Price (excluding VAT) in Luxembourg: EUR 25

OFFICE FOR OFFICIAL PUBLICATIONS
OF THE EUROPEAN COMMUNITIES

L-2985 Luxembourg

ISBN 92-894-4818-0

9 789289 448185

3 14 17 KS-49-02-830-EN-C

DETAILED TABLES

The use of plant protection products in the European Union — Data 1992-1999

eurostat

EN

2002 EDITION

The use of plant protection products in the European Union

Data 1992-1999

8

EUROPEAN COMMISSION

eurostat

THEME 8
Environment and energy

..... Our mission is to provide the **European Union** with a **high-quality statistical information service**

Eurostat's collections are adapted to the needs of all users.
You will find them in each of the nine themes proposed by Eurostat.


1 General statistics


2 Economy and finance


3 Population and social conditions


4 Industry, trade and services


5 Agriculture and fisheries


6 External trade


7 Transport


8 Environment and energy


9 Science and technology

Graphs · Tables · Comments · Maps	CONTENT	FORMAT
Press releases: Eurostat publishes around 100 press releases every year in connection with the release of new data. The press releases include the key figures on the EU, the Member States and their partners. They are provided free of charge. They are also available on the Internet as soon as they are published: www.europa.eu.int/comm/eurostat/		Paper HTML PDF
Statistics in focus: This collection is published regularly by Eurostat and provides up-to-date summaries of the main results of statistical surveys, studies and analyses. It covers all themes and consists of about four to eight pages per issue. Eurostat issues around 150 *Statistics in focus* per year. Available as single copies or on subscription.		Paper PDF
Pocketbooks: This collection provides the main indicators on a theme or sub-theme in an easy-to-carry booklet of up to 100 pages. Available as single copies or on subscription.		Paper HTML
Panorama of the European Union: This collection highlights the features and trends of a multi-sectoral theme or a sectoral sub-theme. The publications consist of around 200 pages and include analyses as well as tables and graphs. Available as single copies or on subscription.		Paper CD-ROM
Methods and nomenclatures: intended for specialists who want to consult the methodologies and nomenclatures used for a theme, a sub-theme or a sector. Available as single copies.		Paper CD-ROM
Detailed tables are intended for specialists. They present part, or all, of the statistical data compiled on a theme, sub-theme or sector. Available as single copies or on subscription.		Paper CD-ROM
Catalogues provide rapid access to concise information on Eurostat´s products and services. They are free of charge and include the *mini-guide*, a selection of Eurostat products and services, and *Statistical references*, the quarterly newsletter on Eurostat´s latest products and services.		Paper

Venta • Salg • Verkauf • Πωλήσεις • Sales • Vente • Vendita • Verkoop • Venda • Myynti • Försäljning
http://eur-op.eu.int/general/en/s-ad.htm

BELGIQUE/BELGIË

Jean De Lannoy
Avenue du Roi 202/Koningslaan 202
B-1190 Bruxelles/Brussel
Tél. (32-2) 538 43 08
Fax (32-2) 538 08 41
E-mail: jean.de.lannoy@infoboard.be
URL: http://www.jean-de-lannoy.be

**La librairie européenne/
De Europese Boekhandel**
Rue de la Loi 244/Wetstraat 244
B-1040 Bruxelles/Brussel
Tél. (32-2) 295 26 39
Fax (32-2) 735 08 60
E-mail: mail@libeurop.be
URL: http://www.libeurop.be

Moniteur belge/Belgisch Staatsblad
Rue de Louvain 40-42/Leuvenseweg 40-42
B-1000 Bruxelles/Brussel
Tél. (32-2) 552 22 11
Fax (32-2) 511 01 84
E-mail: eusales@just.fgov.be

DANMARK

J. H. Schultz Information A/S
Herstedvang 12
DK-2620 Albertslund
Tlf. (45) 43 63 23 00
Fax (45) 43 63 19 69
E-mail: schultz@schultz.dk
URL: http://www.schultz.dk

DEUTSCHLAND

Bundesanzeiger Verlag GmbH
Vertriebsabteilung
Amsterdamer Straße 192
D-50735 Köln
Tel. (49-221) 97 66 80
Fax (49-221) 97 66 82 78
E-Mail: vertrieb@bundesanzeiger.de
URL: http://www.bundesanzeiger.de

ΕΛΛΑΔΑ/GREECE

G. C. Eleftheroudakis SA
International Bookstore
Panepistimiou 17
GR-10564 Athina
Tel. (30-1) 331 41 80/1/2/3/4/5
Fax (30-1) 325 84 99
E-mail: elebooks@netor.gr
URL: elebooks@hellasnet.gr

ESPAÑA

Boletín Oficial del Estado
Trafalgar, 27
E-28071 Madrid
Tel. (34) 915 38 21 11 (libros)
913 84 17 15 (suscripción)
Fax (34) 915 38 21 21 (libros),
913 84 17 14 (suscripción)
E-mail: clientes@com.boe.es
URL: http://www.boe.es

Mundi Prensa Libros, SA
Castelló, 37
E-28001 Madrid
Tel. (34) 914 36 37 00
Fax (34) 915 75 39 98
E-mail: libreria@mundiprensa.es
URL: http://www.mundiprensa.com

FRANCE

Journal officiel
Service des publications des CE
26, rue Desaix
F-75727 Paris Cedex 15
Tél. (33) 140 58 77 31
Fax (33) 140 58 77 00
E-mail: europublications@journal-officiel.gouv.fr
URL: http://www.journal-officiel.gouv.fr

IRELAND

Alan Hanna's Bookshop
270 Lower Rathmines Road
Dublin 6
Tel. (353-1) 496 73 98
Fax (353-1) 496 02 28
E-mail: hannas@iol.ie

ITALIA

Licosa SpA
Via Duca di Calabria, 1/1
Casella postale 552
I-50125 Firenze
Tel. (39) 055 64 83 1
Fax (39) 055 64 12 57
E-mail: licosa@licosa.com
URL: http://www.licosa.com

LUXEMBOURG

Messageries du livre SARL
5, rue Raiffeisen
L-2411 Luxembourg
Tél. (352) 40 10 20
Fax (352) 49 06 61
E-mail: mail@mdl.lu
URL: http://www.mdl.lu

NEDERLAND

SDU Servicecentrum Uitgevers
Christoffel Plantijnstraat 2
Postbus 20014
2500 EA Den Haag
Tel. (31-70) 378 98 80
Fax (31-70) 378 97 83
E-mail: sdu@sdu.nl
URL: http://www.sdu.nl

PORTUGAL

Distribuidora de Livros Bertrand Ld.ª
Grupo Bertrand, SA
Rua das Terras dos Vales, 4-A
Apartado 60037
P-2700 Amadora
Tel. (351) 214 95 87 87
Fax (351) 214 96 02 55
E-mail: dlb@ip.pt

Imprensa Nacional-Casa da Moeda, SA
Secção de Publicações Oficiais
Rua da Escola Politécnica, 135
P-1250-100 Lisboa Codex
Tel. (351) 213 94 57 00
Fax (351) 213 94 57 50
E-mail: spoce@incm.pt
URL: http://www.incm.pt

SUOMI/FINLAND

**Akateeminen Kirjakauppa/
Akademiska Bokhandeln**
Keskuskatu 1/Centralgatan 1
PL/PB 128
FIN-00101 Helsinki/Helsingfors
P./tfn (358-9) 121 44 18
F./fax (358-9) 121 44 35
Sähköposti: sps@akateeminen.com
URL: http://www.akateeminen.com

SVERIGE

BTJ AB
Traktorvägen 11-13
S-221 82 Lund
Tlf. (46-46) 18 00 00
Fax (46-46) 30 79 47
E-post: btjeu-pub@btj.se
URL: http://www.btj.se

UNITED KINGDOM

The Stationery Office Ltd
Customer Services
PO Box 29
Norwich NR3 1GN
Tel. (44) 870 60 05-522
Fax (44) 870 60 05-533
E-mail: book.orders@theso.co.uk
URL: http://www.itsofficial.net

ÍSLAND

Bokabud Larusar Blöndal
Skólavördustig, 2
IS-101 Reykjavik
Tel. (354) 552 55 40
Fax (354) 552 55 60
E-mail: bokabud@simnet.is

SCHWEIZ/SUISSE/SVIZZERA

Euro Info Center Schweiz
c/o OSEC Business Network Switzerland
Stampfenbachstraße 85
PF 492
CH-8035 Zürich
Tel. (41-1) 365 53 15
Fax (41-1) 365 54 11
E-mail: eics@osec.ch
URL: http://www.osec.ch/eics

BĂLGARIJA

Europress Euromedia Ltd
59, blvd Vitosha
BG-1000 Sofia
Tel. (359-2) 980 37 66
Fax (359-2) 980 42 30
E-mail: Milena@mbox.cit.bg
URL: http://www.europress.bg

CYPRUS

Cyprus Chamber of Commerce and Industry
PO Box 21455
CY-1509 Nicosia
Tel. (357-2) 88 97 52
Fax (357-2) 66 10 44
E-mail: demetrap@ccci.org.cy

EESTI

Eesti Kaubandus-Tööstuskoda
(Estonian Chamber of Commerce and Industry)
Toom-Kooli 17
EE-10130 Tallinn
Tel. (372) 646 02 44
Fax (372) 646 02 45
E-mail: einfo@koda.ee
URL: http://www.koda.ee

HRVATSKA

Mediatrade Ltd
Pavla Hatza 1
HR-10000 Zagreb
Tel. (385-1) 481 94 11
Fax (385-1) 481 94 11

MAGYARORSZÁG

Euro Info Service
Szt. István krt.12
III emelet 1/A
PO Box 1039
H-1137 Budapest
Tel. (36-1) 329 21 70
Fax (36-1) 349 20 53
E-mail: euroinfo@euroinfo.hu
URL: http://www.euroinfo.hu

MALTA

Miller Distributors Ltd
Malta International Airport
PO Box 25
Luqa LQA 05
Tel. (356) 66 44 88
Fax (356) 67 67 99
E-mail: gwirth@usa.net

NORGE

Swets Blackwell AS
Hans Nielsen Hauges gt. 39
Boks 4901 Nydalen
N-0423 Oslo
Tel. (47) 23 40 00 00
Fax (47) 23 40 00 01
E-mail: info@no.swetsblackwell.com
URL: http://www.swetsblackwell.com.no

POLSKA

Ars Polona
Krakowskie Przedmiescie 7
Skr. pocztowa 1001
PL-00-950 Warszawa
Tel. (48-22) 826 12 01
Fax (48-22) 826 62 40
E-mail: books119@arspolona.com.pl

ROMÂNIA

Euromedia
Str.Dionisie Lupu nr. 65, sector 1
RO-70184 Bucuresti
Tel. (40-1) 315 44 03
Fax (40-1) 312 96 46
E-mail: euromedia@mailcity.com

SLOVAKIA

Centrum VTI SR
Nám. Slobody, 19
SK-81223 Bratislava
Tel. (421-7) 54 41 83 64
Fax (421-7) 54 41 83 64
E-mail: europ@tbb1.sltk.stuba.sk
URL: http://www.sltk.stuba.sk

SLOVENIJA

GV Zalozba
Dunajska cesta 5
SLO-1000 Ljubljana
Tel. (386) 613 09 1804
Fax (386) 613 09 1805
E-mail: europ@gvestnik.si
URL: http://www.gvzalozba.si

TÜRKIYE

Dünya Infotel AS
100, Yil Mahallessi 34440
TR-80050 Bagcilar-Istanbul
Tel. (90-212) 629 46 89
Fax (90-212) 629 46 27
E-mail: aktuel.info@dunya.com

ARGENTINA

World Publications SA
Av. Cordoba 1877
C1120 AAA Buenos Aires
Tel. (54-11) 48 15 81 56
Fax (54-11) 48 15 81 56
E-mail: wpbooks@infovia.com.ar
URL: http://www.wpbooks.com.ar

AUSTRALIA

Hunter Publications
PO Box 404
Abbotsford, Victoria 3067
Tel. (61-3) 94 17 53 61
Fax (61-3) 94 19 71 54
E-mail: jpdavies@ozemail.com.au

BRESIL

Livraria Camões
Rua Bittencourt da Silva, 12 C
CEP
20043-900 Rio de Janeiro
Tel. (55-21) 262 47 76
Fax (55-21) 262 47 76
E-mail: livraria.camoes@incm.com.br
URL: http://www.incm.com.br

CANADA

Les éditions La Liberté Inc.
3020, chemin Sainte-Foy
Sainte-Foy, Québec G1X 3V6
Tel. (1-418) 658 37 63
Fax (1-800) 567 54 49
E-mail: liberte@mediom.qc.ca

Renouf Publishing Co. Ltd
5369 Chemin Canotek Road, Unit 1
Ottawa, Ontario K1J 9J3
Tel. (1-613) 745 26 65
Fax (1-613) 745 76 60
E-mail: order.dept@renoufbooks.com
URL: http://www.renoufbooks.com

EGYPT

The Middle East Observer
41 Sherif Street
Cairo
Tel. (20-2) 392 69 19
Fax (20-2) 393 97 32
E-mail: inquiry@meobserver.com
URL: http://www.meobserver.com.eg

MALAYSIA

EBIC Malaysia
Suite 45.02, Level 45
Plaza MBf (Letter Box 45)
8 Jalan Yap Kwan Seng
50450 Kuala Lumpur
Tel. (60-3) 21 62 92 98
Fax (60-3) 21 62 61 98
E-mail: ebic@tm.net.my

MÉXICO

Mundi Prensa México, SA de CV
Río Pánuco, 141
Colonia Cuauhtémoc
MX-06500 México, DF
Tel. (52-5) 533 56 58
Fax (52-5) 514 67 99
E-mail: 101545.2361@compuserve.com

SOUTH AFRICA

Eurochamber of Commerce in South Africa
PO Box 781738
2146 Sandton
Tel. (27-11) 884 39 52
Fax (27-11) 883 55 73
E-mail: info@eurochamber.co.za

SOUTH KOREA

**The European Union Chamber of
Commerce in Korea**
5th FI, The Shilla Hotel
202, Jangchung-dong 2 Ga, Chung-ku
Seoul 100-392
Tel. (82-2) 22 53-5631/4
Fax (82-2) 22 53-5635/6
E-mail: eucck@eucck.org
URL: http://www.eucck.org

SRI LANKA

EBIC Sri Lanka
Trans Asia Hotel
115 Sir Chittampalam
A. Gardiner Mawatha
Colombo 2
Tel. (94-1) 074 71 50 78
Fax (94-1) 44 87 79
E-mail: ebicsl@slnet.ik

T'AI-WAN

Tycoon Information Inc
PO Box 81-466
105 Taipei
Tel. (886-2) 87 12 88 86
Fax (886-2) 87 12 47 47
E-mail: euitupe@ms21.hinet.net

UNITED STATES OF AMERICA

Bernan Associates
4611-F Assembly Drive
Lanham MD 20706-4391
Tel. (1-800) 274 44 47 (toll free telephone)
Fax (1-800) 865 34 50 (toll free fax)
E-mail: query@bernan.com
URL: http://www.bernan.com

ANDERE LÄNDER
OTHER COUNTRIES
AUTRES PAYS

Bitte wenden Sie sich an ein Büro Ihrer Wahl/Please contact the sales office of your choice/Veuillez vous adresser au bureau de vente de votre choix

Office for Official Publications of the European Communities
2, rue Mercier
L-2985 Luxembourg
Tel. (352) 29 29-42455
Fax (352) 29 29-42758
E-mail: info-info-opoce@cec.eu.int
URL: publications.eu.int

2/2002

2002 EDITION

The use of plant protection products in the European Union

Data 1992-1999

8

EUROPEAN COMMISSION

eurostat

THEME 8
Environment
and
energy

..... Immediate access to harmonised statistical data

Eurostat Data Shops

A personalised data retrieval service

In order to provide the greatest possible number of people with access to high-quality statistical information, Eurostat has developed an extensive network of Data Shops ([1]).

Data Shops provide a wide range of **tailor-made services:**

- ★ immediate information searches undertaken by a team of experts in European statistics,
- ★ rapid and personalised response that takes account of the specified search requirements and intended use,
- ★ a choice of data carrier depending on the type of information required.

Information can be requested by phone, mail, fax or e-mail.

([1]) See the list of Eurostat Data Shops at the end of this publication.

Internet

Essentials on Community statistical news

- ★ Euro indicators: more than 100 indicators on the euro zone; harmonised, comparable, and free of charge.
- ★ About Eurostat: what it does and how it works.
- ★ Products and databases: a detailed description of what Eurostat has to offer.
- ★ Indicators on the European Union: convergence criteria; euro yield curve and further main indicators on the European Union at your disposal.
- ★ Press releases: direct access to all Eurostat press releases.

For further information, visit us on the Internet: www.europa.eu.int/comm/eurostat/

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu.int).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2002

ISBN 92-894-4818-0

Printed in Luxembourg

PRINTED ON WHITE CHLORINE-FREE PAPER

EUROSTAT

L-2920 Luxembourg — Tel. (352) 43 01-1 — Telex COMEUR LU 3423
Rue de la Loi 200, B-1049 Brussels — Tel. (32-2) 299 11 11

Eurostat is the Statistical Office of the European Communities. Its task is to provide the European Union with statistics, at a European level, that allow comparisons to be made between countries and regions. Eurostat consolidates and harmonises the data collected by the Member States.

To ensure that the vast quantity of accessible data is made widely available and to help each user make proper use of the information, Eurostat has set up a publications and services programme.

This programme makes a clear distinction between general and specialist users and particular collections have been developed for these different groups. The collections *Press releases*, *Statistics in focus*, *Panorama of the European Union*, *Pocketbooks* and *Catalogues* are aimed at general users. They give immediate key information through analyses, tables, graphs and maps.

The collections *Methods and nomenclatures* and *Detailed tables* suit the needs of the specialist who is prepared to spend more time analysing and using very detailed information and tables.

All Eurostat products are disseminated through the Data Shop network or the sales agents of the Office for Official Publications of the European Communities. Data Shops are available in 12 of the 15 Member States as well as in Switzerland, Norway and the United States. They provide a wide range of services from simple database extracts to tailor-made investigations. The information is provided on paper and/or in electronic form via e-mail, on diskette or on CD-ROM.

As part of the new programme, Eurostat has developed its web site. It includes a broad range of online information on Eurostat products and services, newsletters, catalogues, online publications and indicators on the euro zone.

Yves Franchet
Director-General

This publication was prepared under the responsibility of:

Rainer Muthmann, Head of Unit F3, Environment and sustainable development - Eurostat

Publication Editor:

Christian Heidorn - Eurostat

Consultants:

Luisa Sanches (coordination)
Rosa Pascalicchio (statistical and economic analysis)
Giorgio Quirino (data processing)
Christiane Gengler (design and desktop publishing)

World Systems (Europe) Limited
E-mail: general@wsel.lu

For further information please contact Eurostat:

Christian Heidorn
Tel.: (++352) 4301 35271
E-mail: Christian.Heidorn@cec.eu.int

Acknowledgements

The authors would like to thank the marketing research representatives of the companies involved and the ECPA task force for providing the data presented in this report, in particular Mr Lothar Jacob for the compilation of the database and Mr Euros Jones in his function as the ECPA contact for the successful administration of the project.

Table of abbreviations

AI	Active Ingredient
PPP	Plant Protection Product
F	Fungicide
H	Herbicide
I	Insecticide
GR	Growth Regulator
kg AI/ha	Kilogram active ingredient per hectare
g/l	Gram / litre
w/w	Weight for weight
w/v	Weight for volume
t	Tonne
TVC	Total Vegetation Control

Symbols

0	Value "0" or less than half of the unit used
:	Value not available
c	Confidential
-	Not applicable

Table of Contents

Preface

There is an increasing demand not only within the European Community for meaningful and accurate information on the consumption and use patterns of plant protection products.

Pesticides have been the centre of controversy for a long time and are associated with risks to human health and/or to the environment. On the other hand, society accepts these risks within certain limits as there are benefits linked to the use of pesticides in agricultural production.

In the framework of the Sixth Environmental Action Programme, 'Environment 2010, Our Future, Our Choice' (6th EAP) the European Commission has adopted a Communication 'Towards a Thematic Strategy on the Sustainable Use of Pesticides', which is currently being discussed by all involved stakeholders.

To accompany the development and implementation of an adequate European policy with statistical data, Eurostat has launched several activities.

A very important one is the collaboration with the European Crop Protection Association (ECPA), which for the second time now results in a report with detailed tables on the use of the major product groups used on the main crops grown in 15 Member States. Future publications will include data from the Candidate Countries as well.

Eurostat aims to contribute to the improvement of statistics on the use and consumption of plant protection products, within an enlarged European Union, harmonised with the OECD and the FAO, and looks forward to receiving your comments and criticism on this publication.

Yves Franchet

Director General of the Statistical Office of the European Communities

ECPA Introduction

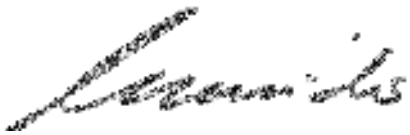
The European Crop Protection Association is pleased to continue our cooperation with EUROSTAT to provide detailed information on the use of plant protection products within the European Union.

As an industry, we are very aware of the need to provide ever better information on the use of our products, and working with EUROSTAT gives us the opportunity to collect meaningful data that is of interest, not only for people directly involved in the sector, but also for other stakeholders with an interest in understanding the importance of plant protection products.

With the full implementation of EU legislation governing plant protection products, we know that there will be major changes in the products being used in the Member States as many products are taken off the market. Improved data collection will help us to understand the likely impact of these changes.

Given the current discussions on the European Commission's Communication 'Towards a Thematic Strategy on the Sustainable Use of Pesticides', comprehensive data is vital when analysing the importance of plant protection products and when considering the need for new legislative initiatives. I hope that this data will help ensure that decisions for a EU Sustainable Use Strategy are made on an informed basis.

ECPA looks forward to continuing its collaboration with EUROSTAT, by providing consolidated information on the use of plant protection in an enlarged EU.



Friedhelm Schmider

ECPA Director General

Introduction

This report presents an update of the Eurostat publication in 2000: 'Plant Protection in the EU, consumption of plant protection products in the European Union'. This publication was well received by European and national policy makers, in international organisations and non-governmental organisations from agriculture, environment protection and public health.

Some constructive criticism was received as well: The (few) Member States that carry out surveys on pesticides usage compared the data provided by ECPA with the results of their national surveys. Deviations were detected and the calculation methods for the volumes of used active ingredients were adjusted and improved. The data presented in the previous study was also re-calculated, and for some specific substances the figures have changed significantly and the time series correspond better with the results of the surveys carried out by Member States.

As in the first publication we provide statistical information on the consumption of plant protection products (PPPs), broken down by Member States, treated crops and chemical classes, and when confidentiality rules allow, on the level of active ingredient. It will help to give a better picture of pesticides usage in agriculture and will provide input data for the development of indicators to monitor the impact of pesticides on the environment and public health, and thus, the performance of EU policies.

A harmonised framework for the authorisation, use and control of PPPs in the European Union is set by **Directive 91/414/EEC**[1]. It defines strict rules for the authorisation of PPPs and requires extensive risk assessments for effects on health and environment to be carried out before a PPP can be placed on the market. Existing PPPs are being evaluated as well, and the Commission communicated in July 2002 that some **320 active substances are to be withdrawn from the market in 2003**[2].

Community rules exist that define maximum residue limits (MRLs) on food and feedstuffs. A recently published report of results from the **'Community Pesticide Residue Programme'**[3] shows that 61% of the samples contained no detectable pesticide residues and that in a further 35% the levels found were below the MRLs.

However, in the remaining 4.5% of samples these limits were exceeded.

The 1992 reform of the Common Agriculture Policy (CAP) was a major step in adapting the market regimes to the requirements of international trade, by reducing guaranteed prices, introducing the concept of decoupled support payments and also taking a new approach to environmental policy. Effects became visible as a decrease in pesticides usage data after 1992. In the framework of the so-called **mid-term review**[4] of the CAP the Commission stated (June 2002) that,

'considerable efforts have already been made to ensure better food safety (testing of animals, traceability, removal of specified risk materials, maximum residue levels for pesticides, etc.)', but that policy instruments available to support food safety and quality within the common agricultural policy remain limited. There is a broad consensus that more can be done within the policy to meet these objectives …'

Among other measures, further set-aside of agricultural land and farm auditing are proposed, which might lead to a reduction of PPP use.

In the framework of the **6th Environmental Action Programme (6EAP)**[5], 'Environment 2010, Our Future, Our Choice' the European Commission has adopted a Communication **'Towards a Thematic Strategy on the Sust**ainable Use of Pesticides'[6], a policy instrument that asks for a better knowledge of the quantities used and how they are used, since one of the main gaps in the information concerns the actual use of the pesticides in the Member States, particularly the actual quantities of the different products (active ingredients) used and the crops to which they are applied.

This publication attempts to fill some of these gaps, but its limitations will also have to be considered:

The data presented do not give a comprehensive overview of the total use of pesticides, given that some pesticides commonly used in agriculture such as molluscicides (slug killers) and treatments of crops after harvest are not included.

1 see: http://www.europa.eu.int/comm/food/fs/ph_ps/pro/legal/index_en.htm
2 see: http://www.europa.eu.int/comm/food/fs/ph_ps/pro/index_en.htm
3 see: http://www.europa.eu.int/comm/dgs/health_consumer/library/press/press235_en.pdf
4 see: http://www.europa.eu.int/comm/agriculture/mtr/index_en.htm
5 see: http://www.europa.eu.int/comm/environment/newprg/index.htm
6 see: http://www.europa.eu.int/eur-lex/en/com/pdf/2002/com2002_0349en01.pdf

The current report, like the previous study covers the product groups 'Herbicides', 'Fungicides' and 'Insecticides'. In addition, data on seed dressing fungicides have been included in the 'Fungicides' category, nematicides in 'Insecticides', and cereal growth regulators have been reported separately.

The data sets do not include the range of biocides or veterinary medicines (for example, sheep dips) used in agriculture.

