1999 (Statistics on Environmental Taxes in EU Member States)

Intentionality of the Tax

The Belgian government was interested in measures to change the behaviour of consumers, rather than in raising revenue.

In theory, the Belgian ecotaxes are not Pigouvian taxes because their rate is not specifically linked to the environmental damage caused by the products whose use is being taxed. They resemble more the Baumol type for two reasons: the rate is rather high (and differs according to the toxicity level) and the tax is explicitly set to put pressure onto the producers and consumers to alter their behaviour in line with the exemptions (De Clerq, 1996a). Ecotaxes are levied on products for which a more environmental-friendly substitute is available on the market.

Organisational Roles and Administration

Ecotaxes are managed by two entities: the Follow-up Commission on Ecotaxes, and the Ministry of Finance. The Follow up Commission is a permanent organ, within the Prime Minister's office. Members are appointed for 5 years by both the federal and regional government and are experts in environmental economics & law, waste, ecology, etc. The Commission advises the Parliament on amendments (and possible new taxes) evaluates the taxes from an ecological and socio-economic point of view, reviews exemptions, and designs the list of a.i.'s. Table 31 below summarises the roles of each actor for the ecotax.

Table 31: Roles and Administration of the Belgian Ecotax on Pesticides

| <i>Who...</i> | <i>ECOTAX</i> |
|--|--|
| ... designed the tax | Green parties With Parliamentary approval Follow-up Commission on Ecotaxes (evaluation, consultation role for future ecotaxes) |
| ... is responsible for implementation and administration (tax collection) | Federal Government (Ministry of Finance, Customs and Excise Division) Follow up Commission proposes amendments and new taxes, runs information campaigns on ecotaxes |
| ... decides on exemptions | Follow-up Commission on Ecotaxes |
| ... monitors level of pollution | Regional environmental agency |

In the first year of implementation, the cost of administering all ecotaxes was estimated to be around 60 Million BF. The costs have not been re-estimated since, to avoid a debate about the possibility of the Federal Finance Ministry needing to recover costs (not covered by the total revenues) from the 3 Belgian regions. Since the ecotax on pesticides has not yet been implemented, the administrative cost has not increased. The mandate of the follow-up Commission on Ecotaxes has not been renewed after its termination in 1998, and no new

Commission is foreseen in the near future. Therefore the development of the ecotax on pesticides is not likely to progress in the near future.

Complementarity Within Portfolio of Policy Instruments

As in other EU countries, a pesticide authorisation process is in place, based on the Uniform Principles, involving a committee made up of representatives of the Ministries of Agriculture, Public Health and Workers' Rights.

Other public sector pesticide measures include:

- research, development and dissemination of pesticide minimisation and safety techniques,
- obligatory controls of equipment;
- Education of pesticide users and salespeople.

The ecotax discussion and lengthy administrative process have indirectly led to the recent setting-up of a small charge on pesticide sales, as described later in this report.

Environmental Effect

Although the ecotax has not actually been levied, there has been some evidence of changes in use of the pesticides targeted in response to the threat of a tax. The Belgian railways (SNCB), the largest user of diuron, reduced consumption of diuron by 25% in 1996, with the aim of reaching a 50% reduction in use.

Some stakeholders at the Ministries consider that the perspective of a tax triggered a self-limitation reaction from wholesalers on the amount of pesticides put on the market. The incentive effect of the ecotax is very often perceived as “stick” which can provoke a slight change in consumption from non-agricultural customers and the acceptance of a small charge on all pesticide uses. The reduction in use was supposed to reach around 20% gradually.

The environmental effectiveness of the ecotax has neither been assessed nor estimated (since it has not been implemented, the effect can be described as “nil”). The elasticity of the a.i.'s has not been estimated, but some estimates of the price changes and elasticity of demand for each ecotax scenario are available.

