The Swedish model and its limitations

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- 450 000 km²
- 7 600 km long coast
- 95 000 lakes > 0.01 km²
- > 150 000 km rivers and water courses
- 65 % forest
- 7 % arable land or about 2.7 million hectare
- 75 000 agricultural holdings

Cereals: 38%

Oilseed crops, peas, potatoes, sugar beets and other crops: 10%

Fallow land and unutilised arable land: 13%

Temporary grass and green fodder: 39%
Sold and used quantities of active substances in plant protection products in Sweden
Pesticide Policy Instruments in Sweden

A non-toxic environment

Approval system

Use restrictions

Action plan on risk reduction
A non-toxic Environment

- One of 16 environmental quality objectives established by the Swedish Government and the Parliament
- Setting the scene for the next generation
- The environment must be free from man-made or extracted compounds and metals that represent a threat to human health or biological diversity.
- Consists of 9 interim targets

Illustrator Tobias Flygar

http://www.miljomal.nu/english/english.php
Interim targets of "A Non-toxic Environment"

3. **Phase-out of substances of very high concern**, New products will be free from;
   - Persistent and bioaccumulating substances,
   - CMR (Cancerogenic, Mutagenic or Reprotoxic),
   - EDS (Endocrine Disrupting Substances),
   - Highly allergenic substances,
   - Cadmium, lead and mercury,
   by 2010 at the latest (mercury by 2007).

4. **Continuous reduction of health and environmental risks of chemicals**
   as measured by indicators.
National Action Plan

A joint work between:

• SBA - Swedish Board of Agriculture
• SEPA - Swedish Environmental Protection Agency
• KEMI - Swedish Chemicals Agency

In collaboration with:

• NFA - National Food Administration
• SWEA - Swedish Work Environment Authority
• SFA - Swedish Forest Agency
• Farmer organisation and industry
Instruments and activities in the National Action Plan

- Approval provisions, substitution etc (KEMI)
- General use regulations (SEPA)
- Mandatory training of farmers (SBA)
- Advisory service (SBA)
- Research and development (SBA)
- Voluntary testing of spraying equipment (SBA)
- Monitoring of residues in food and water (NFA)
- Environmental levies (Government)
- Phase out activities (joint work)
- Farmer driven information campaign (joint work)
EPA Regulation on the Use of Pesticides

• Requirement to calculate and observe buffer zones 5,6 §§
• Equipment requirement 7,8 §§
• Compulsory book-keeping of pesticide use 9 §
• Requirement of notification and information to local authorities 10-13 §§
• General ban on the use in certain areas without a permission 14 §
The substitution principle

- The substitution principle is one of the basic principles of Swedish chemicals control.
- Most experiences from the beginning of the 90-ties.
- Also after 1995, but only for products with substances not yet on Annex 1.
- Important tool in National Action Plans to reduce risks with plant protection products.
Substitution criteria

Substitution is only possible if

- an existing product or non-chemical method is significantly safer for human/animal health or the environment; and
- it presents no significant economic or practical disadvantages; and
- the chemical diversity are adequate to minimize the occurrence of resistance.
Substitution example
A chemical versus a non-chemical method

Examples:

<table>
<thead>
<tr>
<th>Chemical methods</th>
<th>Non-chemical control and prevention methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post harvest disease control on fruit and ware table potatoes</td>
<td>Climatic control of storage diseases. ULO (Ultra Low Oxygen) and low temperature in warehouses.</td>
</tr>
<tr>
<td>Soil disinfection</td>
<td>Preventive methods such as crop rotation, use of resistant crop varieties and to avoid cultivation of susceptible crops in infected areas.</td>
</tr>
<tr>
<td>Aquatic weed control</td>
<td>Mechanical weed control and dredging in ditches and watercourses.</td>
</tr>
</tbody>
</table>
Phase out activities on certain indispensable high risk pesticides

<table>
<thead>
<tr>
<th>Substances</th>
<th>Uses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>benomyl and folpet</td>
<td>Fungicides in pome fruits</td>
<td>Withdrawn in 2000. Alternatives are now available.</td>
</tr>
<tr>
<td>EBDCs</td>
<td>Fungicides in potatoes and onions</td>
<td>75 % use reduction achieved, by a step-wise approach.</td>
</tr>
<tr>
<td>linuron</td>
<td>Herbicide in vegetable crops</td>
<td>Withdrawn in 1996, but used on dispensation in carrots until 1999.</td>
</tr>
<tr>
<td>pendimethalin</td>
<td>Herbicide in cereals and vegetable crops</td>
<td>In 1993 restricted to onions, beans and carrots (85 % use reduction). Withdrawn completely in 2008.</td>
</tr>
<tr>
<td>permethrin</td>
<td>Insecticide in nurseries and in new plantations of conifers</td>
<td>Withdrawn in 2003.</td>
</tr>
</tbody>
</table>
Restrictions on the use of plant growth regulators in cereals