It should be noted that, in terms of risk management, statistics concerning the total volume (or value) of pesticides sold or used in the 15 EU Member States are to be interpreted with caution as they say little about the nature of the active substances concerned and, consequently, about the risks of negative impacts associated with their use. Indeed, an increase (or a reduction) in the total volumes of pesticides sold/used is not necessarily equivalent to an increase (or a reduction) in the risks associated with their use. Thus, for instance, an increase in the volume of pesticides sold might be due to an increased use of less toxic and less persistent, but more narrowly targeted pesticides, which could eventually result in reduced risks for human health and of environmental damage.

Since this study cannot and is not meant to replace National surveys and publications, we refer to chapter 6 and the list of sources for further reading at the end of this report.

Chapter 1
Main results for the EU-15

1.1 Plant Protection Products use and trends over time

According to the data supplied by ECPA, the total amount of plant protection products used in the European Union (reported as tonnes of active ingredients, for the four pesticides types considered in this study) has increased in the period from 1992 to 1998. A slight decline of 10 578 tonnes was observed in 1999. Further data will be needed to judge if a downward trend can be confirmed.

In the 1992 Common Agricultural Policy (CAP) reform, considerations about cost savings and profitability were dominant factors influencing the intensity of treatment measures and the selection of PPP brands or commodity products. After initial insecurity about the implications and impact of the CAP reform leading to lower farm gate prices for most agricultural commodities, the consumption of PPPs has now risen to above the 1992 level.

This decline from 1993 to 1994 occurred mainly in France and Germany - the main cereal and oilseed rape growing countries - resulting from the CAP reform and the insecurity of farmers about the effects of the new regulations on crop areas and market prices for their harvested crops. The main targets for the reforms were cereals and protein crops. Use of crop protection products, primarily fungicides and herbicides and dosage rates were frequently reduced to the limit of effectiveness to cut costs.

PPP use reduction programs implemented in the Scandinavian countries and in The Netherlands have mainly affected the use of nematicides or soil sterilisers in horticultural or speciality crops, which are not covered in this survey. Consequently, the effects of these programs are not visible in the key crops accounting for the main use of PPP active ingredients.

In arable farming there is a trend towards active ingredients that are effective at lower dosage rates compared to former standard products, such as *sulphonylureas*.

However, reducing the use of herbicides or fungicides in the major agricultural crops, e.g. cereals, maize or sugar beets, would only have a marginal effect on the total volume used, which is still dominated by *sulphur* and *copper*. As long as *sulphur* and *copper* are key products in integrated crop protection, the total volume of active ingredient used will not decrease significantly in the European Union.

Fig 1.1.1: Use and composition of PPP in the EU-15, 1992-1999

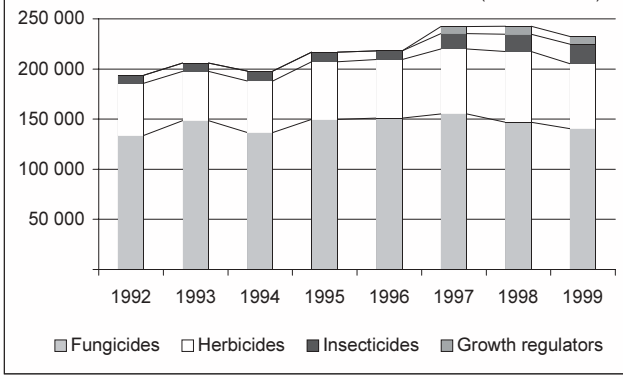


Fig 1.1.2: Use of PPP total, EU-15, 1992-1999

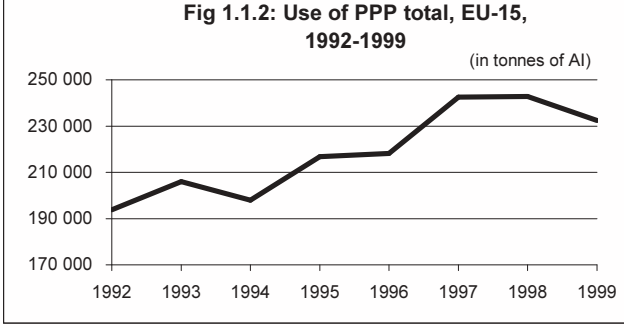


Fig 1.1.3: Use of PPP - fungicides, EU-15, 1992-1999

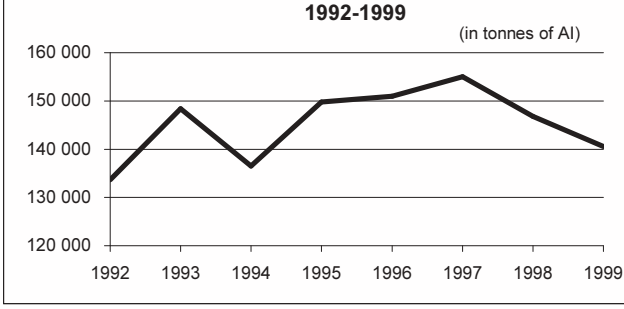
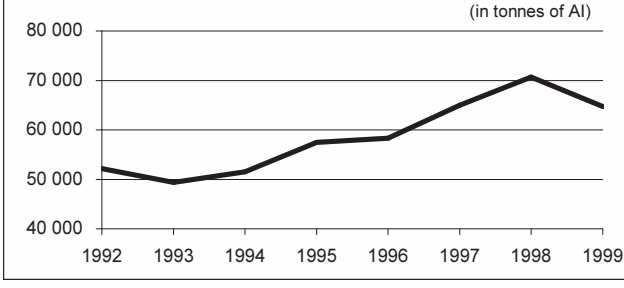


Fig 1.1.4: Use of PPP - herbicides, EU-15, 1992-1999



Herbicides were probably most affected by the impact of the CAP reform, resulting in a 5% decline over the years 1992 and 1993. However, the volume of active ingredients in the herbicides used constantly increased until 1998, followed in 1999 by a decrease of 8%. The use of fungicides and insecticides was less affected (see Figure 1.1.1), as the bulk of these products is used on speciality crops not subject to the CAP regulations.

In 1999 fungicides dominated the volume balance due to the amount of sulphur in use. They represent 61% of the total active ingredient by volume used in EU-15. This large consumption is due to the frequency of the use in sequential programme treatment in speciality crops and is related to the dominating position of sulphur, which is applied at high dosages. The proportion of vineyards is 73% of the total fungicides used by volume followed by cereals (9%) and fruit trees (8%). Potatoes and vegetables account for 5% and 2% of the fungicidal active ingredients.

The herbicide market represents 27% of the total active ingredients used by volume and is dominated by cereals and maize, which account for 42% and 24% respectively. The proportion of oilseeds is 11%; vineyards and sugar beet are 8% each.

As far as insecticides use is concerned, cereals, fruit trees and vineyards represent 31%, 20% and 18% respectively of the total active ingredients used by volume .

Insecticides are also used to prevent damage, mainly to vegetables (11%) and potatoes (9%), especially in countries with a warmer climate. In general, insecticides play only a minor role in terms of active ingredients used by volume, representing 8% of the volume balance (Fig.1.1.8).

Fig 1.1.5: Use of PPP - insecticides, EU-15, 1992-1999

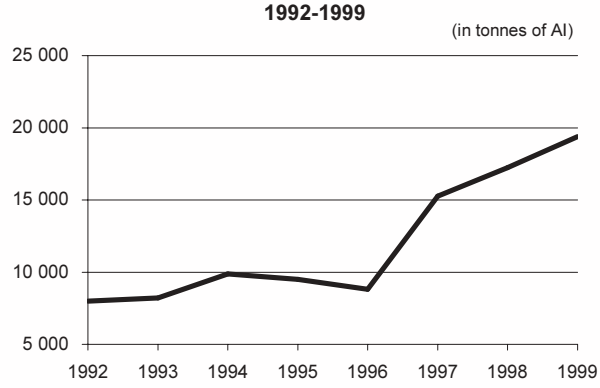


Fig 1.1.6: Use of PPP- growth regulators, EU-15, 1997-1999

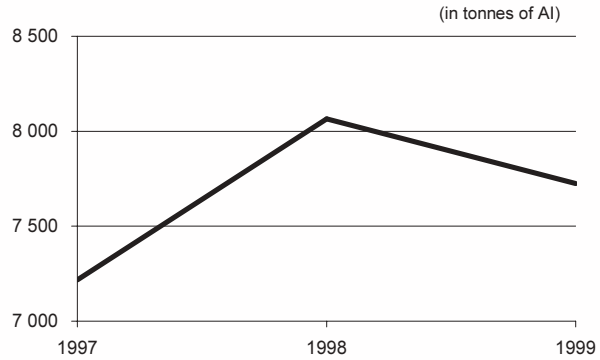


Fig 1.1.7: Composition of PPP in % of the volume, EU-15, 1992

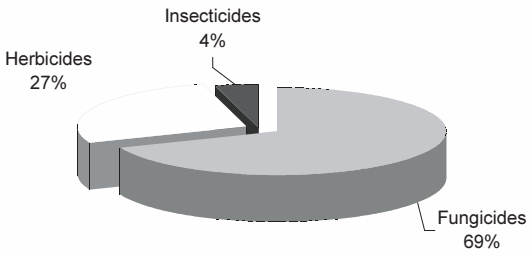
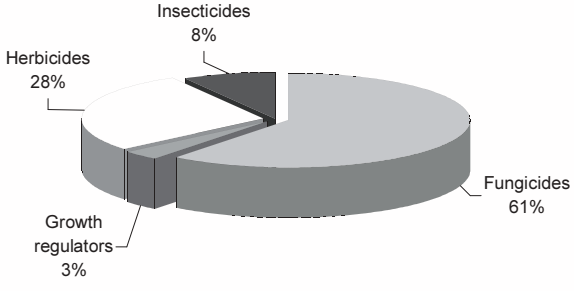


Fig 1.1.8: Composition of PPP in % of the volume, EU-15, 1999



Four Member States use 80% of the volume

Of the total volume of active ingredients applied in the fifteen Member States in 1999, four Member States use 80%: France, Italy, Spain and Germany. France led by far in the use of PPP active ingredients (36%). France and Italy alone accounted for 58% of the total volume of the European Union (Fig 1.1.9).

France, Italy and Spain accounted for 75% of total use of fungicidal active ingredients. The dominating crop in fungicide use is grapes (73% of total fungicide active ingredient). Again, *sulphur* accounted for the bulk of all fungicide applications in this crop (67%).

France led in the ranking of herbicide consumption among Member States, accounting for 43% of all herbicide active ingredients, followed by Germany with 18,6%, the United Kingdom with 9% and Italy with 7,1%.

Cereals and maize are the crops, which dominate herbicide consumption, with 42% and 24% respectively.

The insecticide market is led by Spain (35%), France (29%) and Italy (22%). The remaining twelve Member States each have 2,5% or less individual market share.

The available figures on the use of cereal growth regulators show that 55,2% of the total volume are used in France, followed by Germany (23,7%) and the United Kingdom (12,1%).

The theoretical European average application rate of PPP active ingredients, calculated as the average over all crops, has stabilised at 4,5 kg AI/ha. The highest use rates per ha occurred in Member States with important fruit trees and vineyards sectors: Portugal (9,5 kg AI/ha) and Italy (7,7 kg AI/ha). This is due to the sequential application of fungicides and the dominant position of *sulphur*. The lowest average use rates occurred in Member States that grow mainly arable crops.

Fig 1.1.9: 80 % of the total volume of PPP, 1999

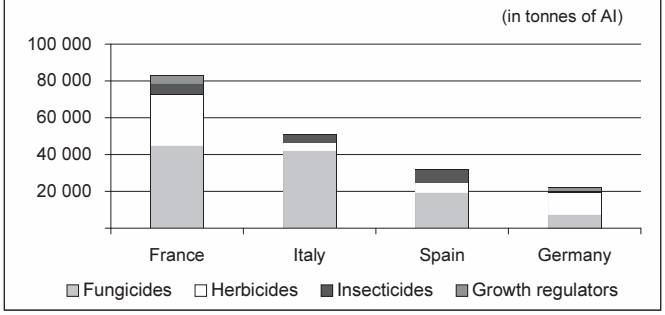


Fig 1.1.10: Share of PPP use by the four Member States, 1999

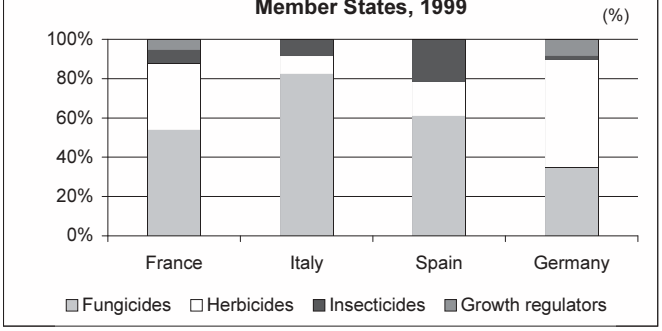


Fig 1.1.11: Dosage of PPP used, 1999

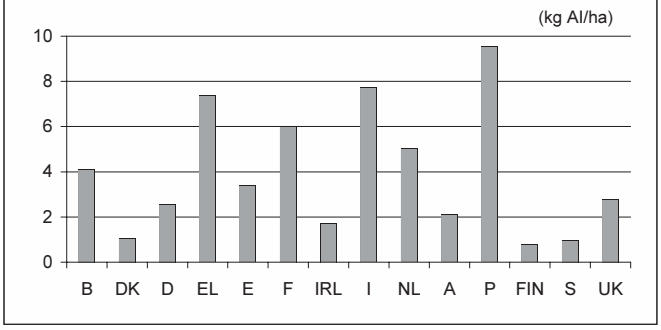


Table 1.1: PPP used by Member State - 1999

(in tonnes of AI)

	Fungicides	Herbicides	Insecticides	Growth Regulators	Total	%
EU-15	**140 566**	**64 702**	**19 384**	**7 725**	**232 377**	**100.0**
B	931	1 847	90	140	3 008	1.3
DK	724	1 016	28	168	1 936	0.8
D	7 671	12 035	410	1 837	21 953	9.4
EL	11 591	662	443	:	12 696	5.5
E	19 299	5 440	6 835	36	31 609	13.6
F	44 893	27 941	5 710	4 266	82 811	35.6
IRL	196	280	9	70	556	0.2
I	42 006	4 594	4 202	108	50 910	21.9
NL	2 062	1 595	364	55	4 075	1.8
A	962	1 057	9	:	2 028	0.9
P	6 051	1 273	555	7	7 885	3.4
FIN	29	543	3	57	633	0.3
S	216	656	15	47	934	0.4
UK	3 934	5 764	712	934	11 344	4.9

1.2 Plant Protection Products use by crop

The majority of the volume of all PPP active ingredients is applied in established speciality crops. In 1999, 48% of the total active ingredients used by volume in the EU were applied in vineyards, which cover 3,4 million ha 7% of the reference crop area). Although the base area treated in speciality crops (6,7 million ha, 13% of the reference crop area) is considerably smaller than the arable crops area (44,6 million ha, 87% of the reference crop area), these speciality crops, mainly vineyards, are still the major market for the high dosage rate compounds such as *sulphur* and *copper*. Moreover, treatments have to be repeated regularly to avoid pest or disease.

Arable crops are not treated at high dosage rates, as the harvested crop is either used as animal feed on the farm or processed by the food industry. Cereals - wheat and barley specifically - cover 55% of the crop area and account for 23% of the active ingredients used by volume.

All other arable crops account for 24% of the active ingredient volume (Fig 1.2.1). For arable crops, fungicides are used mainly as components in seed treatments.

Fungicide applications are predominant in speciality crops (83% of the fungicide volume). Vineyard production requires the highest proportion of fungicides (73% of the fungicide volume) because the vines must be protected against fungal diseases throughout the growing season.

For fruit trees (8% of the fungicide volume), emphasis is placed primarily on the control of apple scab (Venturia inaequalis) because fruits with scab spots cannot be marketed as dessert apples at high prices, but can only be sold for a lower price as bulk to the processing industry.

Herbicides dominate in arable crops, representing 86% of the total active ingredients used by volume (Fig 1.2.2). Insecticides play only a minor role, the proportions of insecticides in arable and vegetable crops being respectively 5% and 8% of all applied chemical agents (Fig 1.2.3).

Fig 1.2.1: Trend in PPP use in the EU-15, 1992-1999

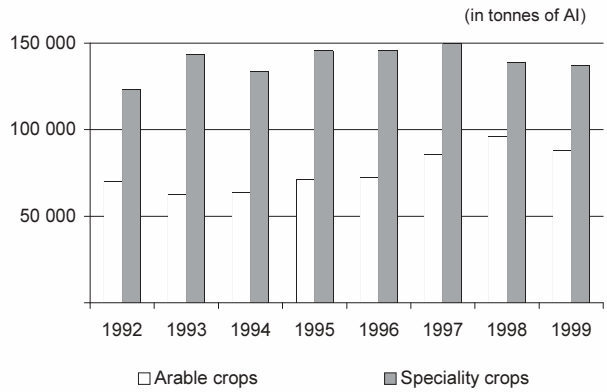


Fig 1.2.2: PPP use in arable crops in the EU-15, 1999

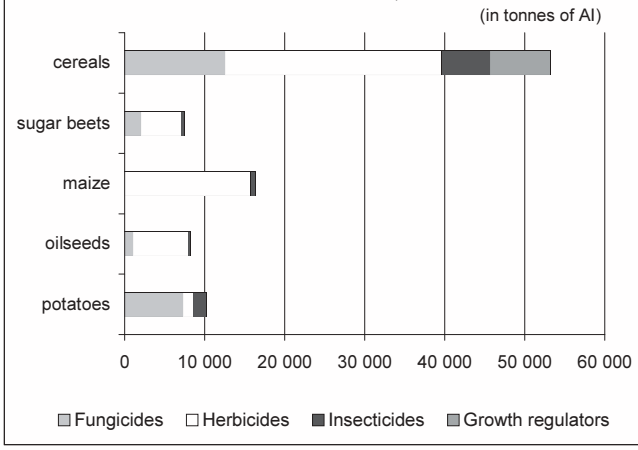
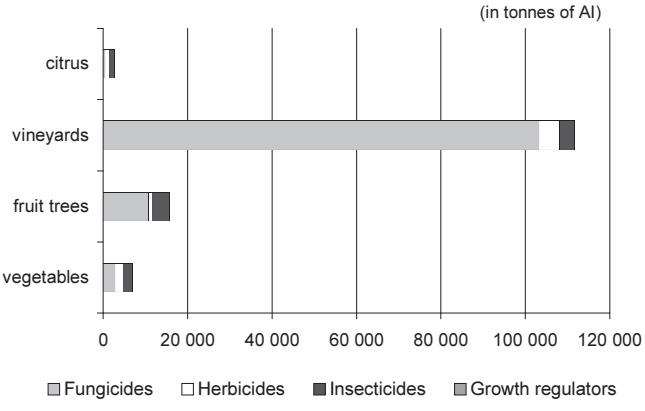


Fig 1.2.3: PPP use in speciality crops in the EU-15, 1999



1.3 Plant Protection Products use and chemical classes

Substances such as *sulphur* and *copper* still account for 45 % of the overall AI volume. It has already been mentioned that *sulphur* and *copper* are used in repeated applications, mainly in fruits and vines. The application rates for these substances far exceed those of modern products. For the control of *powdery mildew*, for example, rates of over 5 kg AI/ha are common for *sulphur*, 3 kg AI/ha are common for *copper* for downy mildew control. Organic contact fungicides are applied at 1 - 2 kg AI/ha, systemic fungicides, e.g. *carbendazim*, are active at 0,1 - 0,25 kg AI/ha.

Ureas play a major role in cereal weed control. *Isoproturon* is the most frequently used urea herbicide; it is active against annual grasses and also broadleaf weeds. *Triazine* herbicides are used for annual and perennial weed control, mostly in fruit orchards and vineyards and for weed control in maize (*Atrazine*). *Chloroacetanilides* (*Alachlor, metolachlor, etc.*) are frequently used for selective weed control in rape and maize.

For the control of insect pests, *organophosphates* are still frequently used because of their low price (*Parathion*) and broad spectrum of activity. Their position has been challenged in recent decades by novel synthetic *pyrethroid* insecticides which, in contrast to the toxic *organophosphates*, have very low mammalian toxicity and thus are classified as non-hazardous for the applicator. Because of their low dosage rates, *pyrethroids* do not appear among the leading chemical classes by volume.

Table 1.3.1 presents a ranking of the 20 chemical classes, covering 90% of reported active ingredients used by volume. The situation of 1999 and in 1992 is given in table 1.3.2.

A detailed ranking of active ingredients, aggregated to chemical classes and broken down per crop, are shown by the tables in chapter 5 under 'Detailed tables by crop'.

A comprehensive list of chemical classes and associated active ingredient common names is included in annexes A and B.

Fig 1.3.1: Main chemical classes: 80% in the EU-15 total, 1999

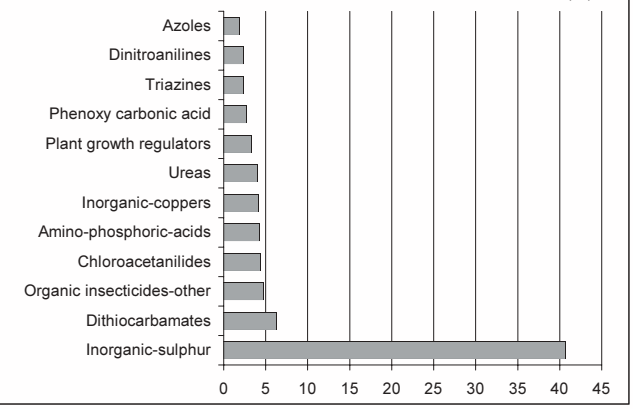


Table 1.3.1: Ranking top-20 chemical classes (reference year 1999)

1992	1993	1994	1995	1996	1997	1998	1999	Chemical classe
1	1	1	1	1	1	1	**1**	Inorganic-sulphur
2	2	2	2	2	2	2	**2**	Dithiocarbamates
41	41	39	40	32	8	7	**3**	Organic insecticides-other*
10	11	11	9	8	5	5	**4**	Chloroacetanilides
7	5	5	4	3	4	4	**5**	Amino-phosphoric-acids
5	6	6	6	6	6	6	**6**	Inorganic-coppers
3	3	3	3	4	3	3	**7**	Ureas
:	:	:	:	:	7	8	**8**	Plant growth regulators*
6	7	7	7	7	10	11	**9**	Phenoxy carbonic acid
4	4	4	5	5	9	10	**10**	Triazines
18	17	17	14	12	11	9	**11**	Dinitroanilines
8	9	9	8	9	14	13	**12**	Azoles
13	10	8	11	14	11	10	**13**	Organophosphates
11	8	10	10	10	12	15	**14**	Phthalic acids
9	13	13	12	11	15	14	**15**	Morpholines
15	14	15	13	16	17	17	**16**	Ethylphosphate
14	12	14	15	13	16	16	**17**	Triazinones
16	16	12	16	17	18	18	**18**	Oil, mineral
24	34	25	19	20	20	19	**19**	Amides*
36	26	26	26	37	19	21	**20**	Diphenyl-ethers*

* New in Top-20 (1999)

Table 1.3.2: Ranking top-20 chemical classes (reference year 1992)

1992	1993	1994	1995	1996	1997	1998	1999	Chemical classe
1	1	1	1	1	1	1	1	Inorganic-sulphur
2	2	2	2	2	2	2	2	Dithiocarbamates
3	3	3	3	4	3	3	7	Ureas
4	4	4	5	5	9	10	10	Triazines
5	6	6	6	6	6	6	6	Inorganic-coppers
6	7	7	7	7	10	11	9	Phenoxy carbonic acid
7	5	5	4	3	4	4	5	Amino-phosphoric-acids
8	9	9	8	9	14	13	12	Azoles
9	13	13	12	11	15	14	15	Morpholines
10	11	11	9	8	5	5	4	Chloroacetanilides
11	8	10	10	10	12	15	14	Phthalic acids
12	15	16	17	15	27	28	28	Thiocarbamates**
13	10	8	11	14	11	10	13	Organophosphates
14	12	14	15	13	16	16	17	Triazinones
15	14	15	13	16	17	17	16	Ethylphosphate
16	16	12	16	17	18	18	18	Oil, mineral
17	18	18	18	18	31	33	33	Bipyridyliums**
18	17	17	14	12	11	9	11	Dinitroanilines
19	21	19	23	22	26	27	27	Benzimidazoles**
20	20	21	21	21	22	22	22	Thiadiazines**

**No longer in Top-20 (1999)

Chapter 2
Detailed tables at EU level

Table 2.1.1: Volume of PPP used - total *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**193 788**	**206 003**	**197 910**	**216 802**	**218 118**	**242 478**	**242 735**	**232 377**
B	2 908	2 618	2 735	3 009	2 742	3 240	3 325	3 008
DK	2 846	2 719	2 683	2 784	2 672	2 015	2 407	1 936
D	20 059	18 227	17 449	20 115	20 358	22 422	24 070	21 953
EL	11 550	11 731	11 776	12 001	12 218	12 287	13 302	12 696
E	29 521	27 888	27 378	25 861	26 470	30 712	31 139	31 609
F	62 717	65 360	56 842	72 227	71 063	86 078	87 643	82 811
IRL	445	328	364	431	435	910	618	556
I	42 479	54 447	53 929	54 141	55 467	58 091	53 665	50 910
NL	3 469	3 401	3 629	3 806	3 897	4 778	4 605	4 075
A	2 417	2 329	2 178	2 261	1 807	2 276	2 247	2 028
P	6 008	7 389	8 624	9 004	9 807	7 110	6 360	7 885
FIN	360	328	302	490	498	717	816	633
S	551	554	681	769	816	827	942	934
UK	8 457	8 683	9 340	9 904	9 869	11 014	11 595	11 344