As a rule and to avoid the pitfalls caused by potentially low elasticity of demand, ecotaxes were only set where cleaner substitutes (specified by the 1993 Law) were available on the market. These substitutes can seldom be perfect substitutes. Substitutes proposed by the government are only classified with regard to their lower toxicity, not with regard to other useful characteristics of interest to the consumer (i.e. practical use comparability, effectiveness of the product, ease of use, frequency of application, etc.). Ecotaxes interfere in the choice via their price signal only and eventually, only core users would keep on using the taxed substances. This is a case where the ecotax has a true economic justification (De

Clercq, 1996). Note that the tax was not obviously intended to support changes in technique (e.g. switches to organic farming) since implicitly, farmers were expected not to stop their use, but to switch to alternative products or reduce the use of taxed pesticides.

Effect on Producers

Since the tax has not been implemented in practice, and price data on the pesticide in questions were not made available for confidentiality reasons, it is not possible to analyse the effect on price. However, since the taxes are per unit of a.i., the tax would vary in percentage terms quite significantly (the costs per unit of a.i. vary widely).

Competitiveness Impacts

Not applicable (no implementation). Few impacts were expected in theory given the exemption of the agricultural sector. There is risk of leakage, both by use of pesticides from the agricultural sector by non-agricultural users (Belgium is a small country, and farms are found amidst more residential areas), and through the purchase of pesticides in neighbouring countries.

Internal Market Effects

In the Belgian ecotax law, a solution had to be found to the following 4 questions:

- How can a linkage be avoided with indirect taxes that could hinder distribution and more specifically, imports?
- How can discrimination be avoided between Belgian and foreign producers?
- How can the tax design avoid the requirement to monitor very complicated distribution chains?

The solution that was chosen consists of bringing the point of imposition of the tax towards the end of the distribution chain.

Products exported from Belgium are exempted from a tax, while imported products fall under the same tax regime as products produced in Belgium. It is interesting to note that atrazine and simazine are not produced, nor formulated in Belgium and that dichloorvos is only formulated in Belgium, which entails that some pesticides can only be imported to Belgium (and taxed) and some others exported from Belgium (not taxed). All exports of dichlorvos (supposedly highly toxic for human health) are exempted from the ecotax.

Additional research was done by the Belgian Fiscal Administration to assess the feasibility and the administrative costs of such a regime, but the results are not publicly available.

Impacts on Trade

During the ecotax negotiations between the regions and the federal government, the main trade-offs have been between administrative, monitoring and enforcement costs and the need

to address potential trade distortions and complications in the context of the single market, by setting the product tax at the level of the wholesaler, at the expense of higher administration costs. The Belgian government opted for reducing potential trade distortion and legal challenges over reducing administrative costs. They have chosen to levy the ecotax as close as possible to the retailer/the end of the distribution chain.

The study mentioned above looked at the socio-economic effect of an ecotax on private, agricultural and the wood industry sectors uses. Effects on households are estimated to be limited.

Impact on Employment

None, as the tax has not been levied.

Impact on Consumers

Had it been implemented, households would have been affected by the ecotax on pesticides via the purchasing of cleaning and maintenance products. The price effect and the elasticity of demand by consumers in the case of two ecotax scenarios⁴ have been estimated. According to the first results (not yet finalised), an ecotax of 2 BEF/gr (0.05 EUR) or 4 BEF/gr would lead to the results shown in Table 32 (we have added our own calculation for the 10 BEF/gr case):

⁴ "Elaboration of evaluation criteria for pesticides in relation to environmental fiscalty": see footnote 6.

Table 32: Estimated Effects Of Different Levels Of Eco-Tax

| Tax scenario | 2 BEF (0.05 EUR)/gr | 4 BEF (0.1 EUR)/gr | 10 BEF (0.25 EUR)/gr |
|--|----------------------------|---------------------------|-----------------------------|
| Average pre-tax price per kg | 750 BEF (18.6 EUR) | 750 BEF (18.6 EUR) | 750 BRF (18.6 EUR) |
| Average a.i. content per kg | 305 gr | 305 gr | 305 gr |
| Average ecotax payment per kg | 610 BEF (15.1 EUR) | 1220 BEF (30.2 EUR) | 3050 BEF (75.6 EUR) |
| Average post tax price per kg | 1360 BEF (33.7 EUR) | 1970 BEF (48.8 EUR) | 3800 BEF (94.2 EUR) |
| Average Tax Share of final price | 45% | 61% | 80% |
| Average price increase per kg | 81% | 162% | 400% |
| % of consumers who stop buying the taxed product (survey) | 15% - 45% | 25% - 65% | - |
| Expected sales reductions | -9% to - 37% | -28% to 81% | - |