• Since 1987, plant growth regulators are not allowed for use in wheat, barley and oat in Sweden.
• The aim has been to promote development and use of short straw varieties.
• This action has prevented an unnecessary increased dietary exposure for consumers.
Critical uses/activities in focus:

- Filling and cleaning of sprayers
- Use in vulnerable areas
- Early and late season use of herbicides
- Use of herbicides in row sown crops on pervious soils
- Repeated applications with fungicides
- Use of fan sprayers in orchard
- Spraying in greenhouses and the following handling of treated plants
Government certification programme of users

• Training required for all professional users of pesticides
• 4 day long course.
• Content:
  - General aspects (legislation etc.)
  - Pesticide risks (environment, operators, food etc)
  - Practical work (plant protection issues)
  - Exercise (mixing and filling of a sprayer)
  - Examination
• The certificate is valid for 5 yrs. 1 day renewal.
Measures

• Pesticide approval - changeover to pesticides with less risk
• Regulations
• Training and information - reduced use and safer handling
• Voluntary test of sprayers in operation
• Levy on pesticides
• Monitoring of pesticide residues in food and water
• Research and development
Plant Protection Centers

Tasks:
- Pest and disease prognoses
- Early warning of pests and diseases
- Diagnoses
- Information
- Development

www.sjv.se/vsc
Advisory services

Local extension officers gives advise and information concerning the use of pesticides, and the risks associated with this use.

In 2005:
- about 1 400 farmers received individual farm advise
- about 5800 participated in different courses
"Grasp the Plant Protection"

- A joint information campaign between authorities, the farmer organisation and industry.
- Raise awareness of pesticide risks among farmers.
- Main focus on reducing point source pollution.
- A “Helper” to calculate proper buffer zones related to wind drift.
- Promote filling and cleaning of spraying equipment on biological active grounds such as on a "biobed".
Average conc. of pesticide residues in the river of Vemmenhög May-Sept 1992-2008

Source: J. Kreuger, SLU
## Programme results

<table>
<thead>
<tr>
<th>Period</th>
<th>Targets (compared with the base period 1981-85).</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1990</td>
<td>Target: 50 % use reduction</td>
<td>49 % use reduction achieved.</td>
</tr>
<tr>
<td>1991-1996</td>
<td>Target: 75 % use reduction</td>
<td>64 % use reduction achieved.</td>
</tr>
<tr>
<td>1997-2001</td>
<td>No use target, but further reduction in risks expressed by indicators</td>
<td>Based on environmental and human health risk indicators, the reduction was 24 and 75 % resp.</td>
</tr>
<tr>
<td>2002-2007</td>
<td>No use target, but further reduction in risks expressed by new indicators</td>
<td>Based on environmental and human health risk indicators, the reduction was 31 and 66 % resp.</td>
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</table>
Pesticide risk indicators

• Two types of indicators; one related to environmental risks and one to operator health risks
• Simple scoring approach, based on (for each active substance):
  ─ the theoretically maximum number of hectare doses
  ─ current hazard classification (including also mobility, persistence and bioaccumulation properties)
  ─ exposure related factors such as formulation type, application method and treatment frequency.
Proposal for a new NAP 2010-2013

Measures
• Continue the successful parts of the existing program.
• Particular focus on R&D and the practical application of IPM.

Targets
• All farmers shall apply IPM or organic farming in 2014 at the latest.
• Continuous risk reduction as measured by national indicators.
Conclusions 1(2)

What has contributed to the success?

- Balance between mandatory and voluntary elements
- Activities performed at different levels and driven by different stakeholders
- Full support of the programme from the Association of Swedish Farmers
- A joint work between the environmental and agricultural authorities
Conclusions 2(2)

Limitations

• A high dependence on pesticides still exists
• Extensive changes in the present cropping systems is needed to achieve “a non-toxic environment”.
• CAP and 91/414/EEC may constitute a barrier to these changes
• Insufficient financial support from the Government
• A small number of negligent farmers are the main polluters