Table 2.1.2: Volume of PPP used - fungicides *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**133 634**	**148 375**	**136 545**	**149 814**	**151 001**	**155 045**	**146 800**	**140 566**
B	1 217	1 039	1 160	1 269	959	1 006	1 097	931
DK	1 028	800	778	792	762	774	793	724
D	7 321	6 306	5 416	7 365	6 977	8 192	7 547	7 671
EL	10 509	10 796	10 780	10 961	11 092	11 195	11 659	11 591
E	24 860	23 397	21 195	19 806	20 300	20 049	19 498	19 299
F	42 175	47 006	38 212	49 558	48 224	52 346	49 920	44 893
IRL	198	168	141	166	177	318	259	196
I	35 500	46 938	45 801	46 075	48 068	48 047	43 696	42 006
NL	1 675	1 549	1 945	2 076	1 980	2 346	2 375	2 062
A	1 323	1 340	1 165	1 228	1 114	1 310	1 210	962
P	4 878	5 890	6 790	7 017	7 728	5 730	4 609	6 051
FIN	19	20	16	21	32	52	97	29
S	107	49	80	104	128	160	176	216
UK	2 823	3 078	3 067	3 375	3 460	3 521	3 864	3 934

Table 2.1.3: Volume of PPP used - herbicides *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**52 155**	**49 415**	**51 491**	**57 481**	**58 307**	**64 958**	**70 640**	**64 702**
B	1 548	1 470	1 466	1 624	1 659	1 970	1 953	1 847
DK	1 738	1 833	1 830	1 908	1 863	1 060	1 435	1 016
D	12 193	11 555	11 628	12 303	13 046	12 029	13 867	12 035
EL	707	640	678	722	805	681	1 002	662
E	3 297	3 291	3 691	3 617	4 164	5 076	5 323	5 440
F	18 762	16 318	16 581	20 581	20 606	26 574	29 704	27 941
IRL	230	159	220	262	254	476	267	280
I	4 089	4 170	4 649	4 850	4 343	5 921	5 867	4 594
NL	1 574	1 667	1 520	1 576	1 724	1 930	1 803	1 595
A	1 058	960	980	1 017	674	958	1 028	1 057
P	850	1 234	1 555	1 777	1 883	1 199	1 253	1 273
FIN	328	297	281	465	462	576	619	543
S	404	480	568	651	666	612	699	656
UK	5 377	5 341	5 842	6 130	6 157	5 896	5 820	5 764

Table 2.1.4: Volume of PPP used - insecticides *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**7 999**	**8 212**	**9 873**	**9 508**	**8 810**	**15 256**	**17 230**	**19 384**
B	143	109	108	116	124	99	90	90
DK	80	86	75	85	46	28	33	28
D	545	366	405	447	335	459	711	410
EL	333	295	317	318	321	411	641	443
E	1 364	1 200	2 492	2 437	2 007	5 520	6 241	6 835
F	1 780	2 036	2 050	2 088	2 232	3 881	3 943	5 710
IRL	18	2	3	3	5	16	13	9
I	2 890	3 339	3 478	3 217	3 056	3 996	3 981	4 202
NL	219	185	164	154	193	418	341	364
A	36	29	32	17	18	7	9	9
P	279	265	279	209	196	173	486	555
FIN	14	11	5	5	4	7	7	3
S	40	26	33	14	22	14	16	15
UK	257	264	431	398	251	228	719	712

Table 2.1.5: Volume of PPP used - growth regulators *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	:	:	:	:	:	**7 218**	**8 065**	**7 725**
B	:	:	:	:	:	166	185	140
DK	:	:	:	:	:	153	146	168
D	:	:	:	:	:	1 742	1 946	1 837
EL	:	:	:	:	:	:	:	:
E	:	:	:	:	:	66	78	36
FI	:	:	:	:	:	3 278	4 076	4 266
IRL	:	:	:	:	:	101	79	70
I	:	:	:	:	:	128	121	108
NL	:	:	:	:	:	84	85	55
A	:	:	:	:	:	:	:	:
P	:	:	:	:	:	8	12	7
FIN	:	:	:	:	:	82	94	57
S	:	:	:	:	:	41	50	47
UK	:	:	:	:	:	1 369	1 191	934

Table 2.1.6: Index of volume of PPP used - total *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**100**	**106**	**102**	**112**	**113**	**125**	**125**	**120**
B	100	90	94	103	94	111	114	103
DK	100	96	94	98	94	71	85	68
D	100	91	87	100	101	112	120	109
EL	100	102	102	104	106	106	115	110
E	100	94	93	88	90	104	105	107
F	100	104	91	115	113	137	140	132
IRL	100	74	82	97	98	205	139	125
I	100	128	127	127	131	137	126	120
NL	100	98	105	110	112	138	133	117
A	100	96	90	94	75	94	93	84
P	100	123	144	150	163	118	106	131
FIN	100	91	84	136	138	199	227	176
S	100	100	124	139	148	150	171	169
UK	100	103	110	117	117	130	137	134

Table 2.1.7: Index of volume of PPP used - fungicides *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**100**	**111**	**102**	**112**	**113**	**116**	**110**	**105**
B	100	85	95	104	79	83	90	77
DK	100	78	76	77	74	75	77	70
D	100	86	74	101	95	112	103	105
EL	100	103	103	104	106	107	111	110
E	100	94	85	80	82	81	78	78
F	100	111	91	118	114	124	118	106
IRL	100	85	71	84	89	161	131	99
I	100	132	129	130	135	135	123	118
NL	100	92	116	124	118	140	142	123
A	100	101	88	93	84	99	91	73
P	100	121	139	144	158	117	94	124
FIN	100	111	86	113	171	278	524	159
S	100	45	74	97	119	149	164	201
UK	100	109	109	120	123	125	137	139

Table 2.1.8: Index of volume of PPP used - herbicides *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**100**	**95**	**99**	**110**	**112**	**125**	**135**	**124**
B	100	95	95	105	107	127	126	119
DK	100	105	105	110	107	61	83	58
D	100	95	95	101	107	99	114	99
EL	100	90	96	102	114	96	142	94
E	100	100	112	110	126	154	161	165
F	100	87	88	110	110	142	158	149
IRL	100	69	96	114	110	207	116	122
I	100	102	114	119	106	145	143	112
NL	100	106	97	100	110	123	115	101
A	100	91	93	96	64	91	97	100
P	100	145	183	209	221	141	147	150
FIN	100	91	86	142	141	176	189	166
S	100	119	141	161	165	152	173	162
UK	100	99	109	114	115	110	108	107

Table 2.1.9: Index of volume of PPP used - insecticides *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**100**	**103**	**123**	**119**	**110**	**191**	**215**	**242**
B	100	76	76	82	87	69	63	63
DK	100	107	93	105	58	36	42	35
D	100	67	74	82	61	84	130	75
EL	100	88	95	95	96	123	192	133
E	100	88	183	179	147	405	457	501
F	100	114	115	117	125	218	222	321
IRL	100	9	17	19	26	89	71	53
I	100	116	120	111	106	138	138	145
NL	100	85	75	70	88	191	156	166
A	100	79	89	46	51	20	24	25
P	100	95	100	75	70	62	174	199
FIN	100	76	37	33	31	51	46	21
S	100	63	83	35	56	34	41	38
UK	100	103	168	155	98	89	280	277

Table 2.1.10: Index of volume of PPP used - growth regulators *(1997 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
EU-15	**:**	**:**	**:**	**:**	**:**	**100**	**112**	**107**
B	:	:	:	:	:	100	112	84
DK	:	:	:	:	:	100	96	110
D	:	:	:	:	:	100	112	105
EL	:	:	:	:	:	:	:	:
E	:	:	:	:	:	100	118	55
F	:	:	:	:	:	100	124	130
IRL	:	:	:	:	:	100	79	70
I	:	:	:	:	:	100	94	84
NL	:	:	:	:	:	100	102	65
A	:	:	:	:	:	:	:	:
P	:	:	:	:	:	100	148	79
FIN	:	:	:	:	:	100	115	70
S	:	:	:	:	:	100	123	115
UK	:	:	:	:	:	100	87	68

Table 2.2.1: Dosage of PPP used by crop (EU-15) - total *(Kg AI/ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1.3	1.2	1.3	1.4	1.4	1.8	2.0	1.9
Sugar beets	3.8	3.7	3.6	3.9	4.0	4.3	4.4	3.7
Maize	1.6	1.4	1.4	1.6	1.5	2.0	2.1	2.1
Oilseeds	0.7	0.5	0.6	0.8	0.9	1.3	1.8	1.5
Potatoes	5.0	5.4	5.8	5.6	5.7	6.7	9.1	7.5
Citrus	5.3	4.9	7.3	6.7	6.3	4.8	4.4	4.6
Vineyards	25.0	30.7	28.8	32.2	33.5	34.9	32.2	32.4
Fruit trees	16.4	17.8	18.1	19.6	17.7	19.1	18.6	17.0
Vegetables	3.3	4.3	3.6	3.9	4.0	3.5	3.2	3.9
Total	**3.6**	**4.0**	**3.9**	**4.3**	**4.2**	**4.6**	**4.7**	**4.5**

Table 2.2.2: Dosage of PPP used by crop (EU-15) - fungicides *(Kg AI/ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Sugar beets	0.7	0.7	0.7	0.9	1.0	1.2	1.4	1.0
Maize	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oilseeds	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Potatoes	3.5	3.8	4.1	3.9	3.8	5.0	5.7	5.3
Citrus	1.1	0.8	0.9	0.8	1.0	1.1	0.9	0.9
Vineyards	23.7	29.3	27.3	30.6	31.9	32.8	30.0	30.0
Fruit trees	12.4	13.3	13.2	14.7	13.1	13.7	13.1	11.7
Vegetables	2.3	3.2	2.6	2.8	2.8	1.6	1.4	1.6
Total	**2.5**	**2.9**	**2.7**	**2.9**	**2.9**	**2.9**	**2.8**	**2.7**

Table 2.2.3: Dosage of PPP used by crop (EU-15) - herbicides *(Kg AI/ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0
Sugar beets	2.8	2.8	2.7	2.7	2.8	2.9	2.8	2.5
Maize	1.5	1.3	1.4	1.5	1.4	1.9	2.0	2.0
Oilseeds	0.5	0.4	0.5	0.7	0.7	1.1	1.6	1.3
Potatoes	1.4	1.4	1.5	1.5	1.6	0.8	0.8	0.9
Citrus	1.5	1.7	1.9	1.9	2.2	2.9	2.6	2.0
Vineyards	1.0	1.1	1.2	1.4	1.4	1.5	1.6	1.4
Fruit trees	1.4	1.3	1.6	1.7	1.4	1.1	1.1	1.0
Vegetables	0.8	1.0	0.8	0.9	1.0	0.9	1.1	1.1
Total	**1.0**	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.4**	**1.3**

Table 2.2.4: Dosage of PPP used by crop (EU-15) - insecticides *(Kg AI/ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
Sugar beets	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Maize	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Oilseeds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Potatoes	0.2	0.2	0.2	0.2	0.2	0.9	2.6	1.3
Citrus	2.6	2.3	4.5	4.1	3.1	0.8	0.9	1.7
Vineyards	0.2	0.3	0.3	0.3	0.3	0.6	0.6	1.0
Fruit trees	2.6	3.1	3.2	3.2	3.2	4.1	4.2	4.1
Vegetables	0.2	0.2	0.2	0.2	0.2	1.1	0.8	1.2
Total	**0.1**	**0.2**	**0.2**	**0.2**	**0.2**	**0.3**	**0.3**	**0.4**

Table 2.2.5: Dosage of PPP used by crop (EU-15) - growth regulators *(Kg AI/ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	:	:	:	:	:	0.2	0.3	0.3
Vineyards	:	:	:	:	:	0.0	0.0	0.0
Fruit trees	:	:	:	:	:	0.2	0.2	0.2
Total	:	:	:	:	:	0.2	0.2	0.2

Table 2.3.1: Top ten chemical classes in the EU - fungicides 1999

	Chemical class	AI volume (in 1000 t)	Share of fungicide AI volume (%)
1	Inorganic-sulphur	94	67.2
2	Dithiocarbamates	14	10.3
3	Inorganic-coppers	10	6.8
4	Azoles	4	3.0
5	Phthalic acids	3	2.4
6	Morpholines	3	2.4
7	Ethylphosphate	3	2.0
8	Anilinopyrimidils	1	1.0
9	Organic fungicides-other	1	0.7
10	Benzimidazoles	1	0.6
	Total	**136**	**96.5**

Table 2.3.2: Top ten chemical classes in the EU - herbicides 1999

	Chemical class	AI volume (in 1000 t)	Share of herbicide AI volume (%)
1	Chloroacetanilides	10	15.7
2	Amino-phosphoric-acids	10	15.3
3	Ureas	9	13.3
4	Phenoxy carbonic acid	6	9.7
5	Triazines	6	8.7
6	Dinitroanilines	5	8.4
7	Triazinones	3	3.9
8	Amides	2	3.7
9	Diphenyl-ethers	1	2.2
10	Thiadiazines	1	2.1
	Total	**54**	**83.0**

Table 2.3.3: Top ten chemical classes in the EU - insecticides 1999

	Chemical class	AI volume (in 1000 t)	Share of insecticide AI volume (%)
1	Organic insecticides-other	11	57.1
2	Organophosphates	4	21.0
3	Oil, mineral	2	12.7
4	Carbamates	1	3.1
5	Oxime-carbamates	0	2.3
6	Pyrethroids	0	1.1
7	Cyclodiene organochlorines	0	0.8
8	Organochlorines	0	0.6
9	Benzilates	0	0.3
10	Benzoylureas	0	0.3
	Total	**19**	**99.3**

Table 2.3.4: Chemical classes in the EU - growth regulators 1999

	Chemical class	AI volume (in 1000 t)	Share of growth regulator AI volume (%)
1	Oxyphenoxies	0	1.2
2	Plant growth regulators	8	98.8
	Total	**8**	**100.0**

Table 2.4.1: Top ten active ingredients in the EU - total 1999 *(%)*

Active Ingredient	Chemical class	Action	Share of AI volume
Alachlor	Chloroacetanilides	H	2.2
Chlormequat-cloride	Plant growth regulators	GR	2.5
Copper	Inorganic-coppers	F	4.1
Glyphosate	Amino-phosphoric-acids	H	4.1
Isoproturon	Ureas	H	2.6
Mancozeb	Dithiocarbamates	F	3.6
Metolachlor	Chloroacetanilides	H	1.2
Pendimethalin	Dinitroanilines	H	1.3
Sulphur	Inorganic-sulphur	F	40.6
Dichloropropene	Organic insecticides-other	I	4.4
Total			**66.8**

Chapter 3
Country profiles

3.1 Belgium / Luxembourg

In 1999 the crop area included in this survey represented 93% (937 000 ha) of the total crop area in Belgium and Luxembourg.

Figure 3.1.1 shows the trend in PPPs used and their composition in Belgium and Luxembourg from 1992 to 1999. The total consumption of pesticides in the reported period fluctuates.

Of the total active ingredient volume used in 1999, 31% were fungicides, 61% herbicides and only 3% insecticides. Growth regulators represent 4% of the total PPP. Except for seasonal variations due to changing pest and disease incidence, this ratio was fairly constant.

Cereals remain at the top of the target crops as far as total AI volume is concerned: their proportion of the total volume is 2%, followed by potatoes and maize with 14% each. It is notable that *atrazine* still accounts for 28% of herbicide volumes to protect maize.

The national average dosage rate is around 4,1 kg AI/ha. Major target crops for high volume PPP applications are fruits trees with 18,7 kg AI/ha, vineyards with 12,8 kg AI/ha (Luxembourg) and vegetables with 8,5 kg AI/ha. Use for potatoes recorded a large decrease from 10,8 kg AI/ha in 1992 to 6,3 kg AI/ha in 1999 (Fig 3.1.3). Control of potato blight (*Phytophthora sp.*) and apple scab (*Venturia sp.*) is the main concern of growers of these crops.

For sugar beets, *metamitron* and *chloridazone* are the most frequently used herbicides. *Mancozeb* clearly dominates the market for potato fungicides.

Fig 3.1.1: Use and composition of PPP - total

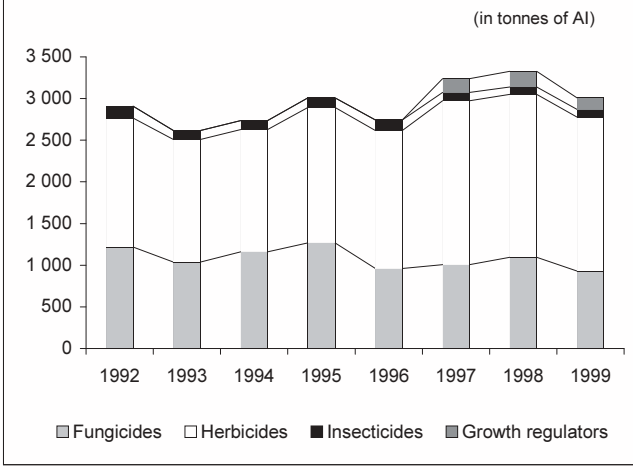


Fig 3.1.2: Volume of PPP used by crop

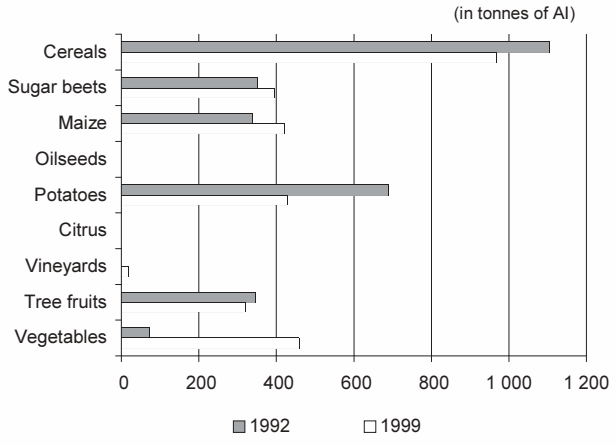
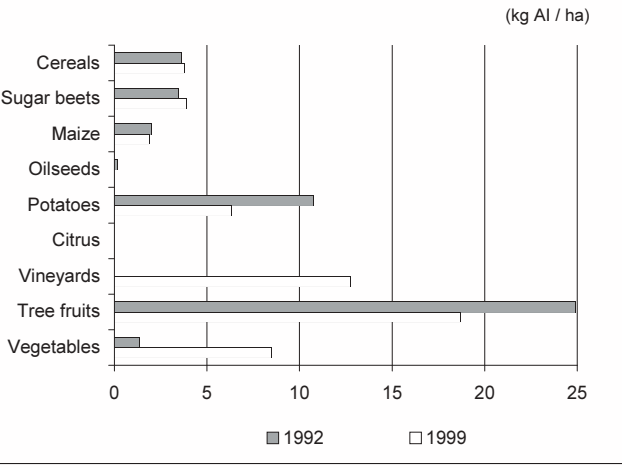


Fig 3.1.3: Dosage of PPP used by crop



3.2 Denmark

For the reference year 1999 the crops covered in this survey account for 66% (1,7 million ha) of the total crop area in Denmark. Crop not included in this survey are mainly permanent and temporary grassland, also horticultural crops, which play an important role in Denmark.

Figure 3.2.1 shows the trend in used of pesticides in Denmark from 1992 to 1999. In total, the volume of PPPs used decreased over the period 1992-1999 with a peak in 1998.

In 1999 herbicide the proportion of the total volume balance is 48% and the proportion of fungicide is 40% of the volume used, they are fairly and constant in their relationship over the report period. Insecticides generally rank below 2% and growth regulators in terms of active ingredients volume used.

When looking at the total active ingredients volume reported for Denmark, it should be noted that some of the companies involved in this survey did not separate their figures by Member State for the Northern region. If the for Denmark estimated 69% of the total active ingredients volume for the Northern Region is attributed to the country, the total active ingredients volume used in Denmark would increase approximately from 1 785 to 1 936 tonnes.

Among the surveyed crops, cereals account for 81,4 of the reference area and are treated with 54,7% of the total active ingredients used. Vegetables and potatoes represent 19,4% and 9,3% respectively of the global volume used.

Because of the minor importance of speciality crops in the use of active ingredients in this survey, the average use of PPPs is rather low at only 1,2 kg AI/ha (Fig 3.2.3).

Control of powdery mildew and grass weeds is the farmers' main concern when using PPP.

Fenpropimorph fungicide and for the control of cereal diseases and *glyphosate* herbicides have the big share of the Danish crop protection market. *Maneb* was used for blight control in potatoes until 1995. Thereafter the company supplying the product replaced it with *mancozeb*.

Fig 3.2.1 Use and composition of PPP - total

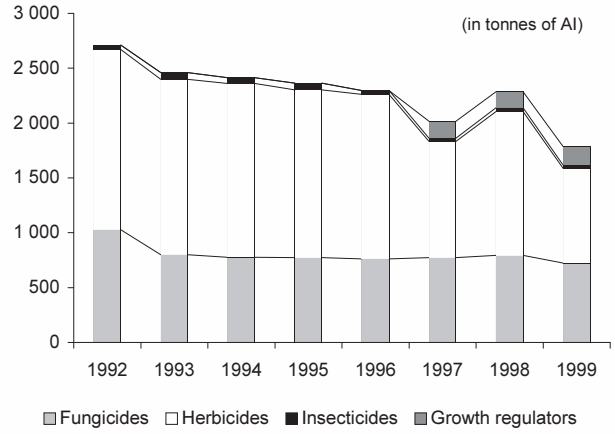


Fig 3.2.2: Volume of PPP used by crop

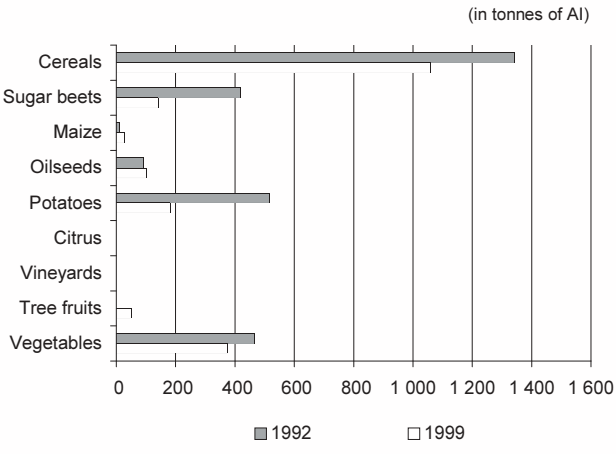
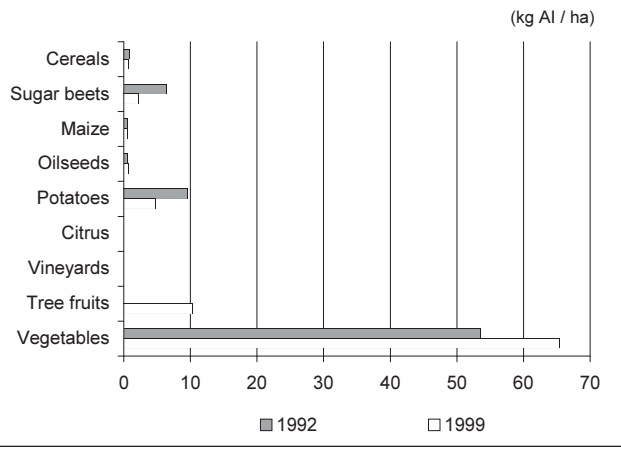


Fig 3.2.3: Dosage of PPP used by crop



3.3 Germany

For the reference year 1999 the crops covered in this survey represent 72% (8,6 million ha) of the statistical crop area.

Figure 3.3.1 shows the trend in the use of pesticides in Germany from 1992 to 1999. In total, the volume of PPPs used decreased over the period 1992-1994 and from 1995 on, an increase in the consumption is observed with a peak in 1998.

The German PPP market is clearly dominated by herbicides in terms of volume used. Their share was 54,8% in 1999. Fungicides comprised 34,9%, insecticides 1,8% and growth regulators 8,3%.

The plant protection market in Germany is led by products to treat wheat, barley and maize (most of the maize is green maize for silage) in terms of area treated (55,5% for cereals and 18% for maize) and total volume used (51,4% for cereals and 8,7% for maize). Vineyards represent only 1,1% of the crop area, but in terms of active ingredients applied, 12,9% of the total volume are used in vineyards according to this survey.

The use of PPPs per hectare of arable or permanent crop remained stable at approximately 2,5 kg/ha over the report period. Due to sequential applications of mainly fungicides, active ingredients use is rather high in vineyards (28 kg/ha) and fruit trees (12,8 kg/ha). Variations in the volumes over the report period are attributable mainly to varying disease incidence due to weather conditions (Fig 3.3.3).

The leading single active ingredients are *Isoproturon* (IPU), a grass weed herbicide used to protect cereals *chlormequat-chloride* (1 637 t in 1999) also in the growth of cereals. *Terbuthylazine*, metolachlor and *pyridate* herbicides are used for maize, *metamitron* for sugar beets and *sulphur* fungicide for vineyards.