Source: ECOLAS (2000) for the two tax scenarios 4 BEF (0.1 EUR) and 2 BEF (0.05 EUR). The average a.i. content and the pre-tax average price are based on a different number of final products. The survey was done for atrazine/simazine/isoproturon and diuron (herbicides)⁵. We have assumed that the same rates could be applied to the ecotax of 10 BEF (0.25 EUR) (the higher rate considered) and the results may not be valid

The same study seems to suggest that any of the two ecotax alternatives would only have a minor effect on household's incomes.

Equity and Distributional Effects

On the whole, it can be said that the ecotax has not had any equity and distributional effects since it has not been implemented.

Complementary Information on the New Charge on Pesticides for Agricultural Use (Article 2, paragraph 7 of the Arrêté Royal of 19th September 1998)

For the time being, very little information is available on the new charge as it has just been implemented. It is presented separately from the ecotax, as these are two different economic instruments to fulfil different objectives.

Following the general failure of the ecotaxes in practice, and the urge to reduce pesticide occurrence in soil and water, the federal government has proposed a charge on the purchase of pesticides for agricultural purposes. The Arrêté Royal on the authorization fees and

⁵ Endosulfan is not widely used by households, while dichlorovs is an insecticide and follows different purchasing patterns.

marketing fees financing the “Raw Material Budget Fund ” (run by the Agriculture and Middle Class Ministry) was passed on August 19th, 1998 and the charge was established after publication of the law in September 1998.

Design of the Charge

The current level (and the only one so far) is of 0.1 BEF per gram of active substance (0.0025 EUR /gram). It applies to the same list of 5 active substances as covered by the ecotax, when those are put on the Belgian market i.e. sold to the “first client”, but for agricultural use only. The charge has been set up at federal level. Contacts at the Ministries seem to suggest that no externality/ex-ante assessment has been made for the moment. The new charge on agricultural pesticides came into force on September 22nd of 1998. It started to be collected for the first time in March 1999.

The low rate has ensured wide industrial and agricultural acceptance, since agro-industry and agriculture are better off than if a higher-rate ecotax had been extended to agricultural use. It is thought that acceptance was mainly driven by the threat of extending the ecotax to agricultural pesticides (personal communication).

Intentionality of the Charge

This charge does not fall under the Ecotax Regulation and does not serve the same purpose. It indirectly aims at financing the active substance registration process (linked to the Directive 91/414/CEE on the marketing of phyto pharmaceutical products) within the framework of the Fund for raw material use by agriculture, fisheries and horticulture. Unlike the ecotax, the law does not provide for any exemptions.

Revenue, Use of Revenue and Administrative Costs

There is for the moment, no information on the revenue raised by the new charge on agricultural pesticides. It is expected to raise more than 10 BEF Millions in revenue for 1999 (personal communication) and will be used to finance a Raw Material Budgetary Fund. This Fund will be used, amongst other things, to finance some research projects on environmentally friendly agriculture.

There is no information on the administrative costs of the new charge. However, since it is linked to existing administrative procedures e.g. registration and authorisation of pesticides, the marginal cost of administrating the charge would be assumed to be minimal.

Organisational Roles

Table 33 below summarises the roles of each actor.

Table 33: Responsibilities for the New Pesticides Charge

| <i>Who...</i> | <i>1998 PESTICIDE CHARGE</i> |
|---|--|
| ... designed the tax | Federal government (Ministry of Agriculture main actor) |
| ... is responsible for implementation and administration (tax collection) | Federal Government (Ministry of Agriculture main actor) |
| ... decides on exemptions | N.A |
| ... monitors level of pollution | Regional environmental agency |

Environmental Effects and Effectiveness

The environmental effectiveness of the recent charge has not been assessed, but the impact is likely to be small because of the rate being set so low.

