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2 Pesticide Taxes in Scandinavia

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6 taxes in Scandinavia.

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8 *Artikel i Pesticide Outlook*

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11 **Introduction**

12 The use of taxes to change pesticide usage is currently being hotly debated in most EU countries.
13 The discussion started in the middle of the 1980s when, in a number of countries, policy goals were
14 introduced to reduce pesticide usage, and taxes were suggested as a means of achieving such goals
15 (Oscam *et al.*, 1992; WWF, 1995).

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17 When discussing pesticide taxes it is important to identify clearly whether the principal aim of the
18 policy is to reduce pesticide usage or to control undesirable environmental effects. For example, a
19 Value Added Tax (VAT), or a tax on the weight of active ingredient (a.i.), would provide a different
20 incentive from that provided by a tax based on environmental hazard indices. Whilst the
21 consumption of pesticides is easy to measure, the more intangible indices of environmental risk give
22 rise to considerable discussion. The objective of the policy of pesticide taxation must, therefore, be
23 transparent to allow for informed discussion.

24

25 Taxes on pesticides have been introduced in the Scandinavian countries of Denmark, Norway,
26 Sweden and Finland. They are also being considered in other EU Member States, but in this paper
27 we only focus on the already implemented tax schemes. In all countries the tax is only one element
28 of a suite of policy measures which have been implemented to regulate pesticide consumption and
29 the pesticide market as a whole. These measures include registration requirements, private and
30 publicly funded R&D, technical standards for spraying equipment, compulsory training of farmers
31 using pesticides, and upgrading of the extension services (Oscam *et al.*, 1998; Piementel, 1997;
32 Watts and MacFarlane, 1997).

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34 In this article the use of pesticide taxes in Scandinavia is described, including the tax-base, tax-rates,
35 tax revenue and other administrative levies, and environmental economics.

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Existing pesticide tax schemes in Scandinavia

Denmark

The first Danish pesticide tax was imposed in 1987 as a VAT of 3% on all pesticides. The objective was to raise revenue for strengthening the research at public research institutes and farmers' extension services in order to achieve a 50% reduction in pesticide use by the end of 1997 compared with the average use in the period 1981–1985. The reduction was intended to be both in quantity and intensity of treatment (measured as the number of times a unit area receives a maximum recommended rate of a pesticide).

In May 1995 a new differential tax-scheme was implemented which distinguished between different groups of pesticides. In January 1998 the Danish government decided to double the tax on pesticides. The current pesticide tax schemes is shown in Table 1. Tax rates do not reflect differences in environmental risk, but are motivated by the levels of the treatment intensity among the different groups of pesticides before 1995. Treatment intensity is a measure of the number of times a unit area receives a maximum recommended rate of a pesticide. For example, if the recommended rate of a sulfonylurea herbicide is 0.04 kg AI per ha and that of a phenoxy acid is 1 kg AI per ha, the treatment intensity is the same viz. 1.00. Thus, if only half the rate is sprayed, the treatment intensity is 0.5. On average, the tax corresponded to 30% of the total agricultural costs to pesticides. Of the total tax revenue of about \$50m in 1998, 60% was channelled back into the agricultural sector through different subsidy schemes, such as those to organic farming. The remaining \$19m are used for public research and pesticide monitoring programmes. Apart from the tax-schemes above, there is no registration fee for introducing or keeping a pesticide product on the Danish market.

The long-term effects of the 1995 tax scheme initiatives are not yet obvious because of hoarding of pesticides during the political decision process prior to the tax-implementation. This hoarding was reflected in increased sales of all pesticides in 1995, especially insecticides—the group of pesticides taxed most heavily (Figure 1). It is not possible to see whether the large drop in sales of insecticides in 1996 and 1997 compared to 1994 is due to the hoarding in 1995 or due to the higher tax-rate on insecticides.

Norway

Since 1998 Norway has had a tax on pesticide sales corresponding to 15.5% of the retail price. From March 1999 the average tax rate doubled, and the tax differentiated according to a classification of the health and environmental hazards of the pesticides. The 1999 tax scheme in Norway divides pesticides into 8 classes (Table 2). Tax levels increase according to the perceived hazards to the environment and human health of each class. The pesticides that fall into classes 3, 4 and 5 are ranked on basis of their physical and toxic properties, e.g. persistence in soil, Predicted Environmental Concentration (PEC), acute toxicity and Predicted Initial Environmental Concentration (PIEC), according to guidelines prepared by The Norwegian Agriculture Inspection Service, Ministry of Agriculture (Landbrukstilsynet, 1999a).