Fig 3.3.1: Use and composition of PPP - total

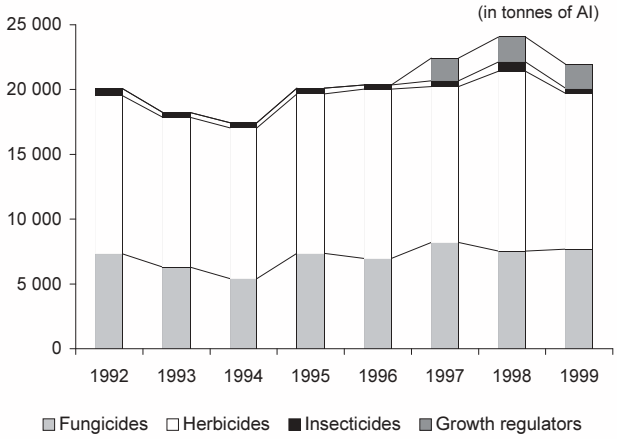


Fig 3.3.2: Volume of PPP used by crop

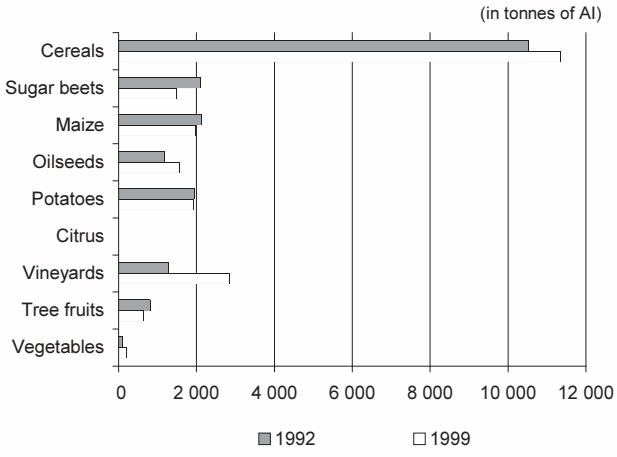
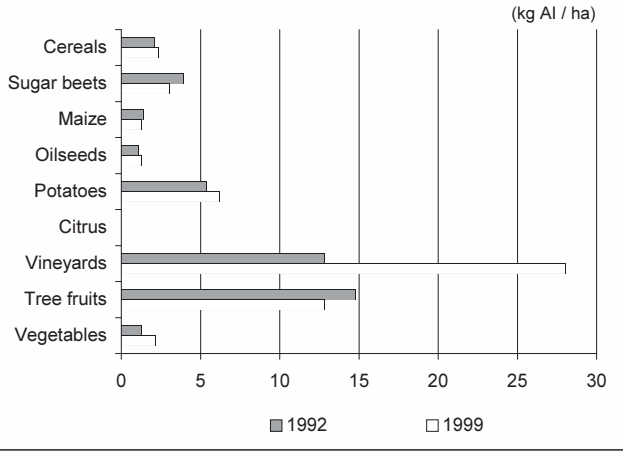


Fig 3.3.3: Dosage of PPP used by crop



3.4 Greece

In 1999 the crop area included in this survey represented 44% (1,7 million ha) of the total crop area in Greece. The remaining area, not covered by this survey, is permanent grassland, olives, fresh fruit (other than dessert pome fruits) and stone fruit, and a variety of minor crops. These minor crops, while important for the local market, do not play a large role in the use of PPPs.

Figure 3.4.1 shows the trend in use of pesticides in Greece from 1992 to 1999. The consumption seems to have a slow increase with a peak in 1998.

Fungicides represent the main share of the plant protection market (91% in 1999). Wheat and barley are the largest single crops grown (1 million ha, 57% of the total crop area). The use of PPP for cereals, however, has increased in the report period, probably due to the increased profitability of cereal growing in Greece after the CAP reform. Its use to treat sugar beet has also increased considerably (by 80%), apparently because of frequent applications of *sulphur* against powdery mildew.

The national average dosage is 7,4 kg AI/ha, due to the dominance of grapes. Vineyards account for 85% of the total active ingredient volume used. For this crop, the average use of PPPs is 81,7 kg/ha, most of which is *sulphur* (78,8%).

Sulphur far outranks all other active ingredient in terms of volume, representing 73% of the total active ingredient use in Greek agriculture.

Fig 3.4.1: Use and composition of PPP - total

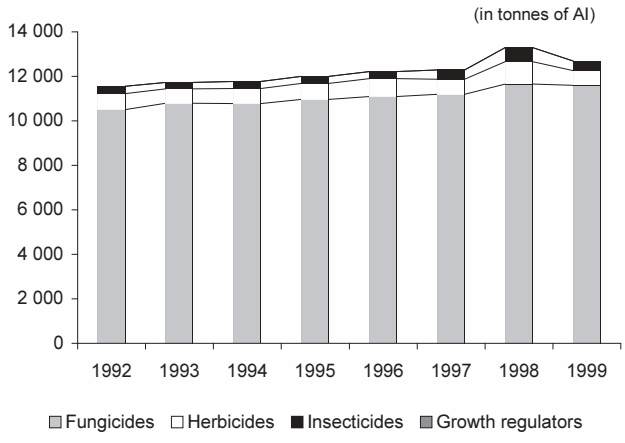


Fig 3.4.2: Volume of PPP used by crop

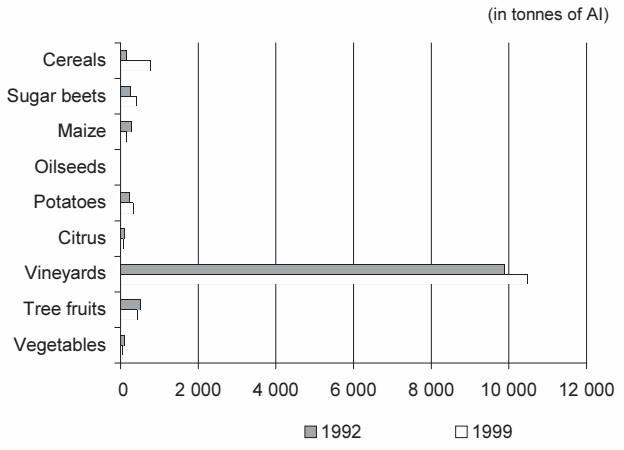
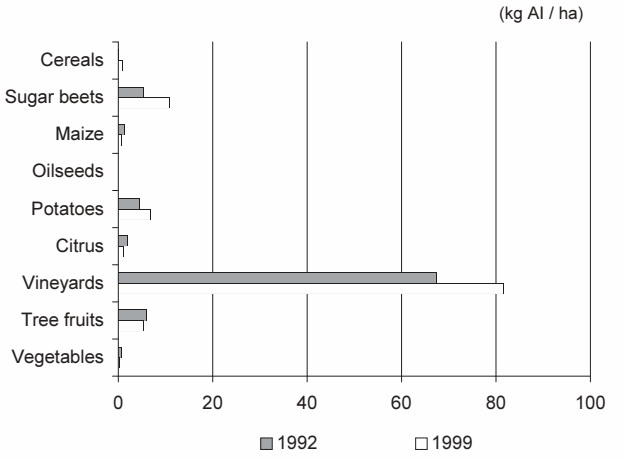


Fig 3.4.3: Dosage of PPP used by crop



3.5 Spain

In 1999 the crop area included in this survey represented 50% (9,3 million ha) of the total crop area in Spain. Crops not considered in this context are olives, rice, and dried pulses, which are of major importance in Spain, but not in the majority of the EU Member States.

Figure 3.5.1 shows the trend in use of pesticides in Spain from 1992 to 1999. The consumption of PPP in Spain has decreased between 1992 and 1995. After 1996 an increase is observed in the composition and especially for herbicides and insecticides.

The Spanish PPP market is clearly dominated by fungicides. In 1999 fungicides represented 61% of total active ingredient used by volume mainly due to the large quantities of sulphur in use. The proportion of herbicides in the volume balance is 17%, the proportion of insecticides 21% and the growth regulators only 0,1%.

While cereals account for 60% of the crop area covered in this report, the total volume of active ingredient used in cereals is 20%. The dominating crops for PPP use are grapes, accounting for 50% of the total active ingredient volume used, but only 12% of the crop area covered.

The calculated national average dosage rate is 3,4 kg AI/ha for the crops covered by the survey.

Only 1,2 kg AI/ha are used in cereals. Vineyards receive up to 13,8 kg AI/ha, citrus fruits and vegetables 7 kg AI/ha and 7,5 kg AI/ha respectively (Fig.3.5.3).

Sulphur is the dominating single active ingredient used for Spanish crop protection. Its target is mainly powdery mildew control and the control of red spider mites in vineyards, fruit trees and vegetables. *Glyphosate* is the leading herbicide used in vineyards.

Fig 3.5.1: Use and composition of PPP - total

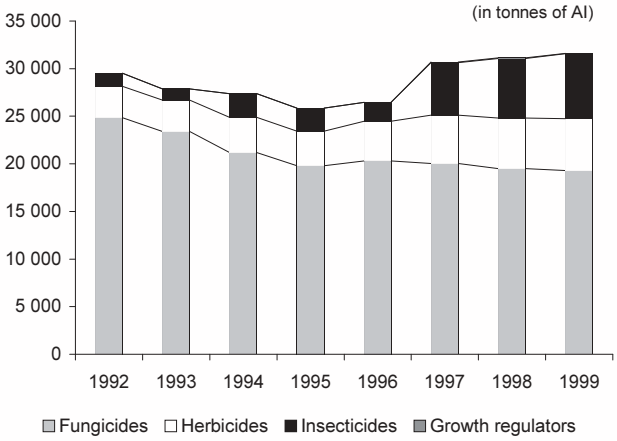


Fig 3.5.2: Volume of PPP used by crop

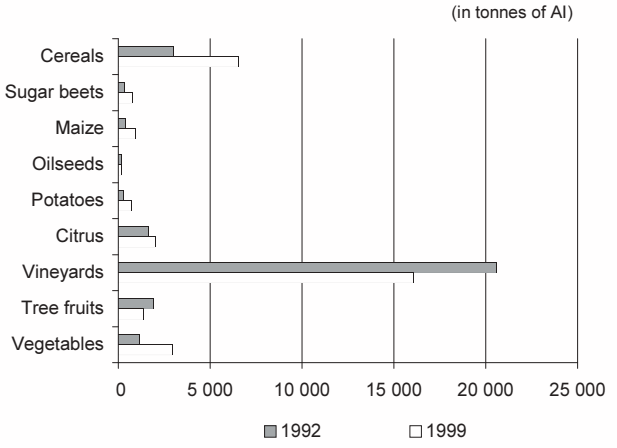
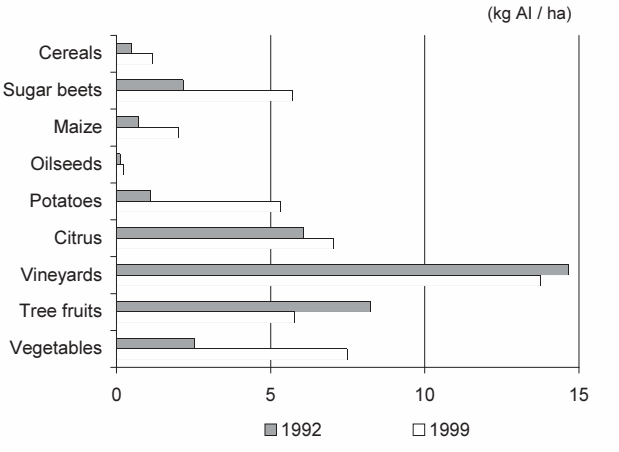


Fig 3.5.3: Dosage of PPP used by crop



3.6 France

In 1999 the crop area included in this survey represented 70% (13,8 million ha) of the total crop area in France. France has the largest market share for plant protection products in the European Union. Its share of the total active ingredient volume used in the EU is 35,6% Major crops not considered in this context are temporary and permanent grassland and perennial or temporary green fodder crops.

Figure 3.6.1 shows the trend in the use of pesticides in France from 1992 to 1999. Overall volumes of active ingredients used increase in 1994 compared to 1992 mainly due to cost saving and rate-cutting strategies after the CAP reform. Less fungicide was used due to low disease incidence in drought conditions, but this has gone up again to top former levels with peak years in 1997 and 1998.

Fungicide use accounts for 54% of all active ingredients used by volume and herbicides for 33%. Insecticides and growth regulators represent 6,8% and 5% respectively. Vineyards account for 49% of all active ingredients used by volume in France in 1999. The treatment of wheat, barley and maize (grain and green maize) represents 34% of the total volume of PPPs used.

The national average dosage rate is around 6 kg AI/ha. In vineyards the use of multiple fungicide applications for the control of downy mildew and Botrytis bunch rot increase the average use per ha rate up to 46,8 kg AI/ha in 1999. Control of Fusarium and Phytophthora in potatoes, and scab and powdery mildew in tree fruits also require multiple applications of fungicides over the growing season, resulting in elevated levels of active ingredient per ha (10,5 kg AI/ha for potatoes and 21,5 kg AI/ha for tree fruits) (Fig 3.6.3).

In vineyards, *sulphur* is the leading single active ingredient used. *Glyphosate* and *Isoproturon* are the herbicides most frequently used for grass weed control in cereals. *Atrazine* and *Alachlor* still have a dominant position in maize weed control.

Fig 3.6.1: Use and composition of PPP - total

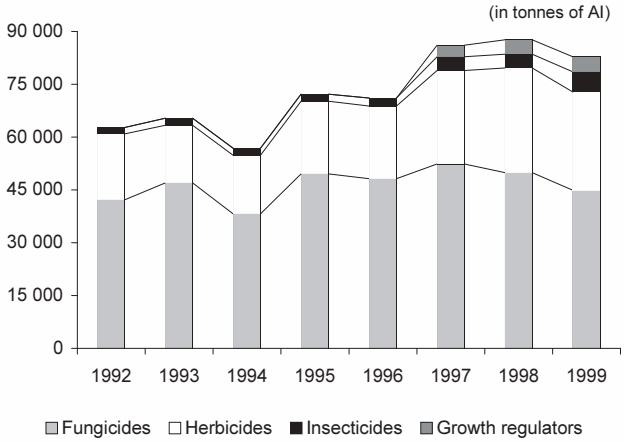


Fig 3.6.2: Volume of PPP used by crop

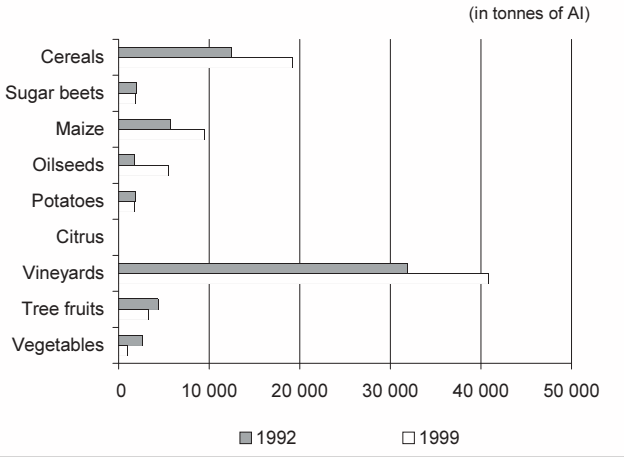
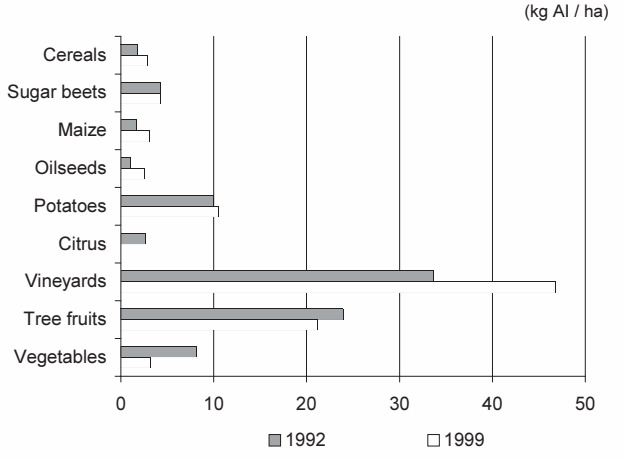


Fig 3.6.3: Dosage of PPP used by crop



3.7 Ireland

In 1999 the crop area included in this survey represented 30% (326 thousand ha) of the total crop area in Ireland. The majority of crop areas in the statistics are temporary and permanent meadows and grazing, on which plant protection products are not used. No data is provided for PPP use on fruit trees in Ireland.

Figure 3.7.1 shows the trend in the use of pesticides in Ireland from 1992 to 1999. From 1993 the volume decreased and re-increased in 1994 with a peak in 1997.

Herbicides and fungicides represent 50% and 35% respectively of the global active ingredients used by volume. Insecticides are not used very much in Ireland. In 1999 they represent only 1,7% of the total active ingredient used, while growth regulators represented 12%.

The key target crops for PPP are cereals (wheat and barley), accounting for 80% of the total AI volume. The other main crops in terms of PPP volume are sugar beet (11,2%) and potatoes (5,8%) (mainly fungicides).

The national average dosage rate was calculated to 1,8 kg AI/ha. However, the dosage rate in potatoes seems underestimated (1,9 kg AI/ha), considering potato blight and the necessity of fungicide applications.

Glyphosate leads for pre-planting treatment and *chlormequat-chloride* as growth regulator in cereals.

Fig 3.7.1 Use and composition of PPP - total

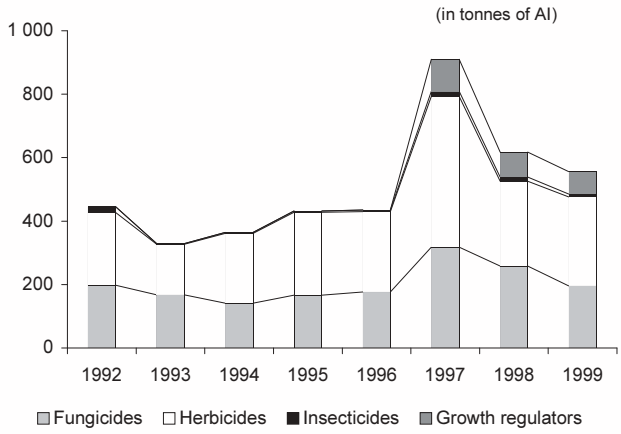


Fig 3.7.2: Volume of PPP used by crop

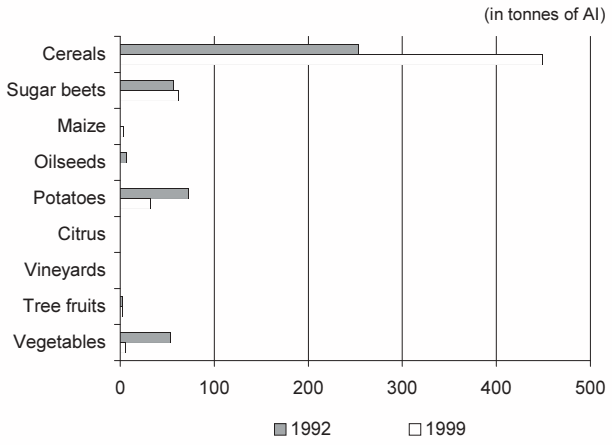
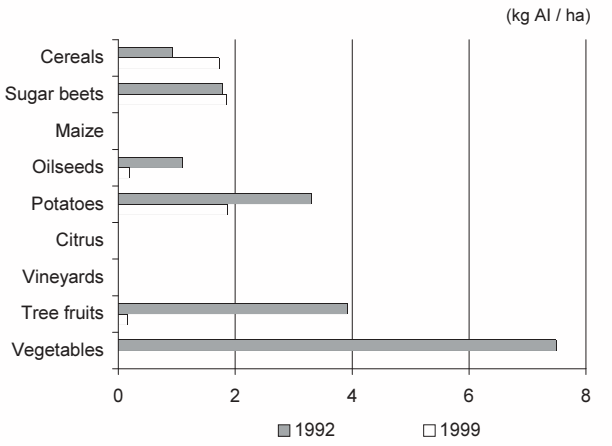


Fig 3.7.3: Dosage of PPP used by crop



3.8 Italy

In 1999 the crops included in this survey represented 59% (6,6 million ha) of the total crop area in Italy. Some major crop areas not considered are annual fodder crops, olives, nuts, soybeans and rice.

Figure 3.8.1 shows the trend in PPP used and composition in Italy from 1992 to 1999. Consumption seems to have clearly decreased from the peak year of 1997 onwards.

In 1999 fungicides dominated the volume balance (more than 82% of total PPP volume), due to the large amounts of sulphur in use. Herbicides represented 9% and insecticides 8% of the total volume of PPP used in the country, while growth regulators represented only 0,21% of the total volume used. A variation in the balance of the different types of pesticides occurred in 1997 and 1998 with herbicides recording a larger increase.

Vineyards (69%) and fruit trees (16%) are the key targets for PPPs, making up 85% of the total active ingredients by volume. Cereals, although accounting for 41,5% of the reference area, represent only 4,9% of the total active ingredient used by volume.

The calculated national average dosage rate is around 7,7 kg AI/ha. Cereals dosage rate is only 0,9 kg AI/ha. Vineyards and fruit trees display the largest use intensity with 38,8 and 30,3 kg AI/ha respectively (Fig 3.8.3).

As in many other European markets, plant protection is dominated by products to protect vines, sulphur accounts for the bulk (54,5%) of active ingredient volumes used in Italy, and 78,6% of active ingredient volumes used in vineyards. *Copper* is the second most important active ingredient used for vineyards, representing 14,7% of the total.

Fig 3.8.1: Use and composition of PPP - total

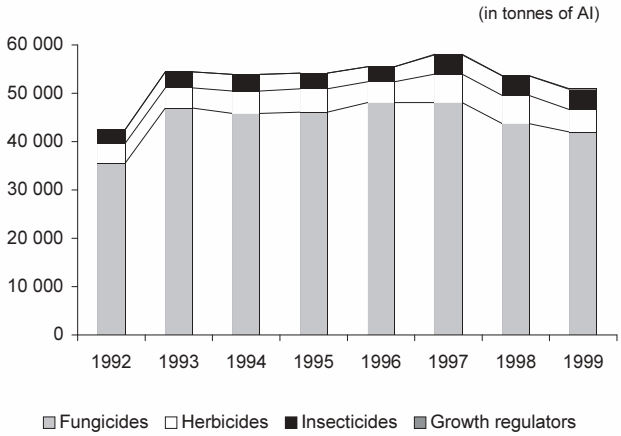


Fig 3.8.2: Volume of PPP used by crop

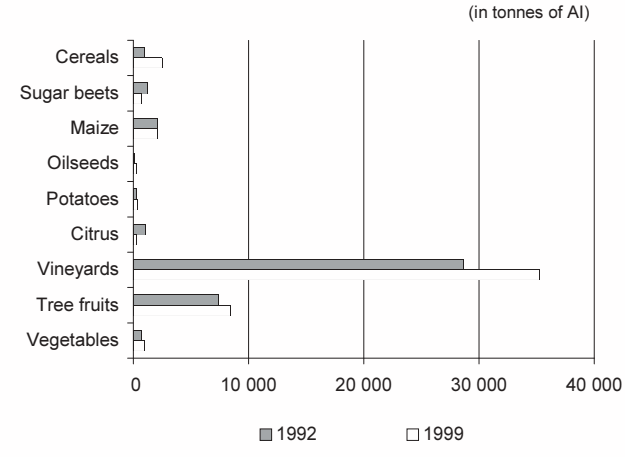
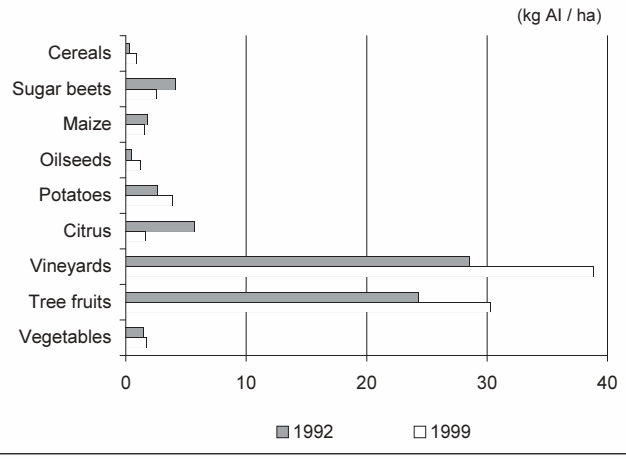


Fig 3.8.3: Dosage of PPP used by crop



3.9 The Netherlands

For the reference year 1999 the crops included in this survey represent 77% (808 000 ha) of the total crop areas in The Netherlands. The arable and permanent crop area does not include permanent pastures and grassland, nor have horticultural crop areas and crops under glass been considered in this study.

Figure 3.9.1 shows the trend in the use of pesticides in the period 1992-1999. The increase of consumption is observed in every PPP groups.

A clear increase of the use of pesticides from 1992 to 1997 (peak) is followed by a downward trend.

The proportion of fungicides in the volume balance is 50,6% and that of herbicides is 39%. Insecticides and growth regulators represent is respectively 9% and 1,34%.

Among the surveyed crops, potatoes account for 52,7% of the total volume used. Cereals, maize and sugar beets together account for 40% of active ingredient by volume.

The national average dosage rate, calculated over all crops, is 5 kg AI/ha for arable and permanent crops.

Tree fruits receive the most intensive treatment, reaching 20,8 kg AI/ha used over a growing season. The average dosage for potatoes is 12 kg AI/ha and 5 kg AI/ha for cereals (Fig. 3.9.3).

Crop potato fungicides are by far the leading product group used in The Netherlands. *Mancozeb*, *maneb* and *metiram* have been the leading active ingredients, representing 67% of active ingredients used on potatoes. *Atrazine* was the dominating herbicide applied to protect maize (35% of the total AI volume of plant protection products).

Fig 3.9.1: Use and composition of PPP - total

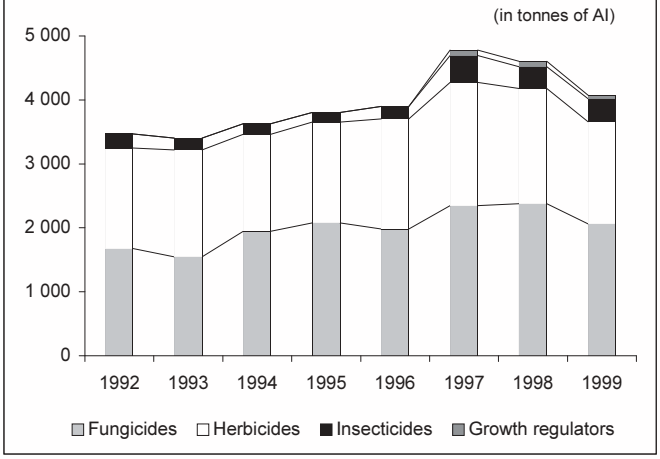


Fig 3.9.2: Volume of PPP used by crop

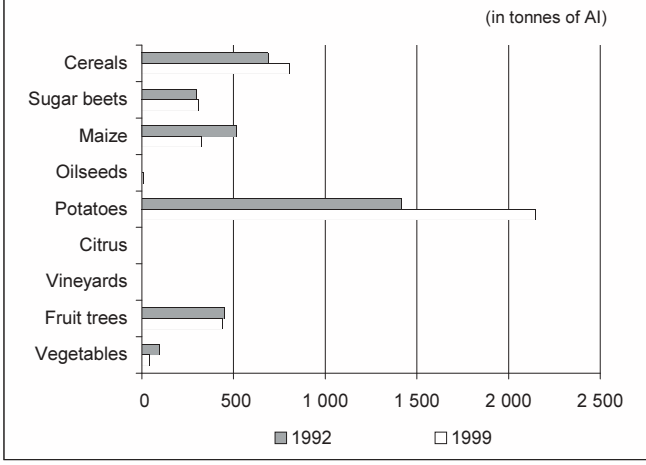
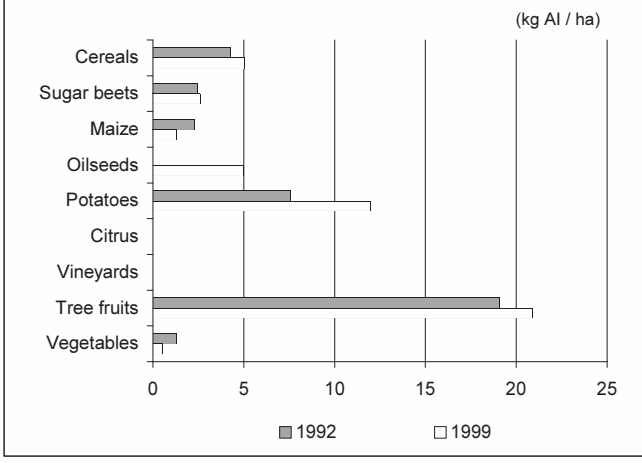


Fig 3.9.3: Dosage of PPP used by crop



3.10 Austria

In 1999 the crops reported in the PPP survey represent approximately 67% (1 million ha) The total area of arable land and permanent crops in Austria in 1999 was 1,5 million ha.