Effect on Producers

The effect of the new charge on agricultural pesticides on producers is likely to be small due to the low rate.. No data on pesticide for agricultural use is available for confidentiality reasons. Moreover no particular complaints for either industry sector (including agriculture) have been reported (personal communication).

Effects on Trade and Competition

The trade distortion caused by the new charge on agricultural pesticides have not been assessed, neither do the contacts think that those might actually take place, given the insignificant rate imposed. The new charge on agricultural pesticides is less likely to cause any of the above since all imports are covered by the charge when sold in Belgium. The new charge is levied when the substance is sold for the first time to a “first” client (principle laid down in the Arrêté Royal). This implies that two persons are required to pay the charge: the Belgian importer pays the charge when the product is sold (or ‘put on the market’) in Belgium, and so does the Belgian manufacturer when its product is sold for the first time (to the retailer for example). Whenever the final consumer makes the import into Belgium, he/she is liable to pay the charge. Overall, no winners and losers have been identified, before and after the implementation of the charge on agricultural pesticides. Most consultees have not raised any concern in this respect. Hence, it is difficult to avoid the payment and potential competition issues are likely to be minimised.

Effect on Consumers

Both the price pass-through onto consumers and the income effect are expected to be very small given the low rate. No estimate is available.

Equity and Distributional Effects

The recent charge on agricultural pesticide use is either not very likely to have any equity or distribution effects, given its insignificant rate. It hits all sales equally, as there are no exemptions. No estimation of the tax burden has been made and no particular complaints have arisen (personal communication). However, the revenue recycling scheme (a fund that promotes among others, research on environmental friendly agriculture) could potentially have some indirect effects, depending on the areas where recycling is directed at. These are not known for the time being.

8.5 Summary

Two of the three taxes have been implemented in a meaningful way. In one of these (Denmark), though it is perhaps premature to say so, the effect of the tax appears to have been a positive one. In the other (Sweden), the effect of the tax *per se* is difficult to dissociate from wider changes in agricultural policy, and also, from the effects of programmes providing advice to farmers.

On the one hand, the fact that both countries have seen the emergence of stockpiling by farmers in response to intentions to increase the tax suggests that farmers are responsive to the price of the taxed products. On the other, this may be a simple reflection of the fact that buying what farmers would otherwise buy anyway will be cheaper before the tax's introduction – it does not necessarily mean that they wish merely to delay by one year any subsequent response.

The base for the tax – whether it is per dose, or per kilogram of active ingredient, or ad valorem in nature – would be expected to affect the way in which farmers respond. Certainly, in cases discussed here, there is a suggestion that farmers in Sweden may be switching towards low dose products with higher levels of activity, reducing their exposure to the tax as a result. One would be inclined to expect this more in the Swedish case (where the tax is set on the basis of the weight of active ingredient) than in the Danish case (where the tax is applied on an ad valorem basis, but then converted to a specific increase). A concern is that this may imply that the environmental effectiveness of the tax could be less than quantitative reductions tend to suggest. However, this is speculation. In both cases, the supporting programmes of advice might be expected to minimise the adverse effects of any switching which does actually occur.

Switching to low dose pesticide is only one possible behavioural response, but farmers can also react by a more careful use of pesticides, aiming at not overdosing and hence, the first marginal reduction in use cannot be seen as a burden. In Denmark a number of advisory schemes have been developed in order to help farmers reduce their pesticide use by improving the monitoring of pests, establishing a threshold to be reached before use and half dose uses.

In Denmark, the fact that price increases are effectively established on the basis of a nominal ad valorem tax (reflecting, presumably, the fact the responses of farmers is usually measured through reference to elasticities, and the percentage price change drives the response under this parameter) is recognition of the fact that ad valorem taxes risk being made less effective by pricing strategies of suppliers. Even so, it appears that the effects of the tax are somewhat less than was expected owing to the tendency of some suppliers to absorb some of the tax (presumably to maintain sales, and possibly also, motivated by the risk of cross-border transactions for farmers' own use).