The base tax level of the 1999 scheme is set at \$1.7 per hectare, with a further flat-rate registration fee (or rather an additional tax) of \$1.6 per hectare. The registration fee is not subject to differentiation. Thus, a pesticide that falls into tax-class 3 is due to a tax of \$3.3 per hectare [$1.7 + 1.6$]; whilst a pesticide in tax-class 5 is due to a tax of \$15.2 per hectare [$(8 \times 1.7) + 1.6$]. The tax on a pesticide pack is calculated from a standardised area dose, that is a weighted average of the recommended rates in various crops. By dividing the amount of pesticide in one pack by the

1 standardised area dose, the number of hectares, which can be treated with the pesticide, is calculated
2 (Landbrukstilsynet, 1999b). The total tax on one pack is then calculated by multiplying the number
3 of standardised hectares by the tax. The total tax revenue is expected to be \$6m in 1999, of which
4 \$4.8m derives from the tax and \$1.2m from the registration fee. In Norway manufacturers pay \$800
5 for initial registration of a product.

6
7 A noteworthy differentiation among pesticide classes in the Norwegian tax scheme is that between
8 pesticides used for commercial and private purposes. Pesticides used in agriculture and horticulture
9 are taxed with a maximum of 8 times the base-tax (Table 2), while those used for non-commercial
10 purposes are taxed at 50 times the base-tax and the ready-for-use packs for home gardening
11 purposes are taxed at 150 times the base-tax. These high tax rates are a result of the small areas on
12 which pesticides are used in private gardens.

13 14 *Sweden*

15 In Sweden a pesticide tax was introduced in July 1984 with the aim of reducing pesticide use and the
16 alleged side-effects. The tax is based on the amount of active ingredient. Initially the tax was \$0.5
17 per kg a.i., and in 1988 it was doubled to \$1.0 per kg a.i. (Franzén, 1995). In 1994 the tax was
18 increased once again, now corresponding to \$2.4 per kg a.i. The revenue of the Swedish pesticide
19 tax is about \$3.8m per year. There is no specific link between the tax revenue and the spending on
20 R&D, advisory services or subsidies to less pesticide intensive farming methods.

21
22 In addition to the tax on pesticide use, producers have to pay a yearly charge corresponding to 2.6%
23 of the sales value of each product. The charge varies between \$240 and \$23,700 per annum.
24 Additionally, producers are charged when registering new products or changing existing
25 registrations. When applying for registration of a new product the charge is \$3600 and the charge
26 for registration of a new product containing an already marketed a.i. is \$1200.

27 28 *Finland*

29 The main purpose of the Finnish pesticide tax is fiscal. The tax is applied as a uniform flat-rate VAT
30 on all pesticides at 3.5 % and is not expected to have significant effects on pesticide usage patterns.
31 The total tax revenue in 1997 was \$1.7m, which was used to fund the costs of pesticide registration
32 and maintaining a pesticide register. Furthermore, Finland has a registration fee of \$900 on all new
33 pesticides.

1 **Some theoretical aspects of pesticide taxes**

2 Economists advocate environmental taxes because of a number of positive properties, mainly the
3 possibility for flexible adjustment in response to the tax and the incentives to develop more
4 environmentally friendly approaches. The substitution incentives also apply to producers of
5 pesticides, if the tax is shared between farmers and pesticide companies. For this reason OECD and
6 the EU Commission advocate taxes as an instrument in pesticide reduction programmes. When taxes
7 are used for regulating pesticide use a number of considerations are of importance.

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9 the objective of the policy—and thus, the tax—needs to be explicit. From economic theory it is a
10 well-established result that an environmental tax be based on the issue that needs to be regulated
11 (Baumoll and Oates, 1988). In the case of pesticide use the issue may *not* be to regulate pesticide
12 use itself but to regulate *the environmental effects of pesticide use*. As mentioned in the introduction
13 the link between *use* and *environmental effects* is seldom known, and therefore taxes need to be
14 applied based on the best assessment of environmental effects in specified conditions.

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16 • the incentives of the tax in terms of changing farming practices and pesticide usage need to be
17 considered in order to prevent negative reactions, such as a shift towards more toxic pesticides
18 or practices which will undermine any environmental benefits of the tax.
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20 • the distribution effects may be of relevance. A tax may lead to undesirable effects on particular
21 crops or farm types, which can be politically unacceptable if certain types of production of
22 regional importance are adversely affected.
- 23
24 • the use of the tax revenue is often subject to considerable discussion by Government. In terms of
25 efficiency the revenue should be used in such a way that it does not interfere with the incentive
26 mechanisms of the tax and so that it yields the greatest *value for money* to the nation as a whole.
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1 **Concluding remarks**