Figure 3.10.1 shows the trend in the volume of pesticides use from 1992 to 1999. A significantly lower use in 1996 was followed by a 'back to normal' situation in 1997, followed by a decrease.

Herbicides (52,1%) and fungicides (47,4%) represent the total volume of active ingredients. The proportion of total active ingredients of insecticides is very low, only 0,44%. No data are available on growth regulators for Austria.

The crop protection market is concentrated on four main crops: vineyards (36%), cereals (24%), maize (17%), and sugar beets (16%). These four segments make up 93% of the total active ingredient use by volume (Fig 3.10.3). While cereals an average of 1 kg AI was used per ha in 1999, vineyards received 12,3 kg of AI/ha, due to the high usage of *sulphur* for *powdery* and *downy mildew* control (33% of the total volume). Austrian agriculture has a high share of organic farming, and as these substances are classified as "natural" chemicals, allowing their use in organic production, this volume is expected to remain at a high level. Overall, a national average of 2,1 kg AI/ha was used in the crops included in the survey.

The decrease recorded in 1996 is primarily due to the reduced use of herbicides (*mainly mancozeb*) in that year. *Sulphur* is the major single active ingredient in compounds to treat vineyards and sugar beets. It accounted for 84% of the total fungicide use by volume in Austria.

Fig 3.10.1: Use and composition of PPP - total

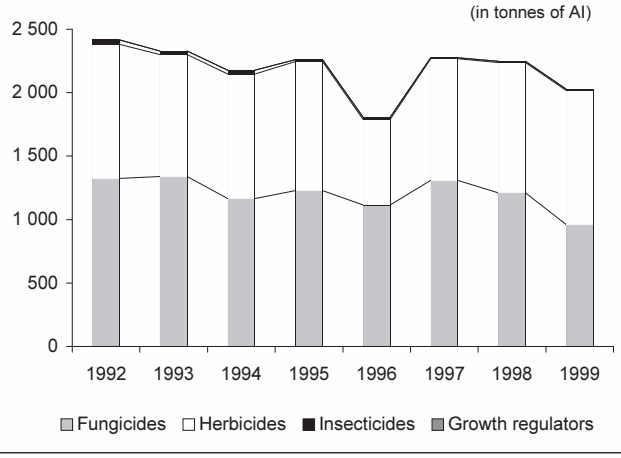


Fig 3.10.2: Volume of PPP used by crop

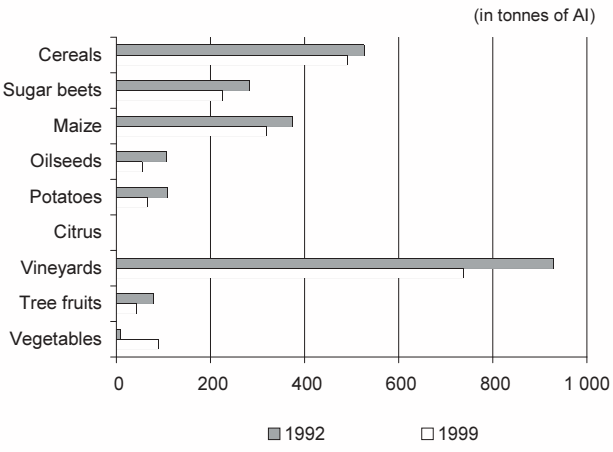
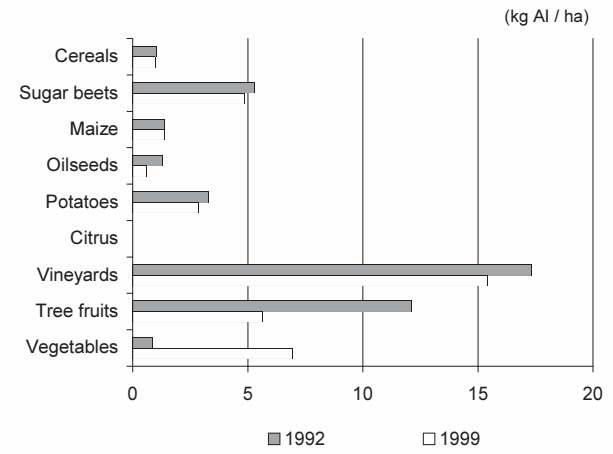


Fig 3.10.3: Dosage of PPP used by crop



3.11 Portugal

The crop area recorded in this survey represented 32% (935 000 ha) of the total arable and permanent crop area in Portugal in 1999. Cereals (29%), maize (29%), and vineyards (23%) account for 81% of the reference area. Olives, fodder crops or grassland were not considered.

Figure 3.11.1 shows the trend in pesticides use and composition between 1992 and 1999 followed by a decrease, mainly in the use of fungicides, while for insecticides an increase in use by volume was observed.

In 1999 the fungicide used, mainly sulphur, accounted for 67% of the total volume of active ingredient used in Portugal. Herbicides comprised 16% and insecticides represented 7% of the total. Vineyards accounted for 68% of the total active ingredients by volume used in Portugal. Cereals, maize, potatoes, tree fruits and vegetables accounted for 29%.

The average application rate calculated over all crops increased from 5,1 to 8,1 kg AI/ha in the report period. Vineyards and fruit trees display the most intensive use with 24,4 and 12,7 kg AI/ha respectively. Potatoes, citrus and vegetables are around 7 kg AI/ha (Fig 3.11.3). The increase in application rate was most significant in cereals and potatoes in the period 1992-1998; a reduction in use is recorded in the 3 last years of the reported period. Use in treating oilseeds, maize and vineyards also increased over the period. This extraordinary increase is apparently the result of the low use rate of fungicides in vineyards in 1992, the first year of this study, caused by severe dry weather conditions and low disease incidence.

The fungicides *sulphur* and *copper* and *glyphosate* for weed control are the leading active ingredients applied in vineyards.

Fig 3.11.1: Use and composition of PPP - total

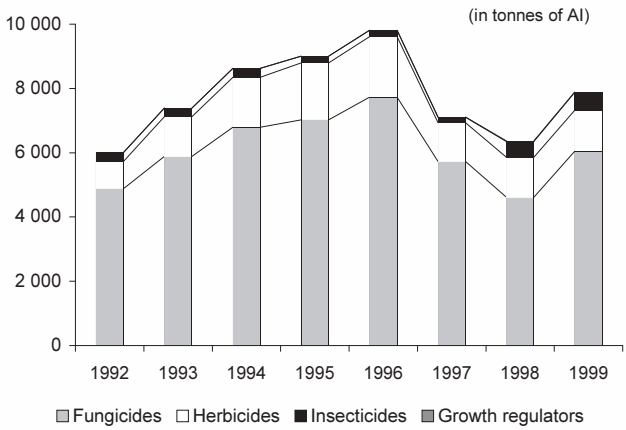


Fig 3.11.2: Volume of PPP used by crop

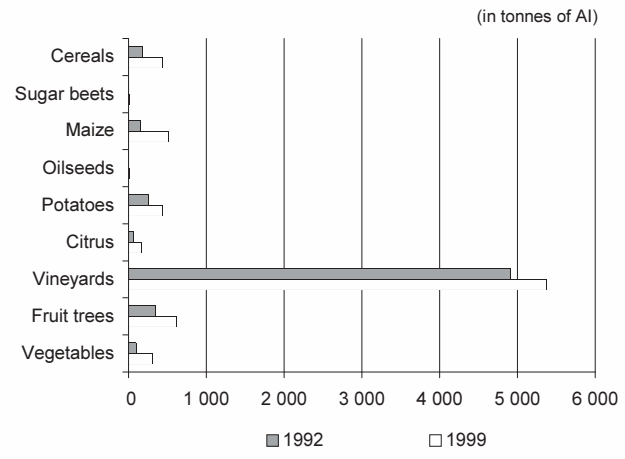
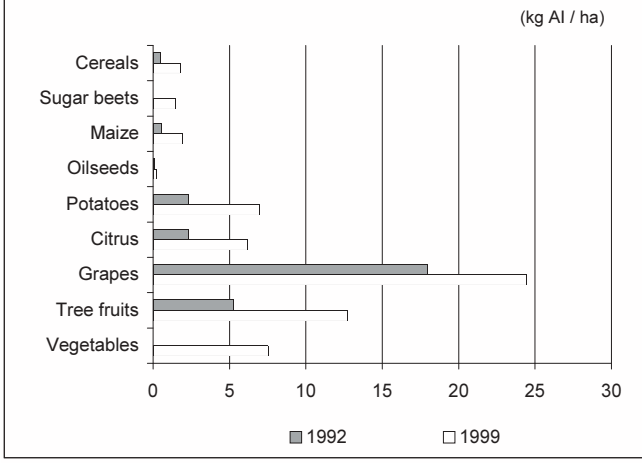


Fig 3.11.3: Dosage of PPP used by crop



3.12 Finland

In 1999 the crops included in this survey represented 36,6% (777 000 ha) of the total crop area in Finland. Cereals cover the 90% of the total area. Crops not considered in this study are temporary and permanent grassland, oats and other mixed grain and fodder crops.

Figure 3.12.1 shows the trend in plant protection products used and their composition from 1992 to 1999. The total figures of use by volume are low. However, consumption has considerably increased over the reported period with a peak in 1998. In 1999 there was a decrease in the volume of pesticides used.

In 1999 the proportion of herbicides dominated the balance with 85% of the total volume of active ingredients. Fungicides and insecticides are of lesser importance: their proportion of total active ingredient by volume is 4,6% and less than 1% respectively. The Finnish crop protection market is of minor importance as it represents 0,27% of the European Union market. Data have been available for growth regulators since 1997. In 1999 they represented 9% of the total active ingredient used in Finland.

Cereals (80%), sugar beets (10%) and potatoes (7%) account for 97% of the total active ingredient volume used in Finland. The key concern is weed control.

The total active ingredient used per ha of cultivated land is 0,8 kg/ha, which represent the EU-15 country with the lowest application rate per ha. The main target crop for active ingredient use per ha is oilseeds with 5,5 kg AI/ha (Fig 3.12.3).

The leading compounds to protect cereals are *glyphosate* for couch grass control after harvest or to clean up former set-aside areas and *MCPA* for broadleaf weed control.

Fig 3.12.1: Use and composition of PPP - total

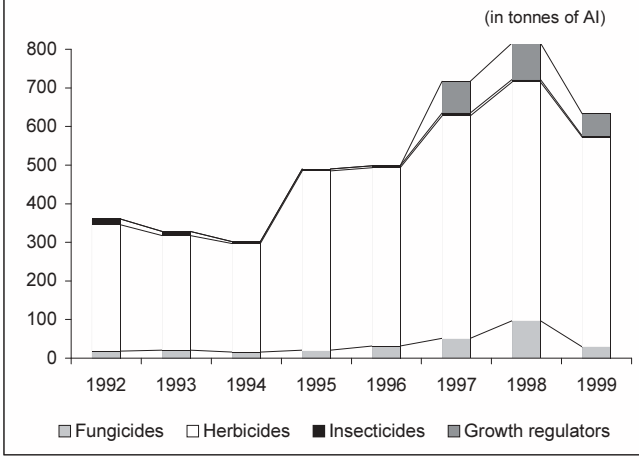


Fig 3.12.2: Volume of PPP used by crop

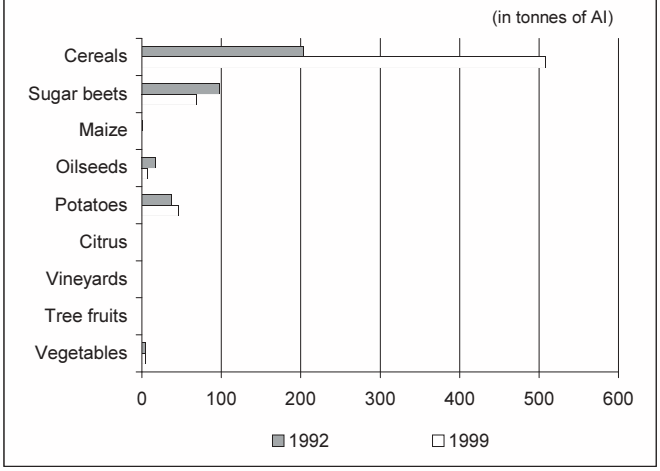
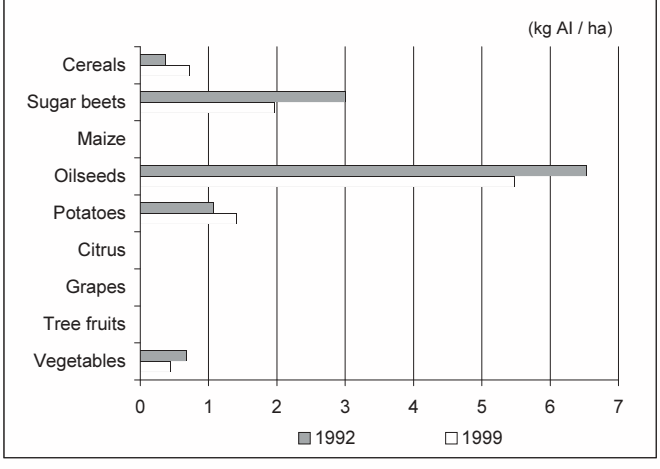


Fig 3.12.3: Dosage of PPP used by crop



3.13 Sweden

For the reference year 1999 the crop area included in this survey represent 33,6% (909 000 ha) of the total crop area in Sweden. The Swedish arable and permanent crop area includes substantial areas of temporary grazing and grassland. Excluding these crops as irrelevant for the usage of plant protection products, the reference area for this study is cereals 83%, sugar beet 6,6%, oilseeds - mainly rape - 5,6% and potatoes 3,6%. In Sweden 75% of the active ingredients sold are used in the wood industry, which has seen major use reductions since 1994, but which are not reflected in this study.

Fig 3.13.1 shows the trend in the use of pesticides in agriculture for the period 1992-1999. The reported data shows an increase of consumption in all pesticides groups. The herbicides proportion on the volume balance is 70%, the proportion of fungicides is 23%. Fungicides remain important, particularly for treatment of cereals, sugar beets and potatoes. The proportion of growth regulators is 5% of the total active ingredient used in Sweden.

Among the survey crops, cereals (59%), sugar beets (16%) and vegetables - mainly turnip rape - (14%) use 71% of the reported active ingredient volume used.

The national average dosage rate is 1,0 kg AI/ha, Sweden ranks among the countries with the lowest application rates per ha. Dosage rate for vegetables in 1995 was 18,9 kg AI/ha, falls to 6,2 kg AI/ha in 1999 (Fig. 3.13.3).

Glyphosate is the leading herbicide for treating cereals. It is used mainly for couch grass control after harvest. In potatoes, *mancozeb* is the major fungicides used for the control of *Phytophthora* root rot, *Fusarium sp.* and *Alternaria sp*. The most commonly used sugar beet herbicide is *metamitron*.

Fig 3.13.1: Use and composition of PPP - total

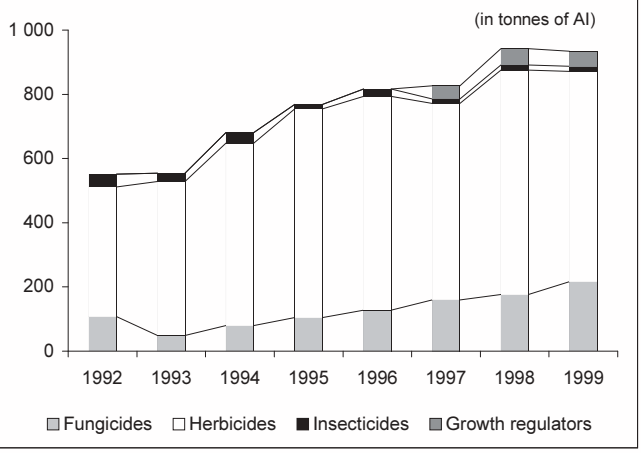


Fig 3.13.2: Volume of PPP used by crop

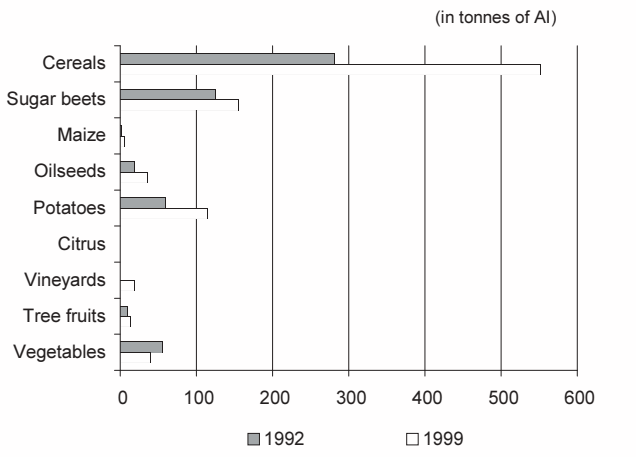
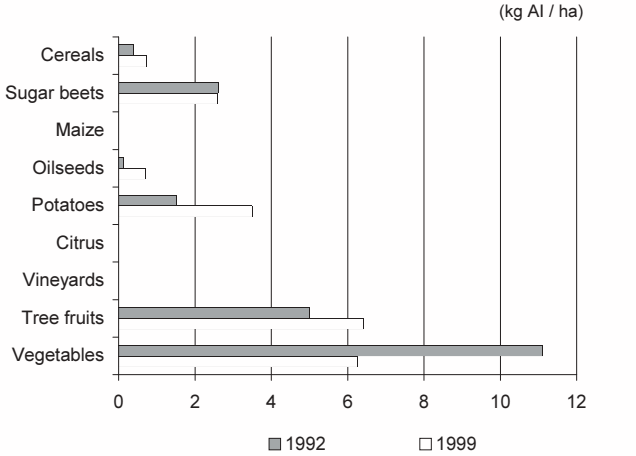


Fig 3.13.3: Dosage of PPP used by crop



3.14 United Kingdom

In 1999 the crops included in this survey corresponded to 65% (4 million ha) of the total crop area in United Kingdom. Cereals are by far the most important crops grown as they cover 74% of the reference area in this study. Green maize is becoming more popular as the area planted for silage and fodder maize.

Figure 3.14.1 shows the trend in the use of pesticides in the United Kingdom from 1992 to 1999. A continuous increase of consumption during the covered period is visible.

In 1999, the proportion of fungicides was 35%, of the total active ingredient used by volume, while the proportion of herbicides was 50%, insecticides 6% and growth regulators 8%.

With a national average application rate of 2,7 kg AI/ha, the UK is in line with other Member States growing mainly arable crops. Most intensive pesticides use is in potatoes (9,9 kg AI/ha) for *Phytophthora*, *Alternaria* and *Fusarium* control, in sugar beets (6,1 kg AI/ha) and in vegetables (3,5 kg AI/ha). Cereals account for 67% of the total AI volume used in the UK. Potatoes (16%), sugar beet (7%) and oilseeds - rape - (4%) together make up a 27% share of the total volume.

Weed control in cereals, sugar beet and oilseed rape is the main reason why herbicides account for 50% of total PPPs use. Fungicides are mostly used to protect cereals against powdery mildew and a variety of other leaf and ear diseases. Potato blight control (*Phytophthora*) and *Alternaria* control are indispensable for potato production. Insecticides are mainly used for aphid control in sugar beets, pulses, and other vegetable crops.

Isoproturon, *fenpropimorph* and *glyphosate* are the leading herbicides used in cereals. *Mancozeb* leads the ranking list in potatoes. In sugar beets, metamitron leads in herbicide use. *Atrazine* use has increased over the report period in areas of maize production. Chlormequat-chloride is the growth regulator used for treatment of cereals.

Fig 3.14.1: Use and composition of PPP - total

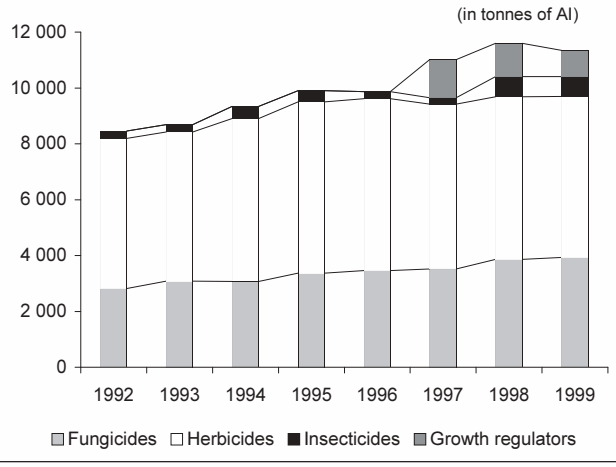


Fig 3.14.2: Volume of PPP used by crop

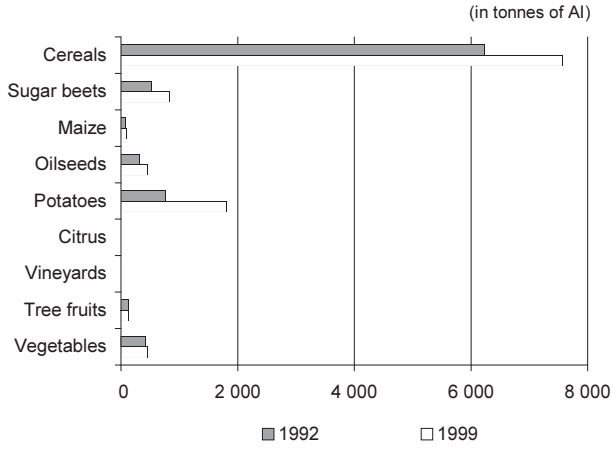
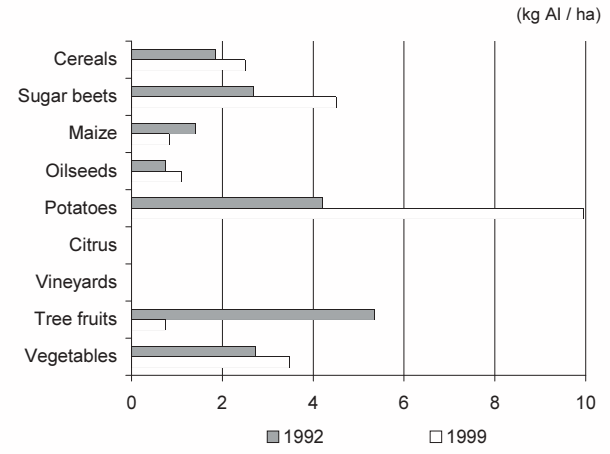


Fig 3.14.3: Dosage of PPP used by crop



Chapter 4
Detailed tables by country

Table 4.1.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	303	292	283	285	278	282	296	254
Sugar beets	101	99	95	99	98	96	94	101
Maize	168	173	189	193	209	219	210	223
Oilseeds	7	6	8	8	7	7	8	11
Potatoes	64	49	52	57	62	56	59	67
Citrus	-	-	-	-	-	-	-	-
Vineyards	1	1	1	1	1	1	1	1
Tree fruits	14	14	15	15	15	16	17	17
Vegetables	55	57	56	56	52	51	53	54
Total	**714**	**691**	**700**	**714**	**723**	**729**	**740**	**729**

Table 4.1.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1 106	899	854	1 041	989	1 148	1 197	967
Sugar beets	351	363	353	363	378	411	442	394
Maize	340	319	356	399	386	452	427	422
Oilseeds	1	3	3	3	2	1	0	0
Potatoes	690	685	799	767	589	440	515	428
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	0	0	0	9	17	17
Tree fruits	347	280	301	346	310	344	329	320
Vegetables	73	70	70	89	87	436	398	459
Total	**2 908**	**2 618**	**2 735**	**3 009**	**2 742**	**3 240**	**3 325**	**3 008**

Table 4.1.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	3.7	3.1	3.0	3.7	3.6	4.1	4.0	3.8
Sugar beets	3.5	3.7	3.7	3.7	3.9	4.3	4.7	3.9
Maize	2.0	1.8	1.9	2.1	1.8	2.1	2.0	1.9
Oilseeds	0.2	0.5	0.4	0.4	0.3	0.1	0.0	0.0
Potatoes	10.8	14.0	15.3	13.5	9.5	7.8	8.7	6.3
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	0.2	0.2	0.1	6.7	12.7	12.8
Tree fruits	24.9	19.4	20.1	23.0	20.2	21.8	19.4	18.7
Vegetables	1.3	1.2	1.2	1.6	1.7	8.5	7.5	8.5
Total	**4.1**	**3.8**	**3.9**	**4.2**	**3.8**	**4.4**	**4.5**	**4.1**

Table 4.1.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	81	77	94	89	104	108	87
Sugar beets	100	103	100	103	108	117	126	112
Maize	100	94	105	117	114	133	126	124
Oilseeds	100	237	242	238	170	49	25	11
Potatoes	100	99	116	111	85	64	75	62
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	100	81	87	100	89	99	95	92
Vegetables	100	95	95	121	119	594	542	625
Total	**100**	**90**	**94**	**103**	**94**	**111**	**114**	**103**