As regards the Internal Market, it is not clear that there are any significant concerns in this respect. Pesticides are still freely traded, and indeed, it appears that they must be in these two cases since both countries are largely dependent upon foreign manufacturers and importers for their pesticides. The case for arguing that the instrument has been levied on protectionist grounds seems weak in either case and there have been no obvious concerns expressed from the industry beyond those which one might expect. The more interesting Internal Market issues probably arise in the context of the current approvals process, and the extent to which they may deviate from what is subsequently laid down in the Uniform Principles. This is an issue which is not directly related to the pesticide tax.

In respect of competitiveness, there have been concerns expressed by farmers in Denmark. They are also concerned that they are unable to use specific products which are freely used in competing countries. On the other hand, the Danish tax was used to finance a reduction in land tax values so that any farmers who will have been most affected by changes in pesticide prices will also have been the farmers benefiting from the reduction in land taxes. The exception would appear to have been some horticultural growers.

Conversely, there is some evidence to suggest that in Sweden, farmers regarded environmental performance as an important attribute that would improve their competitiveness within the EU market after accession. In any case, post-accession, the price regulation charge on pesticides was removed so that the net 'charge plus tax', even after the environmental charge became a tax after it was increased by 250%, was less than had been the case pre-accession when Swedish agriculture was insulated from competition with EU states. Note that in Belgium, the concerns of the agricultural lobby led to exemptions for all agriculture under the ecotax law, but the sector will be affected by a new tax which, however, is levied at a much lower level than the original eco-tax.

The effects on 'the industry' appear to have been of limited concern in the countries studied partly since the Swedish pesticide industry is (as we understand it) non-existent, whilst Denmark principally exports pesticides (which are exempt from tax). One could say that the impact is simply poorly studied. The impacts are being felt by third countries. Some concerns have been expressed, in discussions around implementation of a Belgian tax, for the wood preservatives industry. In Sweden, these are exempted from tax.

Trade effects are difficult to discern. There appear to have been limited concerns from farmers in Sweden, though Danish farmers are evidently voicing concerns about the tax (especially if it increases further in the future). There is a paradox here:

- If Danish farmers really are importing large quantities of pesticides from abroad, and if this is undermining the effect of the instrument, then there is no major effect on farmers, though the positive effects of the reduction in land taxes remains.
- If, on the other hand, very few illegal imports have come into the country, the impact on farmers could be expected to be greater, though even here, studies suggest that reducing pesticide use may not lead to deterioration in the financial position of farmers owing to

possibilities for re-optimisation of use. Belgian farmers have also been keenly opposed to any tax.

One concern has been the importing of pesticides for own use. In Sweden, this is no longer seen as being significant since neighbouring countries have high tax rates. However, in Denmark, this is believed to be an issue, though it is not believed to be a significant one at current tax rates. However, it is somewhat difficult to establish the truth here.

An interesting aspect of the two taxes implemented is that they have not specified wide exemptions. This contrasts with the Belgian ecotax design, where exemptions have made the tax completely ‘toothless’ (indeed, it is not clear whether non-implementation and implementation would amount to one and the same thing owing to these exemptions). The new tax will be different.

There is some interest in these countries in designing a risk-based instrument, though the complexities (and the debates opened up by such considerations) have not favoured full implementation.

An important aspect of pesticide charges / taxes has been their revenue raising role. The funds raised can be used to support programmes aimed at optimising use of pesticides, reducing pesticide use whilst reducing any negative impacts upon farmers. This has clearly been important in Sweden and the role of advice and extension complements the tax in Denmark, where some funds are also used to support organic conversion. Both Sweden and Denmark now have significant organic agriculture sectors.

Employment effects at current tax rates are negligible, though the funding of advice schemes certainly provides some employment. There may be impacts in third countries as a consequence of reduced use of pesticides, and within the countries concerned, from reduced distribution. At the macroeconomic level, these effects are very small. The tax revenues represent very small fractions of GDP.