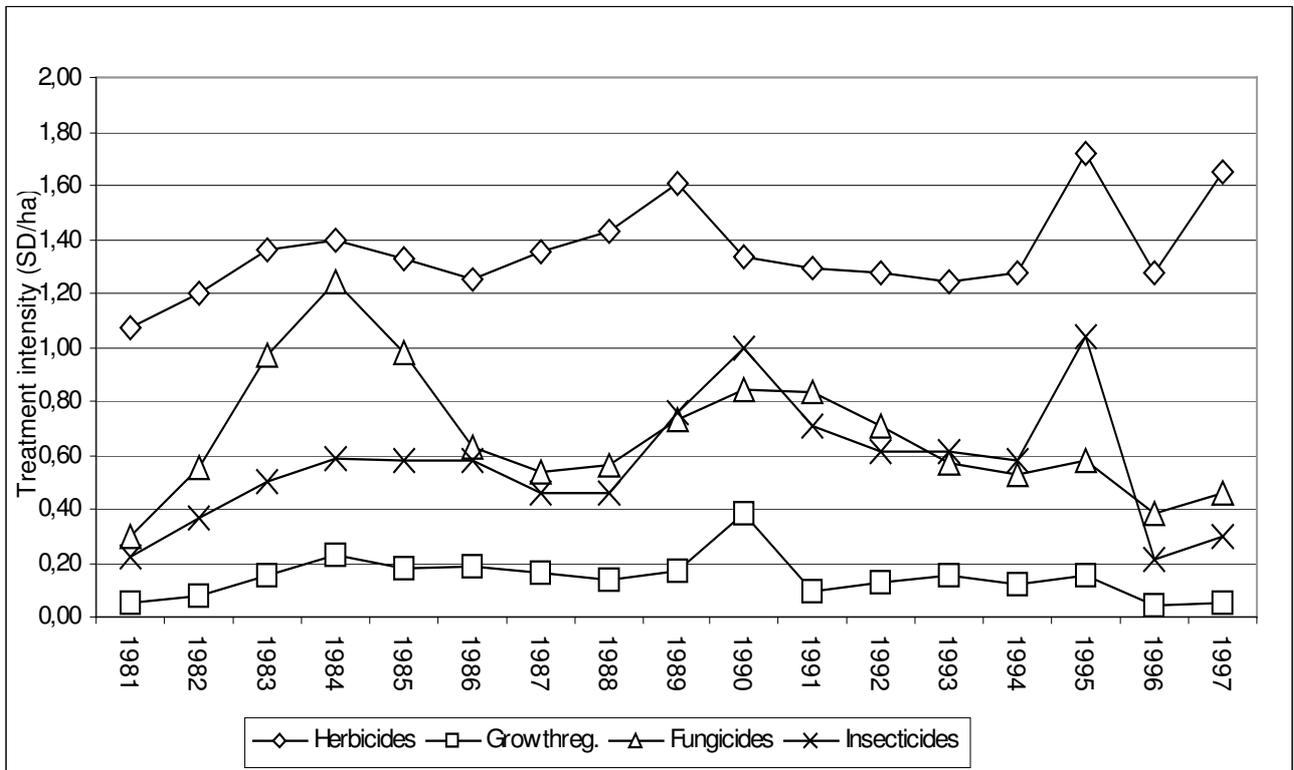
2 The tax-schemes that various countries have implemented are based on different perceptions of the
3 objective of the tax. Only Denmark and Norway distinguish between types of pesticides in their tax
4 schemes. In Norway the tax is based on quantity per unit area and the presumed environmental
5 effect of the pesticide. In Denmark pesticides are not taxed according to their perceived
6 environmental effect, but according to their classification into insecticides, fungicides and herbicides.
7 Ongoing discussion in Denmark about the ranking of environmental and toxicological hazards is
8 intense, but the Government cannot separate revenue raising from a scientific approach to pesticide
9 control. Currently, there is a political desire to change the system from a value-added tax to a tax
10 based on treatment intensity; whether this makes the tax more environmentally targeted seems
11 unclear.

12
13 A clear distinction between commercial and non-commercial pesticide consumption is made in both
14 Norway and Denmark. In Denmark, the Government intent to ban pesticide use in private gardens
15 and on public areas. In Norway the Government has imposed a very high rate of tax on private
16 pesticide use. It is notable that the politically reluctant attitude towards pesticide use in private
17 gardens in Norway is communicated via the market mechanisms, whereas a non-flexible
18 regulation—such as a total ban—has been chosen in Denmark. Considering the cost-efficiency
19 criteria listed in the previous section it seems questionable whether such a radical measure against
20 one particular use of pesticides can be justified by the expected environmental gains.

21
22 In conclusion, taxes on their own may have some desirable properties in terms of changing usage
23 behaviour, but the actual environmental benefits of taxing pesticide usage are largely dependent on
24 whether the hazardous attributes of pesticides are properly assessed. In the Scandinavian countries
25 pesticide tax schemes reflect political priorities. Nevertheless there may be potential for making
26 pesticide taxes more environmentally targeted in the future.

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2 **Figure 1.** The pesticide treatment intensity in Denmark 1981-97 (based on pesticide sales).

3 Source: Statistics Denmark (1998).

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Table 2. The Norwegian pesticide tax-scheme

Class no.	Criterion/Type of pesticide	Tax-rate ¹⁾
1.	Adjuvants	0
2.	Biocides and fungicides for treatment of seeds	1/2
3.	Pesticides with low environmental and low health risk	1
4.	Pesticides with low environmental and high health risk; and pesticides with high environmental and low health risk	4
5.	Pesticides with high environmental and high health risk	8
7.	Pesticides for non-commercial purposes	50
8.	Ready-for-use pesticides for non-commercial purposes	150

1) Measured in terms of the base-tax (\$1.7 per hectare).

Source: Landbrukstilsynet, 1999a.