Table 4.1.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	38	34	31	35	36	35	36	32
Sugar beets	12	14	13	12	14	13	13	13
Maize	12	12	13	13	14	14	13	14
Oilseeds	0	0	0	0	0	0	0	0
Potatoes	24	26	29	26	21	14	15	14
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	0	0	0	0	1	1
Tree fruits	12	11	11	11	11	11	10	11
Vegetables	3	3	3	3	3	13	12	15
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.1.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	147	159	123
Glyphosate	H	64	70	54	111	94	107	133	123
Isoproturon	H	59	47	14	11	11	195	205	162
Mcpa	H	157	68	56	46	57	66	82	77
Sulphur	F	124	101	91	55	101	95	101	59
Others		702	611	639	817	726	537	517	423
Total		**1 106**	**899**	**854**	**1 041**	**989**	**1 148**	**1 197**	**967**

Table 4.1.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	:	1	1	18	17	43	41	43
Metamitron	H	152	146	131	132	148	123	133	102
Metolachlor	H	:	5	:	21	26	26	26	33
Phenmedipham	H	8	8	9	8	8	40	23	23
Others		c	c	c	c	c	c	c	c
Total		**351**	**363**	**353**	**363**	**378**	**411**	**442**	**394**

Table 4.1.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Atrazine	H	131	134	109	143	139	143	139	122
Bentazone	H	c	c	c	c	c	c	c	c
Dimethenamide	H	:	:	c	c	c	c	c	c
Metolachlor	H	41	30	39	26	33	55	77	71
Pyridate	H	50	50	40	38	40	36	31	35
Others		c	c	c	c	c	c	c	c
Total		**340**	**319**	**356**	**399**	**386**	**452**	**427**	**422**

Table 4.1.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alpha-cypermethrin	I	:	:	:	:	:	:	:	0
Carbendazim	F	0	:	:	:	0	0	:	:
Clopyralid	H	:	:	:	:	:	0	0	0
Cyfluthrin	I	c	c	c	c	c	:	:	c
Tebuconazole	F	0	:	:	:	:	0	0	0
Others		c	c	c	c	c	0	0	c
Total		**1**	**3**	**3**	**3**	**2**	**1**	**0**	**0**

Table 4.1.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Fentin	F	40	35	22	31	31	16	21	21
Mancozeb	F	156	128	236	252	157	193	243	187
Metiram	F	23	32	36	32	84	77	86	62
Metobromuron	H	26	18	16	20	19	14	14	22
Metoxuron	H	5	2	22	13	15	13	14	17
Others		439	471	467	419	284	128	137	118
Total		**690**	**685**	**799**	**767**	**589**	**440**	**515**	**428**

Table 4.1.11: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Captan	H	8	9	8	5	3	15	26	29
Simazine	F	71	46	38	43	64	78	88	74
Sulphur	F	44	36	53	52	69	77	60	60
Tebuconazole	F	17	19	25	25	26	31	32	32
Tolylfluanid	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**347**	**280**	**301**	**346**	**310**	**344**	**329**	**320**

Table 4.1.12: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorothalonil	F	:	:	:	5	:	0	23	28
Diquat	H	:	:	:	:	:	42	32	37
Prosulfocarb	H	:	:	:	:	:	c	c	c
Sulcotrione	H	:	:	:	:	:	c	c	c
Sulfosate	H	:	:	:	:	:	c	c	c
Others		73	70	70	84	87	79	71	62
Total		**73**	**70**	**70**	**89**	**87**	**436**	**398**	**459**

Table 4.2.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1 493	1 329	1 274	1 327	1 438	1 404	1 366	1 366
Sugar beets	65	66	66	68	70	69	66	63
Maize	20	26	31	37	42	43	47	48
Oilseeds	180	164	170	152	105	103	118	152
Potatoes	54	47	39	42	43	39	36	38
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	0	5	5	5	4	5	5	5
Vegetables	9	14	14	14	7	7	7	6
Total	**1 821**	**1 651**	**1 598**	**1 645**	**1 709**	**1 670**	**1 645**	**1 678**

Table 4.2.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1 341	1 397	1 689	1 710	1 601	1 254	1 228	1 060
Sugar beets	418	369	344	307	291	226	202	141
Maize	11	6	9	9	14	22	31	27
Oilseeds	93	49	42	50	82	59	65	101
Potatoes	516	378	307	313	345	149	128	181
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	18	27	62	45	47	57	50
Vegetables	467	502	265	333	294	258	696	376
Total	**2 846**	**2 719**	**2 683**	**2 784**	**2 672**	**2 015**	**2 407**	**1 936**

Table 4.2.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.9	1.1	1.3	1.3	1.1	0.9	0.9	0.8
Sugar beets	6.4	5.6	5.2	4.5	4.2	3.3	3.1	2.2
Maize	0.5	0.2	0.3	0.2	0.3	0.5	0.7	0.6
Oilseeds	0.5	0.3	0.2	0.3	0.8	0.6	0.6	0.7
Potatoes	9.6	8.1	7.9	7.4	8.0	3.8	3.6	4.8
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	3.8	5.8	13.3	11.5	9.9	11.9	10.4
Vegetables	53.6	35.0	18.5	23.2	42.7	37.4	95.1	65.4
Total	**1.6**	**1.6**	**1.7**	**1.7**	**1.6**	**1.2**	**1.5**	**1.2**

Table 4.2.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	104	126	128	119	93	92	79
Sugar beets	100	88	82	73	69	54	48	34
Maize	100	54	77	79	124	199	280	245
Oilseeds	100	53	46	54	89	63	70	109
Potatoes	100	73	59	61	67	29	25	35
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	-	-	-	-	-	-	-
Vegetables	100	107	57	71	63	55	149	80
Total	**100**	**96**	**94**	**98**	**94**	**71**	**85**	**68**

Table 4.2.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	47	51	63	61	60	62	51	55
Sugar beets	15	14	13	11	11	11	8	7
Maize	0	0	0	0	1	1	1	1
Oilseeds	3	2	2	2	3	3	3	5
Potatoes	18	14	11	11	13	7	5	9
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	1	1	2	2	2	2	3
Vegetables	16	18	10	12	11	13	29	19
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.2.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	110	106	124
Cholin-chloride	GR	:	:	:	:	:	38	35	39
Fenpropimorph	F	257	265	300	219	240	226	219	151
Glyphosate	H	334	286	377	397	315	235	287	236
Isoproturon	H	20	31	13	10	23	:	219	57
Others		730	815	998	1 084	1 023	647	362	453
Total		**1 341**	**1 397**	**1 689**	**1 710**	**1 601**	**1 254**	**1 228**	**1 060**

Table 4.2.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Desmedipham	H	:	:	c	c	c	c	c	c
Glyphosate	H	18	15	20	21	17	9	11	9
Imidacloprid	I	:	:	:	:	:	:	:	c
Metamitron	H	284	244	245	232	224	207	169	115
Phenmedipham	H	:	:	:	:	:	7	11	8
Others		c	c	c	c	c	c	c	c
Total		**418**	**369**	**344**	**307**	**291**	**226**	**202**	**141**

Table 4.2.8: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Propaquizafop	H	:	:	:	c	c	c	c	c
Propyzamide	H	:	:	:	:	10	18	18	13
Sulphur	F	63	:	:	:	39	38	38	67
Tau-fluvalinate	I	:	:	:	:	c	c	c	c
Tebuconazole	F	:	:	:	:	:	:	:	1
Others		30	49	42	c	c	c	c	c
Total		**93**	**49**	**42**	**50**	**82**	**59**	**65**	**101**

Table 4.2.9: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Aclonifen	H	:	:	:	:	:	:	c	c
Glufosinate-ammonium	H	:	:	:	:	:	c	c	c
Linuron	H	:	:	1	1	1	8	7	5
Mancozeb	F	28	33	26	22	263	21	5	153
Propamocarb	F	:	:	:	:	:	c	c	c
Others		488	345	280	290	81	c	99	4
Total		**516**	**378**	**307**	**313**	**345**	**149**	**128**	**181**

Table 4.2.10: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bitertanol	F	:	c	c	c	c	c	c	c
Captan	F	:	10	15	29	32	25	24	23
Malathion	I	:	:	:	:	:	:	4	3
Propineb	F	:	c	c	c	c	c	c	c
Propyzamide	H	:	:	:	:	:	2	2	2
Others		0	c	c	c	c	c	c	c
Total		**0**	**18**	**27**	**62**	**45**	**47**	**57**	**50**

Table 4.2.11: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alpha-cypermethrin	I	:	:	:	:	:	:	0	1
Bentazone	H	c	c	c	c	c	c	c	c
Mancozeb	F	:	:	:	:	:	186	246	144
MCPA	H	57	68	5	7	17	15	29	28
Pendimethalin	H	110	119	:	:	:	:	375	167
Others		c	c	c	c	c	c	c	c
Total		**467**	**502**	**265**	**333**	**294**	**258**	**696**	**376**

Table 4.3.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	5 006	4 595	4 504	4 687	4 803	4 994	4 983	4 811
Sugar beets	534	522	500	513	515	504	503	489
Maize	1 538	1 595	1 550	1 577	1 699	1 663	1 576	1 574
Oilseeds	1 066	1 088	1 246	1 026	897	948	1 041	1 231
Potatoes	361	312	293	315	336	304	297	309
Citrus	-	-	-	-	-	-	-	-
Vineyards	100	103	104	103	102	102	102	101
Tree fruits	55	55	55	55	55	50	50	50
Vegetables	82	77	78	84	90	89	90	93
Total	**8 743**	**8 348**	**8 331**	**8 361**	**8 498**	**8 653**	**8 643**	**8 658**

Table 4.3.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	10 527	9 962	9 186	10 513	10 329	10 749	13 151	11 336
Sugar beets	2 095	1 913	1 742	1 795	1 921	1 801	1 775	1 481
Maize	2 120	1 479	1 797	1 370	1 904	1 938	2 222	1 969
Oilseeds	1 165	761	967	1 136	1 070	1 283	1 456	1 567
Potatoes	1 944	1 700	1 272	1 456	1 641	1 782	1 995	1 923
Citrus	-	-	-	-	-	-	-	-
Vineyards	1 289	1 584	1 870	2 768	2 677	3 928	2 872	2 841
Tree fruits	814	700	521	953	671	894	523	636
Vegetables	105	130	94	124	146	48	77	201
Total	**20 059**	**18 227**	**17 449**	**20 115**	**20 358**	**22 422**	**24 070**	**21 953**

Table 4.3.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	2.1	2.2	2.0	2.2	2.2	2.2	2.6	2.4
Sugar beets	3.9	3.7	3.5	3.5	3.7	3.6	3.5	3.0
Maize	1.4	0.9	1.2	0.9	1.1	1.2	1.4	1.3
Oilseeds	1.1	0.7	0.8	1.1	1.2	1.4	1.4	1.3
Potatoes	5.4	5.4	4.3	4.6	4.9	5.9	6.7	6.2
Citrus	-	-	-	-	-	-	-	-
Vineyards	12.8	15.4	18.0	26.8	26.1	38.3	28.3	28.0
Tree fruits	14.8	12.7	9.4	17.3	12.2	18.0	10.5	12.8
Vegetables	1.3	1.7	1.2	1.5	1.6	0.5	0.9	2.2
Total	**2.3**	**2.2**	**2.1**	**2.4**	**2.4**	**2.6**	**2.8**	**2.5**

Table 4.3.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	95	87	100	98	102	125	108
Sugar beets	100	91	83	86	92	86	85	71
Maize	100	70	85	65	90	91	105	93
Oilseeds	100	65	83	98	92	110	125	134
Potatoes	100	87	65	75	84	92	103	99
Citrus	-	-	-	-	-	-	-	-
Vineyards	100	123	145	215	208	305	223	220
Tree fruits	100	86	64	117	82	110	64	78
Vegetables	100	123	89	118	139	45	73	191
Total	**100**	**91**	**87**	**100**	**101**	**112**	**120**	**109**

Table 4.3.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	52	55	53	52	51	48	55	52
Sugar beets	10	10	10	9	9	8	7	7
Maize	11	8	10	7	9	9	9	9
Oilseeds	6	4	6	6	5	6	6	7
Potatoes	10	9	7	7	8	8	8	9
Citrus	-	-	-	-	-	-	-	-
Vineyards	6	9	11	14	13	18	12	13
Fruit trees	4	4	3	5	3	4	2	3
Vegetables	1	1	1	1	1	0	0	1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.3.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	1 599	1 766	1 637
Dichlorprop-p	H	c	c	c	c	c	c	c	c
Fenpropimorph	F	900	488	581	899	783	411	359	501
Glyphosate	H	461	772	567	722	991	658	702	508
Isoproturon	H	2 612	2 454	2 473	2 678	2 580	2 286	3 511	2 466
Others		c	c	c	c	c	c	c	c
Total		**10 527**	**9 962**	**9 186**	**10 513**	**10 329**	**10 749**	**13 151**	**11 336**

Table 4.3.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	253	232	203	211	195	182	165	125
Glyphosate	H	26	44	43	46	55	110	117	85
Metamitron	H	1 181	1 080	897	1 010	1 148	913	933	827
Phenmedipham	H	154	113	119	122	109	99	113	78
Others		c	c	c	c	c	c	c	c
Total		**2 095**	**1 913**	**1 742**	**1 795**	**1 921**	**1 801**	**1 775**	**1 481**

Table 4.3.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Glyphosate	H	26	48	51	50	55	125	134	97
Metolachlor	H	224	181	241	217	431	476	525	536
Pyridate	H	305	205	245	238	415	356	318	265
Sulcotrione	H	:	:	:	:	c	c	c	c
Terbuthylazine	H	569	449	552	327	626	530	594	620
Others		996	595	707	537	c	c	c	c
Total		**2 120**	**1 479**	**1 797**	**1 370**	**1 904**	**1 938**	**2 222**	**1 969**

Table 4.3.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbetamide	H	:	:	:	:	:	127	95	78
Dimethachlor	H	c	c	c	:	:	c	c	c
Metazachlor	H	c	c	c	c	c	c	c	c
Quinmerac	H	:	:	c	c	c	c	c	c
Tebuconazole	F	33	14	22	:	44	:	:	109
Others		c	c	499	c	c	293	406	440
Total		**1 165**	**761**	**967**	**1 136**	**1 070**	**1 283**	**1 456**	**1 567**

Table 4.3.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Ioxynil	H	:	:	:	:	:	0	:	103
Mancozeb	F	273	254	244	284	348	847	998	884
Metiram	F	256	258	97	108	154	122	124	123
Propamocarb	F	:	:	c	:	c	c	c	c
Propineb	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**1 944**	**1 700**	**1 272**	**1 456**	**1 641**	**1 782**	**1 995**	**1 923**

Table 4.3.11: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Glyphosate	H	32	42	115	88	63	79	83	62
Mancozeb	F	38	45	38	203	9	13	:	62
Metiram	F	:	:	246	272	298	285	291	289
Propineb	F	c	c	c	c	c	c	c	c
Sulphur	F	645	918	1 036	1 498	1 559	2 794	1 994	1 907
Others		c	c	c	c	c	c	c	c
Total		**1 289**	**1 584**	**1 870**	**2 768**	**2 677**	**3 928**	**2 872**	**2 841**

Table 4.3.12: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Captan	F	446	290	34	22	89	:	27	33
Dichlofluanid	F	55	67	45	105	126	130	75	83
Dithianon	F	49	44	14	28	30	59	57	44
Glyphosate	H	:	:	36	19	:	47	50	36
Sulphur	F	136	142	236	323	260	438	114	298
Others		128	157	156	457	165	220	200	141
Total		**814**	**700**	**521**	**953**	**671**	**894**	**523**	**636**

Table 4.3.13: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
2,4-D	H	:	:	:	:	:	1	1	2
Bentazone	H	c	c	:	:	c	c	c	c
Dimethoate	I	3	2	:	:	1	2	3	9
Pendimethalin	H	10	9	:	:	:	:	:	87
Vinclozolin	F	c	c	:	:	:	c	c	c
Others		c	c	94	124	c	c	c	c
Total		**105**	**130**	**94**	**124**	**146**	**48**	**77**	**201**

Table 4.4.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1 119	1 079	1 065	990	1 003	983	970	987
Sugar beets	50	46	40	42	40	53	36	39
Maize	214	198	198	163	213	229	239	217
Oilseeds	14	18	20	22	24	25	35	30
Potatoes	51	40	47	52	50	48	38	48
Citrus	57	58	58	58	58	59	59	60
Vineyards	147	144	138	136	132	129	129	128
Tree fruits	85	86	87	86	80	80	79	81
Vegetables	132	129	130	133	134	132	134	134
Total	**1 869**	**1 798**	**1 783**	**1 683**	**1 734**	**1 737**	**1 720**	**1 724**

Table 4.4.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	166	154	162	191	204	460	909	778
Sugar beets	267	248	241	461	501	660	830	420
Maize	274	258	232	201	277	189	247	166
Oilseeds	-	-	1	-	-	-	-	-
Potatoes	232	197	206	207	229	227	331	319
Citrus	110	99	105	119	121	78	76	64
Vineyards	9 894	10 195	10 198	10 213	10 246	10 170	10 235	10 475
Tree fruits	512	483	535	508	524	448	625	428
Vegetables	94	96	96	102	116	55	49	46
Total	**11 550**	**11 731**	**11 776**	**12 001**	**12 218**	**12 287**	**13 302**	**12 696**

Table 4.4.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.1	0.1	0.2	0.2	0.2	0.5	0.9	0.8
Sugar beets	5.3	5.4	6.0	10.9	12.4	12.4	22.9	10.8
Maize	1.3	1.3	1.2	1.2	1.3	0.8	1.0	0.8
Oilseeds	-	-	0.0	-	-	-	-	-
Potatoes	4.5	4.9	4.4	4.0	4.6	4.8	8.8	6.7
Citrus	1.9	1.7	1.8	2.0	2.1	1.3	1.3	1.1
Vineyards	67.5	70.6	73.7	75.1	77.4	78.6	79.1	81.7
Tree fruits	6.0	5.6	6.2	5.9	6.6	5.6	7.9	5.3
Vegetables	0.7	0.7	0.7	0.8	0.9	0.4	0.4	0.3
Total	**6.2**	**6.5**	**6.6**	**7.1**	**7.0**	**7.1**	**7.7**	**7.4**

Table 4.4.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	93	97	115	123	277	547	468
Sugar beets	100	93	90	173	188	247	311	157
Maize	100	94	85	73	101	69	90	60
Oilseeds	-	-	-	-	-	-	-	-
Potatoes	100	85	89	89	99	98	143	138
Citrus	100	90	96	108	110	71	69	58
Vineyards	100	103	103	103	104	103	103	106
Tree fruits	100	94	104	99	102	87	122	84
Vegetables	100	102	101	108	123	58	51	49
Total	**100**	**102**	**102**	**104**	**106**	**106**	**115**	**110**

Table 4.4.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1	1	1	2	2	4	7	6
Sugar beets	2	2	2	4	4	5	6	3
Maize	2	2	2	2	2	2	2	1
Oilseeds	-	-	0	-	-	-	-	-
Potatoes	2	2	2	2	2	2	2	3
Citrus	1	1	1	1	1	1	1	1
Vineyards	86	87	87	85	84	83	77	83
Tree fruits	4	4	5	4	4	4	5	3
Vegetables	1	1	1	1	1	0	0	0
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.4.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Fosetyl	F	:	:	:	:	:	:	60	45
Glyphosate	H	28	32	39	51	47	107	103	95
Mancozeb	F	2	1	1	1	10	36	54	52
Propineb	F	c	c	c	c	c	c	c	c
Sulphur	F	4	4	4	3	3	10	5	94
Others		c	c	c	c	c	c	c	c
Total		**166**	**154**	**162**	**191**	**204**	**460**	**909**	**778**

Table 4.4.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	:	:	:	:	:	c	c	c
Ethofumesate	H	10	10	11	13	6	5	8	4
Metamitron	H	53	44	44	32	36	48	27	25
Metolachlor	H	18	22	18	16	19	20	22	19
Sulphur	F	120	120	120	360	354	509	664	354
Others		67	53	49	40	86	c	c	c
Total		**267**	**248**	**241**	**461**	**501**	**660**	**830**	**420**

Table 4.4.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alachlor	H	95	74	55	53	86	:	56	28
Atrazine	H	86	88	93	80	96	87	77	55
Chlorpyrifos	I	6	6	6	6	6	8	9	9
Metolachlor	H	76	81	68	50	54	54	53	39
Terbufos	I	:	:	:	:	:	29	27	22
Others		11	8	10	12	34	11	24	12
Total		**274**	**258**	**232**	**201**	**277**	**189**	**247**	**166**

Table 4.4.9: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	10	10	10	10	10	13	15	15
Copper	F	7	6	6	4	6	59	61	55
Ethoprophos	I	:	:	:	:	:	:	c	c
Mancozeb	F	17	12	15	11	15	67	76	112
Propineb	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**232**	**197**	**206**	**207**	**229**	**227**	**331**	**319**

Table 4.4.10: Top 5 active ingredients applied to citrus crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	4	4	4	4	4	5	6	6
Glyphosate	H	35	40	49	67	61	45	38	29
Mancozeb	F	:	:	:	:	5	7	7	7
Methidathion	I	c	c	c	c	c	c	c	c
Picloram	H	:	:	:	:	:	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**110**	**99**	**105**	**119**	**121**	**78**	**76**	**64**

Table 4.4.11: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	29	26	5	6	7	223	237	225
Glyphosate	H	54	58	71	98	86	63	51	44
Mancozeb	F	27	22	16	15	17	24	24	32
Propineb	F	c	c	c	c	c	c	c	c
Sulphur	F	9 276	9 658	9 667	9 672	9 676	9 710	9 692	9 999
Others		c	c	c	c	c	c	c	c
Total		**9 894**	**10 195**	**10 198**	**10 213**	**10 246**	**10 170**	**10 235**	**10 475**

Table 4.4.12: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	20	20	20	20	20	25	30	30
Copper	F	48	40	40	40	45	85	107	78
Glyphosate	H	2	2	2	2	2	59	51	43
Sulphur	F	72	87	92	86	77	66	76	66
Ziram	F	73	75	75	56	50	49	75	30
Others		297	259	306	305	331	164	286	181
Total		**512**	**483**	**535**	**508**	**524**	**448**	**625**	**428**

Table 4.4.13: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	3	2	2	1	1	6	5	5
Mancozeb	F	7	7	6	6	6	16	11	9
Maneb	F	14	11	12	11	13	6	6	5
Methomyl	I	12	11	11	10	12	14	15	16
Oxamyl	I	:	:	:	:	:	c	c	c
Others		58	65	64	73	85	c	c	c
Total		**94**	**96**	**96**	**102**	**116**	**55**	**49**	**46**

Table 4.5.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	6 355	5 571	5 510	5 682	5 585	5 761	5 448	5 576
Sugar beets	163	180	183	172	157	158	150	135
Maize	512	386	457	462	544	592	548	478
Oilseeds	1 465	2 154	1 424	1 199	1 196	1 071	1 094	898
Potatoes	257	208	201	206	180	150	134	136
Citrus	268	270	268	272	276	284	286	288
Vineyards	1 405	1 280	1 233	1 196	1 164	1 161	1 165	1 166
Tree fruits	233	234	234	231	225	226	222	234
Vegetables	454	426	423	391	390	396	389	395
Total	**11 112**	**10 710**	**9 933**	**9 811**	**9 716**	**9 798**	**9 435**	**9 306**

Table 4.5.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	3 021	1 660	1 897	2 010	2 334	5 267	5 245	6 575
Sugar beets	354	391	474	557	650	911	1 116	772
Maize	370	239	347	377	489	747	861	961
Oilseeds	183	241	247	219	176	113	124	192
Potatoes	284	231	307	380	416	829	2 517	723
Citrus	1 620	1 465	2 755	2 423	2 216	2 194	1 836	2 028
Vineyards	20 608	19 412	17 696	16 203	16 412	16 081	15 909	16 046
Tree fruits	1 926	1 882	1 960	2 005	1 970	1 750	1 321	1 353
Vegetables	1 156	2 369	1 695	1 687	1 808	2 820	2 210	2 959
Total	**29 521**	**27 888**	**27 378**	**25 861**	**26 470**	**30 712**	**31 139**	**31 609**

Table 4.5.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.5	0.3	0.3	0.4	0.4	0.9	1.0	1.2
Sugar beets	2.2	2.2	2.6	3.2	4.1	5.8	7.5	5.7
Maize	0.7	0.6	0.8	0.8	0.9	1.3	1.6	2.0
Oilseeds	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2
Potatoes	1.1	1.1	1.5	1.8	2.3	5.5	18.9	5.3
Citrus	6.1	5.4	10.3	8.9	8.0	7.7	6.4	7.0
Vineyards	14.7	15.2	14.4	13.5	14.1	13.8	13.7	13.8
Tree fruits	8.3	8.0	8.4	8.7	8.7	7.7	5.9	5.8
Vegetables	2.5	5.6	4.0	4.3	4.6	7.1	5.7	7.5
Total	**2.7**	**2.6**	**2.8**	**2.6**	**2.7**	**3.1**	**3.3**	**3.4**

Table 4.5.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	55	63	67	77	174	174	218
Sugar beets	100	110	134	157	183	257	315	218
Maize	100	65	94	102	132	202	233	260
Oilseeds	100	132	135	120	96	62	68	105
Potatoes	100	81	108	134	147	292	886	255
Citrus	100	90	170	150	137	135	113	125
Vineyards	100	94	86	79	80	78	77	78
Tree fruits	100	98	102	104	102	91	69	70
Vegetables	100	205	147	146	156	244	191	256
Total	**100**	**94**	**93**	**88**	**90**	**104**	**105**	**107**

Table 4.5.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	10	6	7	8	9	17	17	21
Sugar beets	1	1	2	2	2	3	4	2
Maize	1	1	1	1	2	2	3	3
Oilseeds	1	1	1	1	1	0	0	1
Potatoes	1	1	1	1	2	3	8	2
Citrus	5	5	10	9	8	7	6	6
Vineyards	70	70	65	63	62	52	51	51
Tree fruits	7	7	7	8	7	6	4	4
Vegetables	4	8	6	7	7	9	7	9
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.5.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
2,4-D	H	95	171	163	161	233	459	433	532
Chlorotoluron	H	620	536	556	513	520	496	457	492
Dichloropropene	I	:	:	:	:	:	c	c	c
Glyphosate	H	178	202	210	218	284	352	457	483
Sulphur	F	1 418	103	109	117	230	221	225	280
Others		709	647	858	1 002	1 068	c	c	c
Total		**3 021**	**1 660**	**1 897**	**2 010**	**2 334**	**5 267**	**5 245**	**6 575**

Table 4.5.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	31	32	34	25	34	38	42	32
Lenacil	H	19	20	21	22	26	17	20	21
Metamitron	H	84	104	119	122	123	120	126	89
Sulphur	F	72	79	114	224	306	540	743	433
Others		c	c	c	c	c	c	c	c
Total		**354**	**391**	**474**	**557**	**650**	**911**	**1 116**	**772**

Table 4.5.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Acetochlor	H	:	:	:	c	:	c	c	c
Alachlor	H	:	:	:	:	:	200	246	331
Atrazine	H	139	90	136	149	204	220	259	275
Chlorpyrifos	I	:	2	3	3	5	24	27	32
Metolachlor	H	102	75	117	141	168	181	194	153
Others		130	71	91	c	112	c	c	c
Total		**370**	**239**	**347**	**377**	**489**	**747**	**861**	**961**

Table 4.5.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	:	:	:	:	:	:	:	:
Diuron	H	:	:	:	:	:	:	:	11
Pendimethalin	H	:	:	0	1	0	8	18	35
Propineb	F	:	:	:	:	:	:	:	c
Terbutryne	H	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**183**	**241**	**247**	**219**	**176**	**113**	**124**	**192**

Table 4.5.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	7	6	6	6	11	35	40	39
Dichloropropene	I	:	:	:	:	:	c	c	c
Disulfoton	I		:	:	:	c	c	c	c
Fosetyl	F	:	:	:	:	:	21	23	22
Mancozeb	F	104	78	131	160	185	169	147	104
Others		97	72	125	154	c	c	c	c
Total		**284**	**231**	**307**	**380**	**416**	**829**	**2 517**	**723**

Table 4.5.11: Top 5 active ingredients applied to citrus crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	21	39	53	45	43	127	156	492
Fosetyl	F	48	34	47	53	71	269	121	171
Glyphosate	H	313	371	384	375	464	1 199	938	677
Methidathion	I	c	c	c	c	c	c	c	c
Simazine	H	33	32	30	22	31	41	52	65
Others		c	c	c	c	c	c	c	c
Total		**1 620**	**1 465**	**2 755**	**2 423**	**2 216**	**2 194**	**1 836**	**2 028**

Table 4.5.12: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	:	5	7	8	10	54	63	91
Copper	F	48	45	45	44	63	245	238	312
Dichloropropene	I	:	:	:	:	:	c	c	c
Glyphosate	H	104	124	133	128	156	182	235	277
Sulphur	F	19 714	18 585	16 925	15 438	15 466	14 818	14 568	14 501
Others		742	653	586	585	716	c	c	c
Total		**20 608**	**19 412**	**17 696**	**16 203**	**16 412**	**16 081**	**15 909**	**16 046**

Table 4.5.13: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	95	82	82	83	69	272	222	309
Dichloropropene	I	:	:	:	:	:	c	:	c
Fosetyl	F	48	34	47	53	71	36	19	44
Glyphosate	H	:	0	1	1	1	24	44	56
Sulphur	F	528	600	652	611	607	772	614	573
Others		1 255	1 165	1 178	1 256	1 222	c	421	c
Total		**1 926**	**1 882**	**1 960**	**2 005**	**1 970**	**1 750**	**1 321**	**1 353**

Table 4.5.14: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	2	2	2	2	5	60	108	91
Dichloropropene	I	:	:	:	:	:	c	c	c
Diquat	H	16	22	30	31	39	:	92	57
Mancozeb	F	63	64	65	70	77	106	108	121
Sulphur	F	797	2 038	1 338	1 315	1 298	1 042	786	745
Others		278	244	261	269	389	c	c	c
Total		**1 156**	**2 369**	**1 695**	**1 687**	**1 808**	**2 820**	**2 210**	**2 959**

Table 4.6.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	6 882	6 136	5 980	6 132	6 573	6 800	6 866	6 607
Sugar beets	461	441	437	458	461	462	456	436
Maize	3 392	3 333	3 138	3 207	3 307	3 335	3 258	3 105
Oilseeds	1 644	1 336	1 657	1 827	1 766	1 863	1 927	2 170
Potatoes	184	164	166	172	175	170	164	164
Citrus	3	3	3	3	3	3	3	2
Vineyards	948	940	933	927	917	914	913	873
Tree fruits	182	182	180	172	168	163	157	154
Vegetables	331	314	317	325	321	313	315	300
Total	**14 026**	**12 850**	**12 811**	**13 223**	**13 691**	**14 023**	**14 060**	**13 812**

Table 4.6.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	12 459	10 184	9 688	11 031	11 397	18 463	20 395	19 210
Sugar beets	1 975	1 812	1 613	1 911	2 104	2 105	1 938	1 848
Maize	5 756	5 016	4 949	6 497	5 982	8 643	9 117	9 473
Oilseeds	1 770	1 157	1 568	2 146	2 366	4 071	6 624	5 500
Potatoes	1 837	1 748	1 769	1 847	1 905	1 627	1 659	1 726
Citrus	7	7	9	10	11	-	-	-
Vineyards	31 899	37 805	29 676	40 531	39 758	45 649	42 743	40 835
Tree fruits	4 341	5 140	5 339	5 872	5 082	4 586	4 310	3 264
Vegetables	2 673	2 491	2 230	2 380	2 458	933	858	955
Total	**62 717**	**65 360**	**56 842**	**72 227**	**71 063**	**86 078**	**87 643**	**82 811**

Table 4.6.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1.8	1.7	1.6	1.8	1.7	2.7	3.0	2.9
Sugar beets	4.3	4.1	3.7	4.2	4.6	4.6	4.2	4.2
Maize	1.7	1.5	1.6	2.0	1.8	2.6	2.8	3.1
Oilseeds	1.1	0.9	0.9	1.2	1.3	2.2	3.4	2.5
Potatoes	10.0	10.6	10.7	10.8	10.9	9.6	10.1	10.5
Citrus	2.6	2.6	3.1	3.6	3.7	-	-	-
Vineyards	33.6	40.2	31.8	43.7	43.4	49.9	46.8	46.8
Tree fruits	23.9	28.2	29.6	34.1	30.3	28.2	27.4	21.2
Vegetables	8.1	7.9	7.0	7.3	7.7	3.0	2.7	3.2
Total	**4.5**	**5.1**	**4.4**	**5.5**	**5.2**	**6.1**	**6.2**	**6.0**

Table 4.6.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	82	78	89	91	148	164	154
Sugar beets	100	92	82	97	107	107	98	94
Maize	100	87	86	113	104	150	158	165
Oilseeds	100	65	89	121	134	230	374	311
Potatoes	100	95	96	101	104	89	90	94
Citrus	100	104	119	144	156	-	-	-
Vineyards	100	119	93	127	125	143	134	128
Tree fruits	100	118	123	135	117	106	99	75
Vegetables	100	93	83	89	92	35	32	36
Total	**100**	**104**	**91**	**115**	**113**	**137**	**140**	**132**

Table 4.6.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	20	16	17	15	16	21	23	23
Sugar beets	3	3	3	3	3	2	2	2
Maize	9	8	9	9	8	10	10	11
Oilseeds	3	2	3	3	3	5	8	7
Potatoes	3	3	3	3	3	2	2	2
Citrus	0	0	0	0	0	-	-	-
Vineyards	51	58	52	56	56	53	49	49
Tree fruits	7	8	9	8	7	5	5	4
Vegetables	4	4	4	3	3	1	1	1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.6.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	2 467	3 063	2 950
Dichloropropene	I	:	:	:	:	:	c	c	c
Glyphosate	H	1 026	1 102	1 314	1 645	1 845	1 640	2 003	1 958
Isoproturon	H	1 048	842	780	800	1 017	2 171	2 263	1 893
Sulphur	F	716	235	310	180	258	975	1 672	849
Others		9 669	8 006	7 284	8 406	8 277	c	c	c
Total		**12 459**	**10 184**	**9 688**	**11 031**	**11 397**	**18 463**	**20 395**	**19 210**

Table 4.6.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	96	86	71	80	60	77	71	88
Glyphosate	H	57	61	73	91	102	160	205	206
Metamitron	H	662	590	481	492	490	499	464	357
Sulphur	F	424	424	372	515	686	631	577	470
Others		c	c	c	c	c	c	c	c
Total		**1 975**	**1 812**	**1 613**	**1 911**	**2 104**	**2 105**	**1 938**	**1 848**

Table 4.6.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alachlor	H	50	53	71	96	80	2 441	3 125	3 622
Atrazine	H	3 009	2 845	2 737	3 701	3 057	2 755	2 415	2 005
Dimethenamide	H	:	:	c	c	c	c	c	c
Glyphosate	H	57	61	73	91	102	680	924	979
Metolachlor	H	710	638	724	882	966	902	855	947
Others		1 931	1 418	c	c	c	c	c	c
Total		**5 756**	**5 016**	**4 949**	**6 497**	**5 982**	**8 643**	**9 117**	**9 473**

Table 4.6.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Aclonifen	H	:	:	:	:	:	c	c	c
Metazachlor	H	c	c	c	c	c	c	c	c
Metolachlor	H	208	109	121	139	126	183	241	235
Tebutam	H	c	c	c	c	c	c	c	c
Trifluralin	H	:	:	:	:	:	600	2 909	1 491
Others		c	c	c	c	c	1 053	1 028	1 067
Total		**1 770**	**1 157**	**1 568**	**2 146**	**2 366**	**4 071**	**6 624**	**5 500**

Table 4.6.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Dichloropropene	I	:	:	:	:	:	:	:	c
Mancozeb	F	1 141	896	876	804	810	998	1 227	1 098
Maneb	F	77	179	168	159	156	258	123	187
Metobromuron	H	4	7	7	10	11	26	19	55
Propineb	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**1 837**	**1 748**	**1 769**	**1 847**	**1 905**	**1 627**	**1 659**	**1 726**

Table 4.6.11: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Dichloropropene	I	:	:	:	:	:	c	c	c
Folpet	F	1 838	2 353	2 342	1 943	1 958	2 318	2 106	2 272
Fosetyl	F	1 249	2 319	2 378	2 484	2 214	2 288	2 150	2 161
Mancozeb	F	1 815	2 104	1 490	1 832	1 881	1 665	1 826	1 190
Sulphur	F	21 788	25 967	18 625	28 714	28 109	31 847	29 088	26 338
Others		5 208	5 062	4 841	5 558	5 597	c	c	c
Total		**31 899**	**37 805**	**29 676**	**40 531**	**39 758**	**45 649**	**42 743**	**40 835**

Table 4.6.12: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Captan	F	359	536	615	818	602	375	378	265
Mancozeb	F	402	576	365	346	178	168	310	192
Mineral oil	I	c	c	c	c	c	c	c	c
Sulphur	F	1 781	1 951	2 069	2 357	2 241	2 172	1 909	1 196
Thiram	F	187	162	123	141	:	240	179	187
Others		c	c	c	c	c	c	c	c
Total		**4 341**	**5 140**	**5 339**	**5 872**	**5 082**	**4 586**	**4 310**	**3 264**

Table 4.6.13: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bentazone	H	c	c	c	c	c	c	c	c
Chlorothalonil	F	133	172	222	158	114	87	49	145
Dichloropropene	I	:	:	:	:	:	c	c	c
Pendimethalin	H	5	5	4	3	1	148	148	153
Sulphur	F	1 295	1 469	1 311	1 483	1 470	105	108	102
Others		c	c	c	c	c	c	c	c
Total		**2 673**	**2 491**	**2 230**	**2 380**	**2 458**	**933**	**858**	**955**

Table 4.7.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	275	260	244	249	267	284	275	260
Sugar beets	31	32	35	35	32	32	33	34
Maize	0	0	0	0	0	0	0	0
Oilseeds	6	3	6	4	3	4	6	3
Potatoes	22	22	21	22	24	18	18	17
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	1	-	-	-	-	-	-	12
Vegetables	7	-	-	-	-	-	-	-
Total	**342**	**317**	**307**	**311**	**327**	**339**	**332**	**326**

Table 4.7.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	254	198	216	288	286	748	500	449
Sugar beets	56	14	19	19	17	82	76	62
Maize	-	-	-	5	6	6	3	4
Oilseeds	7	8	5	4	5	6	1	0
Potatoes	73	48	58	45	50	61	32	33
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	2	2	4	3	3	0	1	2
Vegetables	53	59	62	66	68	8	6	5
Total	**445**	**328**	**364**	**431**	**435**	**910**	**618**	**556**

Table 4.7.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.9	0.8	0.9	1.2	1.1	2.6	1.8	1.7
Sugar beets	1.8	0.4	0.5	0.5	0.5	2.5	2.3	1.8
Maize	-	-	-	-	-	-	-	-
Oilseeds	1.1	2.3	0.8	1.1	1.4	1.3	0.1	0.2
Potatoes	3.3	2.2	2.7	2.0	2.1	3.3	1.7	1.9
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	3.9	-	-	-	-	-	-	0.2
Vegetables	7.5	-	-	-	-	-	-	-
Total	**1.3**	**1.0**	**1.2**	**1.4**	**1.3**	**2.7**	**1.9**	**1.8**

Table 4.7.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	78	85	114	113	295	197	177
Sugar beets	100	25	34	34	30	146	136	111
Maize	100	-	-	-	114	107	42	151
Oilseeds	100	121	81	67	76	91	12	7
Potatoes	100	66	79	62	69	84	44	45
Citrus	100	-	-	-	-	-	-	-
Vineyards	100	-	-	-	-	-	-	-
Tree fruits	100	81	160	148	130	9	26	84
Vegetables	100	110	117	123	127	14	11	9
Total	**100**	**74**	**111**	**118**	**101**	**209**	**68**	**90**

Table 4.7.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	57	60	59	67	66	82	81	81
Sugar beets	13	4	5	4	4	9	12	11
Maize	-	-	-	1	1	1	0	1
Oilseeds	1	2	1	1	1	1	0	0
Potatoes	16	15	16	11	12	7	5	6
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	1	1	1	1	1	0	0	0
Vegetables	12	18	17	15	16	1	1	1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.7.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	92	70	59
Fenpropimorph	F	8	7	4	16	34	89	71	47
Glyphosate	H	50	61	56	59	63	57	58	68
MCPA	H	:	:	:	:	:	21	34	37
Mecoprop-p	H	c	:	:	c	:	c	c	c
Others		c	130	155	c	190	c	c	c
Total		**254**	**198**	**216**	**288**	**286**	**748**	**500**	**449**

Table 4.7.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbofuran	I	c	:	:	:	:	c	c	c
Glyphosate	H	:	:	:	:	:	11	12	10
Isofenphos	I	c	:	:	:	:	c	c	c
Lenacil	H	9	10	10	12	10	6	7	9
Metamitron	H	37	:	:	:	:	38	35	31
Others		c	5	10	7	7	c	c	c
Total		**56**	**14**	**19**	**19**	**17**	**82**	**76**	**62**

Table 4.7.8: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Cymoxanil	F	1	1	1	0	1	1	1	1
Mancozeb	F	37	38	35	27	32	50	23	21
Metalaxyl	F	c	c	c	c	c	c	c	c
Metribuzin	H	4	:	:	:	:	4	4	7
Simazine	H	5	4	4	2	2	2	2	2
Others		c	c	c	c	c	c	c	c
Total		**73**	**48**	**58**	**45**	**50**	**61**	**32**	**33**

Table 4.7.9: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Benomyl	F	3	3	2	2	1	0	0	1
Chlorothalonil	F	6	6	6	3	2	2	1	1
Mancozeb	F	1	2	2	1	1	1	1	1
Simazine	H	0	1	2	1	1	1	1	1
Terbutryne	H	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**53**	**59**	**62**	**66**	**68**	**8**	**6**	**5**

Table 4.8.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	2 968	2 724	2 764	2 864	2 818	2723	2685	2740
Sugar beets	296	280	282	284	250	297	288	284
Maize	1 173	1 251	1 219	1 244	1 314	1 330	1 252	1 311
Oilseeds	125	125	238	276	318	299	294	259
Potatoes	106	93	86	89	91	90	90	86
Citrus	182	183	184	185	184	184	183	182
Vineyards	1 005	979	946	926	916	910	905	908
Tree fruits	304	300	301	294	289	287	283	279
Vegetables	503	494	487	481	492	498	569	551
Total	**6 662**	**6 430**	**6 506**	**6 644**	**6 671**	**6 617**	**6 549**	**6 600**

Table 4.8.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	968	1 111	1 367	1 434	1 483	2 984	3 021	2 490
Sugar beets	1 232	1 159	1 225	1 171	962	1 236	1 097	713
Maize	2 080	1 981	2 119	2 257	1 988	2 596	2 515	2 062
Oilseeds	62	86	143	157	136	127	143	307
Potatoes	281	311	317	343	316	313	254	334
Citrus	1 042	995	978	1 067	1 041	348	383	304
Vineyards	28 703	39 911	38 976	38 782	41 582	40 706	36 716	35 280
Tree fruits	7 382	8 132	7 993	7 947	6 956	8 780	8 604	8 451
Vegetables	729	762	812	983	1 003	1 001	933	970
Total	**42 479**	**54 447**	**53 929**	**54 141**	**55 467**	**58 091**	**53 665**	**50 910**

Table 4.8.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.3	0.4	0.5	0.5	0.5	1.1	1.1	0.9
Sugar beets	4.2	4.1	4.3	4.1	3.9	4.2	3.8	2.5
Maize	1.8	1.6	1.7	1.8	1.5	2.0	2.0	1.6
Oilseeds	0.5	0.7	0.6	0.6	0.4	0.4	0.5	1.2
Potatoes	2.7	3.3	3.7	3.8	3.5	3.5	2.8	3.9
Citrus	5.7	5.4	5.3	5.8	5.7	1.9	2.1	1.7
Vineyards	28.5	40.8	41.2	41.9	45.4	44.7	40.6	38.8
Tree fruits	24.3	27.1	26.6	27.0	24.0	30.6	30.4	30.3
Vegetables	1.4	1.5	1.7	2.0	2.0	2.0	1.6	1.8
Total	**6.4**	**8.5**	**8.3**	**8.1**	**8.3**	**8.8**	**8.2**	**7.7**

Table 4.8.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	115	141	148	153	308	312	257
Sugar beets	100	94	99	95	78	100	89	58
Maize	100	95	102	108	96	125	121	99
Oilseeds	100	138	231	254	219	205	231	495
Potatoes	100	111	113	122	113	111	90	119
Citrus	100	96	94	102	100	33	37	29
Vineyards	100	139	136	135	145	142	128	123
Tree fruits	100	110	108	108	94	119	117	114
Vegetables	100	105	111	135	138	137	128	133
Total	**100**	**128**	**127**	**127**	**131**	**137**	**126**	**120**

Table 4.8.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	2	2	3	3	3	5	6	5
Sugar beets	3	2	2	2	2	2	2	1
Maize	5	4	4	4	4	4	5	4
Oilseeds	0	0	0	0	0	0	0	1
Potatoes	1	1	1	1	1	1	0	1
Citrus	2	2	2	2	2	1	1	1
Vineyards	68	73	72	72	75	70	68	69
Tree fruits	17	15	15	15	13	15	16	17
Vegetables	2	1	2	2	2	2	2	2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.8.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alachlor	H	:	:	:	:	:	184	167	148
Copper	F	24	24	32	42	40	190	168	102
Dichloropropene	I	:	:	:	:	:	c	c	c
Glyphosate	H	198	212	234	273	301	318	378	272
MCPA	H	68	78	100	76	62	127	135	105
Others		679	797	1001	1044	1081	c	c	c
Total		**968**	**1 111**	**1 367**	**1 434**	**1 483**	**2 984**	**3 021**	**2 490**

Table 4.8.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbofuran	I	c	c	c	c	c	c	c	c
Chloridazone	H	c	c	c	c	c	c	c	c
Glyphosate	H	23	25	28	33	36	127	151	106
Lenacil	H	3	3	5	6	6	35	44	18
Metamitron	H	337	316	339	341	279	363	352	219
Others		c	c	c	c	c	c	c	c
Total		**1 232**	**1 159**	**1 225**	**1 171**	**962**	**1 236**	**1 097**	**713**

Table 4.8.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alachlor	H	45	43	50	43	28	768	686	602
Dimethenamide	H	:	:	:	c	c	c	c	c
Metolachlor	H	896	828	860	846	765	766	706	602
Pendimethalin	H	77	87	109	109	113	261	292	207
Terbuthylazine	H	496	460	476	474	456	382	336	332
Others		567	564	623	c	c	c	c	c
Total		**2 080**	**1 981**	**2 119**	**2 257**	**1 988**	**2 596**	**2 515**	**2 062**

Table 4.8.9: Top 5 applied to oilseed crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Azinphos-m	I	:	:	:	:	:	:	:	22
Copper	F	:	:	:	:	:	:	:	46
Fenthion	I	:	:	:	:	:	:	:	c
Metolachlor	H	6	9	17	30	24	32	35	42
Mineral oil	I	:	:	:	:	:	:	:	c
Others		56	76	126	127	112	95	108	c
Total		**62**	**86**	**143**	**157**	**136**	**127**	**143**	**307**

Table 4.8.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bupirimate	F	:	:	:	:	:	c	c	c
Chlorpyrifos	I	1	1	5	5	6	15	13	12
Copper	F	48	50	54	48	50	195	160	141
Cymoxanil	F	4	5	5	5	5	7	6	7
Phorate	I	:	:	:	:	:	c	:	c
Others		228	255	252	284	255	c	c	c
Total		**281**	**311**	**317**	**343**	**316**	**313**	**254**	**334**

Table 4.8.11: Top 5 active ingredients applied to citrus crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorpyrifos	I	2	3	2	6	3	9	9	9
Copper	F	10	8	9	9	10	114	136	140
Glyphosate	H	99	129	138	156	166	127	152	116
Methidathion	I	c	c	c	c	c	c	c	c
Methomyl	I	5	4	5	5	5	6	5	6
Others		c	c	c	c	c	c	c	c
Total		**1 042**	**995**	**978**	**1 067**	**1 041**	**348**	**383**	**304**

Table 4.8.12: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	1 766	658	588	610	626	4 172	5 265	5 199
Glyphosate	H	199	247	262	303	324	332	393	301
Mancozeb	F	1 244	1 804	943	1 479	1 052	1 248	1 099	930
Metiram	F	3	538	546	547	590	164	145	140
Sulphur	F	22 363	33 142	33 236	32 265	35 512	33 471	28 609	27 746
Others		3 128	3 522	3 401	3 579	3 478	1 318	1 205	963
Total		**28 703**	**39 911**	**38 976**	**38 782**	**41 582**	**40 706**	**36 716**	**35 280**

Table 4.8.13: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	132	124	127	112	114	590	736	734
Metiram	F	2	477	447	447	346	493	435	419
Mineral oil	I	c	c	c	c	c	c	c	c
Sulphur	F	2 738	2 842	2 800	2 774	1 727	2 414	2 626	2 495
Ziram	F	1 013	968	978	1 022	970	781	729	672
Others		c	c	c	c	c	c	c	c
Total		**7 382**	**8 132**	**7 993**	**7 947**	**6 956**	**8 780**	**8 604**	**8 451**

Table 4.8.14: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorothalonil	F	35	34	42	182	173	33	34	35
Copper	F	64	74	67	62	63	465	401	430
Dichloropropene	I	:	:	:	:	:	c	c	c
Metiram	F	:	:	:	:	:	164	145	140
Sulphur	F	53	74	70	74	68	78	89	101
Others		576	580	633	665	699	c	c	c
Total		**729**	**762**	**812**	**983**	**1 003**	**1 001**	**933**	**970**

Table 4.9.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	161	158	165	170	177	179	178	160
Sugar beets	121	117	115	116	117	114	110	120
Maize	225	239	240	228	234	245	234	247
Oilseeds	4	2	1	1	1	1	1	1
Potatoes	187	166	170	179	185	180	127	180
Citrus	-	-	-	-	-	-	-	-
Vineyards	0	0	0	0	0	0	0	0
Fruit trees	24	23	23	22	22	22	21	21
Vegetables	76	74	76	75	77	71	72	79
Total	**798**	**780**	**790**	**793**	**813**	**812**	**742**	**808**

Table 4.9.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	688	804	678	725	942	915	969	803
Sugar beets	298	295	259	286	252	343	268	311
Maize	518	464	482	458	519	495	446	326
Oilseeds	0	0	-	-	-	6	7	6
Potatoes	1 416	1 333	1 680	1 635	1 606	2 500	2 284	2 149
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Fruit trees	451	411	488	644	519	471	589	438
Vegetables	98	94	42	58	59	47	41	42
Total	**3 469**	**3 401**	**3 629**	**3 806**	**3 897**	**4 778**	**4 605**	**4 075**

Table 4.9.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	4.3	5.1	4.1	4.3	5.3	5.1	5.4	5.0
Sugar beets	2.5	2.5	2.3	2.5	2.2	3.0	2.4	2.6
Maize	2.3	1.9	2.0	2.0	2.2	2.0	1.9	1.3
Oilseeds	0.0	0.0	-	-	-	10.8	8.1	5.0
Potatoes	7.6	8.0	9.9	9.1	8.7	13.9	18.1	12.0
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	19.1	17.6	20.9	28.9	23.6	21.4	27.5	20.9
Vegetables	1.3	1.3	0.5	0.8	0.8	0.7	0.6	0.5
Total	**4.3**	**4.4**	**4.6**	**4.8**	**4.8**	**5.9**	**6.2**	**5.0**

Table 4.9.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	117	99	105	137	133	141	117
Sugar beets	100	99	87	96	84	115	90	104
Maize	100	90	93	89	100	96	86	63
Oilseeds	100	53	-	-	-	8 353	9 407	8 573
Potatoes	100	94	119	115	113	177	161	152
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Fruit trees	100	91	108	143	115	105	131	97
Vegetables	100	96	43	60	60	48	42	43
Total	**100**	**98**	**105**	**110**	**112**	**138**	**133**	**117**

Table 4.9.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	20	24	19	19	24	19	21	20
Sugar beets	9	9	7	8	6	7	6	8
Maize	15	14	13	12	13	10	10	8
Oilseeds	0	0	-	-	-	0	0	0
Potatoes	41	39	46	43	41	52	50	53
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Fruit trees	13	12	13	17	13	10	13	11
Vegetables	3	3	1	2	2	1	1	1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.9.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Fenpropimorph	F	26	18	35	56	99	64	60	47
Glyphosate	H	100	82	71	119	128	155	150	200
MCPA	H	112	108	113	78	176	107	138	78
Mecoprop-p	H	c	c	c	c	c	c	c	c
Propachlor	H	:	:	:	:	:	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**688**	**804**	**678**	**725**	**942**	**915**	**969**	**803**

Table 4.9.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	:	1	13	16	13	27	18	31
Metamitron	H	158	155	99	113	45	138	125	131
Phenmedipham	H	:	1	9	:	10	36	21	27
Triallate	H	20	28	29	20	24	22	16	12
Others		c	c	c	c	c	c	c	c
Total		**298**	**295**	**259**	**286**	**252**	**343**	**268**	**311**

Table 4.9.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Atrazine	H	236	207	211	206	199	173	146	114
Bentazone	H	c	c	c	c	c	c	c	c
Bromoxynil	H	0	:	:	:	:	7	14	15
Glyphosate	H	6	5	4	7	8	31	30	40
Pyridate	H	1	:	0	0	47	61	90	88
Others		c	c	c	c	c	c	c	c
Total		**518**	**464**	**482**	**458**	**519**	**495**	**446**	**326**

Table 4.9.9: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorothalonil	F	:	:	:	11	14	58	294	134
Dichloropropene	I	:	:	:	:	:	c	c	c
Mancozeb	F	601	630	788	707	550	532	612	655
Maneb	F	289	213	322	341	316	639	145	238
Propamocarb	F	:	:	:	:	c	c	c	c
Others		525	490	570	575	c	c	c	c
Total		**1 416**	**1 333**	**1 680**	**1 635**	**1 606**	**2 500**	**2 284**	**2 149**

Table 4.9.10: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Captan	F	272	243	282	417	298	252	145	100
Copper	F	:	:	:	:	:	48	69	50
Dichlofluanid	F	:	:	:	:	:	:	64	64
Simazine	H	20	10	11	16	14	24	34	37
Sulphur	F	22	22	22	22	22	64	100	72
Others		137	136	173	189	185	83	177	115
Total		**451**	**411**	**488**	**644**	**519**	**471**	**589**	**438**

Table 4.9.11: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bentazone	H	:	:	:	:	:	:	:	c
Fenpropimorph	F	1	1	1	1	3	3	3	3
Oxamyl	I	:	:	:	:	:	c	c	c
Pyridate	H	:	:	:	:	:	2	5	5
Vinclozolin	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	12
Total		**98**	**94**	**42**	**58**	**59**	**47**	**41**	**42**

Table 4.10.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	521	506	494	485	507	520	530	504
Sugar beets	54	53	52	52	53	52	50	46
Maize	274	271	273	264	264	245	224	229
Oilseeds	83	94	109	116	84	75	74	90
Potatoes	33	31	30	27	26	23	23	23
Citrus	0	0	0	0	0	0	0	0
Vineyards	54	50	49	49	49	48	48	48
Tree fruits	7	7	7	6	7	7	7	8
Vegetables	9	8	8	12	12	13	12	13
Total	**1 033**	**1 021**	**1 022**	**1 011**	**1 003**	**983**	**967**	**962**

Table 4.10.2: Volume of PPP used by crop *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	527	330	489	642	330	563	584	491
Sugar beets	284	284	251	261	258	334	327	226
Maize	374	456	321	248	226	209	202	318
Oilseeds	107	118	101	76	56	31	42	55
Potatoes	109	102	95	81	100	81	77	66
Citrus	0	0	0	1	1	0	0	0
Vineyards	929	931	803	870	737	966	908	738
Tree fruits	80	100	109	71	90	50	52	43
Vegetables	8	7	9	11	9	43	56	91
Total	**2 417**	**2 329**	**2 178**	**2 261**	**1 807**	**2 276**	**2 247**	**2 028**

Table 4.10.3: Dosage of PPP used by crop *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1.0	0.7	1.0	1.3	0.7	1.1	1.1	1.0
Sugar beets	5.3	5.3	4.8	5.1	4.9	6.5	6.6	4.9
Maize	1.4	1.7	1.2	0.9	0.9	0.9	0.9	1.4
Oilseeds	1.3	1.3	0.9	0.7	0.7	0.4	0.6	0.6
Potatoes	3.3	3.3	3.2	3.0	3.8	3.4	3.4	2.8
Citrus	-	-	-	-	-	-	-	-
Vineyards	17.3	18.5	16.3	17.9	15.2	20.2	18.9	15.4
Tree fruits	12.1	15.0	16.3	11.0	13.2	7.0	7.2	5.6
Vegetables	0.9	0.9	1.1	0.9	0.7	3.4	4.6	6.9
Total	**2.3**	**2.3**	**2.1**	**2.2**	**1.8**	**2.3**	**2.3**	**2.1**

Table 4.10.4: Index of volume of PPP used by crop *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	63	93	122	63	107	111	93
Sugar beets	100	100	88	92	91	118	115	80
Maize	100	122	86	66	61	56	54	85
Oilseeds	100	111	94	71	53	29	39	52
Potatoes	100	93	87	74	91	74	71	60
Citrus	-	-	-	-	-	-	-	-
Vineyards	100	100	86	94	79	104	98	79
Tree fruits	100	126	136	89	113	62	65	54
Vegetables	100	91	113	142	115	544	703	1 142
Total	**100**	**96**	**90**	**94**	**75**	**94**	**93**	**84**

Table 4.10.5: Proportion of PPP volume used by crop *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	22	14	22	28	18	25	26	24
Sugar beets	12	12	12	12	14	15	15	11
Maize	15	20	15	11	13	9	9	16
Oilseeds	4	5	5	3	3	1	2	3
Potatoes	5	4	4	4	6	4	3	3
Citrus	0	0	0	0	0	0	0	0
Vineyards	38	40	37	38	41	42	40	36
Tree fruits	3	4	5	3	5	2	2	2
Vegetables	0	0	0	0	1	2	2	4
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.10.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
2,4-D	H	41	41	41	7	7	103	77	65
Glyphosate	H	38	31	32	31	23	31	48	31
Isoproturon	H	17	11	12	12	17	22	29	37
MCPA	H	30	21	15	0	22	27	24	24
Mecoprop	H	46	32	174	341	63	225	241	186
Others		356	194	216	251	198	155	165	148
Total		**527**	**330**	**489**	**642**	**330**	**563**	**584**	**491**

Table 4.10.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Metamitron	H	55	55	55	52	52	77	102	73
Quinmerac	H	:	:	:	:	:	:	:	c
Sulphur	F	168	173	136	164	168	195	174	100
Triallate	H	24	20	20	13	11	17	23	22
Others		c	c	c	c	c	c	c	c
Total		**284**	**284**	**251**	**261**	**258**	**334**	**327**	**226**

Table 4.10.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Dimethenamide	H	:	:	:	:	:	:	:	c
Metolachlor	H	45	108	93	71	69	78	87	61
Pendimethalin	H	:	:	25	41	55	50	44	56
Pyridate	H	64	76	92	66	36	32	22	28
Rimsulfuron	H	:	c	c	c	c	c	c	c
Others		264	c	c	c	c	c	c	c
Total		**374**	**456**	**321**	**248**	**226**	**209**	**202**	**318**

Table 4.10.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbetamide	H	:	:	:	:	:	:	:	14
Dimefuron	H	:	:	:	:	:	:	:	c
Metazachlor	H	c	c	c	c	c	c	c	c
Metconazole	F	:	:	:	:	:	:	:	1
Tebuconazole	F	:	:	:	1	1	:	:	1
Others		c	c	c	c	c	c	c	c
Total		**107**	**118**	**101**	**76**	**56**	**31**	**42**	**55**

Table 4.10.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Cymoxanil	F	0	0	:	0	0	7	6	3
Dimethomorph	F	:	:	:	:	:	c	c	c
Mancozeb	F	66	60	55	49	66	56	56	51
Metalaxyl	F	c	c	c	c	c	c	c	c
Metobromuron	H	6	6	5	5	4	5	3	3
Others		c	c	c	c	c	c	c	c
Total		**109**	**102**	**95**	**81**	**100**	**81**	**77**	**66**

Table 4.10.11: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	7	7	7	:	:	19	32	33
Folpet	F	:	:	:	9	3	46	46	41
Mancozeb	F	75	65	54	27	27	26	33	31
Metiram	F	55	32	28	42	19	30	:	24
Sulphur	F	615	652	551	707	626	737	685	509
Others		177	175	163	85	62	107	112	99
Total		**929**	**931**	**803**	**870**	**737**	**966**	**908**	**738**

Table 4.10.12: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Diflubenzuron	I	1	1	1	1	1	1	1	1
Dithianon	F	18	13	15	3	7	12	11	8
Fenoxycarb	I	c	c	c	c	c	c	c	c
Kresoxim	F	:	:	:	:	:	:	c	c
Sulphur	F	32	32	32	32	32	28	24	21
Others		c	c	c	c	c	c	c	c
Total		**80**	**100**	**109**	**71**	**90**	**50**	**52**	**43**

Table 4.10.13: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active ingredients (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Aclonifen	H	:	:	:	:	:	:	:	c
Bentazone	H	:	:	:	:	c	c	c	c
Cyanazine	H	:	:	:	:	:	18	20	21
MCPB	H	:	:	:	:	:	7	10	10
Pendimethalin	H	:	:	:	:	:	9	11	8
Others		8	7	9	11	c	c	c	c
Total		**8**	**7**	**9**	**11**	**9**	**43**	**56**	**91**

Table 4.11.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	347	312	289	311	283	310	175	246
Sugar beets	0	0	1	1	0	4	3	8
Maize	287	292	299	299	307	316	324	272
Oilseeds	77	95	133	94	101	67	60	50
Potatoes	109	88	85	96	89	82	86	62
Citrus	27	26	26	26	27	27	27	27
Grapes	273	272	267	265	263	263	264	220
Tree fruits	67	61	58	56	55	55	55	49
Vegetables	0	0	0	68	70	40	42	41
Total	**1 188**	**1 146**	**1 157**	**1 216**	**1 194**	**1 163**	**1 037**	**976**

Table 4.11.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	172	428	641	901	962	232	397	440
Sugar beets	-	-	-	0	3	6	9	12
Maize	156	149	186	212	255	475	518	518
Oilseeds	5	4	38	39	28	9	2	9
Potatoes	255	327	485	411	433	289	433	434
Citrus	62	62	64	50	74	30	139	169
Vineyards	4 908	5 905	6 599	6 850	7 476	5 817	4 311	5 374
Fruit trees	351	359	417	339	359	230	523	623
Vegetables	99	155	193	203	218	23	27	306
Total	**6 008**	**7 389**	**8 624**	**9 004**	**9 807**	**7 110**	**6 360**	**7 885**

Table 4.11.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.5	1.4	2.2	2.9	3.4	0.7	2.3	1.8
Sugar beets	-	-	-	0.1	-	1.6	2.6	1.5
Maize	0.5	0.5	0.6	0.7	0.8	1.5	1.6	1.9
Oilseeds	0.1	0.0	0.3	0.4	0.3	0.1	0.0	0.2
Potatoes	2.3	3.7	5.7	4.3	4.9	3.5	5.0	7.0
Citrus	2.3	2.4	2.5	1.9	2.7	1.1	5.1	6.2
Grapes	18.0	21.7	24.7	25.8	28.4	22.1	16.3	24.4
Tree fruits	5.2	5.9	7.2	6.1	6.5	4.2	9.5	12.7
Vegetables	-	-	-	3.0	3.1	0.6	0.6	7.5
Total	**5.1**	**6.4**	**7.5**	**7.4**	**8.2**	**6.1**	**6.1**	**8.1**

Table 4.11.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	249	373	523	559	135	231	256
Sugar beets	-	-	-	-	-	-	-	-
Maize	100	95	119	136	164	305	333	332
Oilseeds	100	76	717	731	523	164	45	177
Potatoes	100	128	190	161	169	113	170	170
Citrus	100	100	103	80	120	49	225	273
Vineyards	100	120	134	140	152	119	88	110
Fruit trees	100	102	119	97	102	65	149	177
Vegetables	100	157	195	205	220	23	27	309
Total	**100**	**123**	**144**	**150**	**163**	**118**	**106**	**131**

Table 4.11.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	3	6	7	10	10	3	6	6
Sugar beets	0	0	0	0	0	0	0	0
Maize	3	2	2	2	3	7	8	7
Oilseeds	0	0	0	0	0	0	0	0
Potatoes	4	4	6	5	4	4	7	6
Citrus	1	1	1	1	1	0	2	2
Vineyards	82	80	77	76	76	82	68	68
Fruit trees	6	5	5	4	4	3	8	8
Vegetables	2	2	2	2	2	0	0	4
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.11.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlorotoluron	H	40	38	37	32	36	34	27	33
Endosulfan	I	:	:	16	17	22	:	25	27
Glyphosate	H	15	15	17	19	19	47	56	66
Mancozeb	F	26	21	22	26	42	7	72	71
Sulphur	F	46	27	33	36	41	38	52	65
Others		45	327	517	771	802	106	164	179
Total		**172**	**428**	**641**	**901**	**962**	**232**	**397**	**440**

Table 4.11.7: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alachlor	H	56	37	49	57	75	242	259	254
Atrazine	H	51	59	77	98	105	156	170	163
Endosulfan	I	:	:	5	6	7	7	8	8
Lindane	I	:	:	:	:	:	3	9	7
Metolachlor	H	26	31	38	39	49	54	58	70
Others		23	21	23	18	26	20	22	23
Total		**156**	**149**	**191**	**218**	**262**	**482**	**526**	**526**

Table 4.11.8: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alpha-cypermethrin	I	:	:	2	2	3	0	0	0
Chlorfenvinphos	I	:	:	c	c	c	c	c	c
Copper	F	:	:	:	:	:	:	:	5
Cyanazine	H	:	:	20	20	15	:	:	:
Fenthion	I	:	:	:	:	:	:	:	c
Others		5	4	c	c	c	c	c	c
Total		**5**	**4**	**38**	**39**	**28**	**9**	**2**	**9**

Table 4.11.9: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bacillus thuringiensis	I	:	:	:	:	:	:	:	13
Copper	F	4	5	5	4	4	7	14	18
Cymoxanil	F	9	11	15	15	16	15	20	17
Mancozeb	F	54	92	238	193	191	108	193	196
Propineb	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**255**	**327**	**485**	**411**	**433**	**289**	**433**	**434**

Table 4.11.10: Top 5 active ingredients applied to citrus crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	1	2	2	2	4	7	12	16
Dimethoate	I	0	0	2	2	2	:	5	5
Glyphosate	H	9	10	12	12	12	15	20	23
Mineral oil	I	c	c	c	c	c	c	c	c
Zineb	F	1	1	1	1	1	0	4	5
Others		c	c	c	c	c	c	c	c
Total		**62**	**62**	**64**	**50**	**74**	**30**	**139**	**169**

Table 4.11.11: Top 5 active ingredients applied to vineyard crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	114	135	152	172	192	186	196	226
Glyphosate	H	103	120	135	195	180	231	277	302
Mancozeb	F	127	129	178	161	160	109	145	182
Propineb	F	c	c	c	c	c	c	c	c
Sulphur	F	3 632	4 325	4 836	5 222	5 840	4 289	2 699	3 695
Others		c	c	c	c	c	c	c	c
Total		**4 908**	**5 905**	**6 599**	**6 850**	**7 476**	**5 817**	**4 311**	**5 374**

Table 4.11.12: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Copper	F	53	63	49	60	78	29	66	136
Dichloropropene	I	:	:	:	:	:	c	c	c
Mancozeb	F	14	18	41	25	14	5	35	33
Mineral oil	I	c	c	c	c	c	c	c	c
Thiram	F	46	46	42	37	33	32	32	36
Others		c	c	c	c	c	c	c	c
Total		**351**	**359**	**417**	**339**	**359**	**230**	**523**	**623**

Table 4.11.13: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Group	1992	1993	1994	1995	1996	1997	1998	1999
Bentazone	H	:	:	:	:	:	c	c	c
Mancozeb	F	1	3	4	4	2	7	12	10
Methomyl	I	1	1	1	1	2	2	2	2
Oxamyl	I	:	:	:	:	:	c	c	c
Sulphur	F	:	:	:	:	:	:	:	279
Others		98	152	189	198	214	c	c	c
Total		**99**	**155**	**193**	**203**	**218**	**23**	**27**	**306**

Table 4.12.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	561	558	594	617	655	708	687	699
Sugar beets	32	33	34	35	35	35	33	35
Maize	0	0	0	0	0	0	0	0
Oilseeds	3	3	3	2	1	2	1	1
Potatoes	35	36	37	36	35	33	33	32
Citrus	0	0	0	0	0	0	0	0
Vineyards	0	0	0	0	0	0	0	0
Tree fruits	0	0	0	0	0	0	0	0
Vegetables	7	7	8	10	11	10	9	10
Total	**638**	**637**	**675**	**699**	**736**	**788**	**764**	**777**

Table 4.12.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	204	167	173	334	348	591	659	508
Sugar beets	97	94	78	90	82	65	73	68
Maize	1	0	0	0	0	-	0	0
Oilseeds	16	17	8	8	10	5	5	7
Potatoes	37	39	31	38	43	51	72	45
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	-	-	2	-	-	2	-
Vegetables	5	11	11	18	15	4	4	4
Total	**360**	**328**	**302**	**490**	**498**	**717**	**816**	**633**

Table 4.12.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.4	0.3	0.3	0.5	0.5	0.8	1.0	0.7
Sugar beets	3.0	2.8	2.3	2.6	2.4	1.9	2.2	2.0
Maize	-	-	-	-	-	-	-	-
Oilseeds	6.5	6.0	2.9	5.1	8.7	2.9	4.2	5.5
Potatoes	1.1	1.1	0.8	1.0	1.2	1.5	2.2	1.4
Citrus	-	-	-	-	-	-	-	-
Grapes	-	-	-	-	-	-	-	-
Tree fruits	-	-	-	-	-	-	-	-
Vegetables	0.7	1.5	1.4	1.8	1.4	0.4	0.5	0.4
Total	**0.6**	**0.5**	**0.4**	**0.7**	**0.7**	**0.9**	**1.1**	**0.8**

Table 4.12.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	82	85	164	171	290	323	249
Sugar beets	100	96	80	93	85	67	75	70
Maize	100	0	37	53	0	-	50	67
Oilseeds	100	106	47	47	58	32	33	40
Potatoes	100	105	83	101	115	137	194	121
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	-	-	-	-	-	-	-
Vegetables	100	233	242	383	311	82	91	90
Total	**100**	**91**	**84**	**136**	**138**	**199**	**227**	**176**

Table 4.12.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	57	51	57	68	70	82	81	80
Sugar beets	27	28	26	18	17	9	9	11
Maize	0	0	0	0	0	-	0	0
Oilseeds	5	5	3	2	2	1	1	1
Potatoes	10	12	10	8	9	7	9	7
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	-	-	-	0	-	-	0	-
Vegetables	1	3	4	4	3	1	1	1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.12.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	50	49	40
Dichlorprop-p	H	:	:	:	c	:	c	c	c
Glyphosate	H	146	114	100	98	143	210	261	192
MCPA	H	21	7	28	175	135	226	140	130
Mecoprop-p	H	:	:	:	:	:	c	c	c
Others		30	26	23	c	35	c	c	c
Total		**197**	**147**	**152**	**298**	**314**	**591**	**642**	**487**

Table 4.12.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Alpha-cypermethrin	I	:	:	:	:	0	0	0	0
Lambda-cyhalothrin	I	:	0	0	0	0	0	0	0
Metamitron	H	90	86	74	85	77	60	67	66
Propaquizafop	H	:	:	:	c	c	c	c	c
Triflusulfuron	H	:	:	:	c	c	c	c	c
Others		5	6	3	c	c	c	c	c
Total		**95**	**92**	**77**	**89**	**82**	**65**	**72**	**68**

Table 4.12.8: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Fluazifop	H	6	7	4	4	4	:	:	:
Isofenphos	I	6	6	1	1	:	:	:	:
Lambda-cyhalothrin	I	:	0	0	0	0	:	:	0
Metazachlor	H	:	:	:	:	c	c	c	c
Propaquizafop	H	:	:	:	0	c	c	c	c
Others		4	2	0	0	:	:	:	:
Total		**15**	**15**	**6**	**5**	**7**	**5**	**4**	**4**

Table 4.12.9: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Dimethomorph	F	:	:	:	:	:	c	c	c
Linuron	H	:	:	:	:	:	4	:	4
Mancozeb	F	11	11	5	2	5	17	36	22
Metribuzin	H	4	3	3	4	4	4	4	4
Terbutryne	H	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**32**	**32**	**24**	**30**	**35**	**51**	**72**	**45**

Table 4.13.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	718	716	725	715	803	827	843	757
Sugar beets	48	52	53	58	59	60	59	60
Maize	0	0	0	0	0	0	0	0
Oilseeds	138	145	128	79	41	42	40	51
Potatoes	39	36	33	35	37	36	34	33
Citrus	0	0	0	0	0	0	0	0
Vineyards	0	0	0	0	0	0	0	0
Tree fruits	2	2	2	2	2	2	2	2
Vegetables	5	6	6	6	7	7	7	6
Total	**950**	**958**	**947**	**895**	**948**	**974**	**984**	**909**

Table 4.13.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	282	285	380	430	483	506	583	551
Sugar beets	126	126	151	150	128	171	161	155
Maize	1	0	0	1	0	5	7	6
Oilseeds	18	13	10	25	16	22	27	36
Potatoes	59	34	35	39	52	64	100	115
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	16	9	19
Tree fruits	10	7	9	16	13	16	8	13
Vegetables	56	90	96	108	124	27	48	39
Total	**551**	**554**	**681**	**769**	**816**	**827**	**942**	**934**

Table 4.13.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7
Sugar beets	2.6	2.4	2.8	2.6	2.2	2.9	2.7	2.6
Maize	-	-	-	-	-	-	-	-
Oilseeds	0.1	0.1	0.1	0.3	0.4	0.5	0.7	0.7
Potatoes	1.5	0.9	1.1	1.1	1.4	1.8	3.0	3.5
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	5.0	3.4	4.3	8.2	6.4	7.1	3.9	6.4
Vegetables	11.1	15.0	16.0	18.0	17.6	4.1	7.3	6.2
Total	**0.6**	**0.6**	**0.7**	**0.9**	**0.9**	**0.8**	**1.0**	**1.0**

Table 4.13.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	101	135	153	172	180	207	196
Sugar beets	100	100	120	119	102	136	128	123
Maize	100	0	37	53	1	415	558	501
Oilseeds	100	69	56	137	86	120	146	196
Potatoes	100	57	59	66	88	109	168	194
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	100	69	85	163	128	158	82	129
Vegetables	100	162	173	195	222	49	86	70
Total	**100**	**100**	**124**	**139**	**148**	**150**	**171**	**169**

Table 4.13.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	51	51	56	56	59	61	62	59
Sugar beets	23	23	22	19	16	21	17	17
Maize	0	0	0	0	0	1	1	1
Oilseeds	3	2	2	3	2	3	3	4
Potatoes	11	6	5	5	6	8	11	12
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	2	1	2
Tree fruits	2	1	1	2	2	2	1	1
Vegetables	10	16	14	14	15	3	5	4
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.13.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	24	29	27
Dichlorprop-p	H	:	:	:	:	:	c	c	c
Fenpropimorph	F	33	14	35	45	55	53	53	35
Glyphosate	H	120	191	209	219	282	201	198	226
Mecoprop-p	H	10	:	:	:	:	c	c	c
Others		105	42	96	101	84	c	c	c
Total		**268**	**247**	**341**	**365**	**420**	**506**	**551**	**514**

Table 4.13.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbosulfan	I	:	:	:	:	:	c	c	c
Chloridazone	H	:	:	:	:	:	c	c	c
Cycloxydim	H	:	:	:	:	:	c	c	c
Glyphosate	H	:	:	:	:	:	10	10	11
Metamitron	H	103	112	129	124	124	124	112	112
Others		18	11	20	23	3	12	13	7
Total		**121**	**123**	**149**	**147**	**127**	**171**	**160**	**154**

Table 4.13.8: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Aclonifen	H	:	:	:	:	:	:	:	c
Dimethomorph	F	:	:	:	:	:	c	c	c
Mancozeb	F	15	7	8	11	21	44	79	87
Metalaxyl	F	c	c	c	c	c	c	c	c
Metribuzin	H	7	6	6	7	7	7	6	6
Others		c	c	c	c	c	c	c	6
Total		**50**	**20**	**22**	**25**	**37**	**64**	**100**	**115**

Table 4.13.9: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bentazone	H	:	:	:	:	:	c	c	c
Cyanazine	H	:	:	:	:	:	4	19	14
Cycloxydim	H	:	:	:	:	:	c	c	c
Pendimethalin	H	:	:	:	:	:	1	1	1
Propachlor	H	42	67	73	77	99	:	:	:
Others		c	c	c	c	c	c	c	c
Total		**47**	**72**	**77**	**77**	**99**	**27**	**48**	**39**

Table 4.14.1: Crop area *(1 000 ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	3 364	2 926	2 919	3 052	3 245	3 395	3 300	3 025
Sugar beets	197	197	195	196	199	196	189	183
Maize	51	73	94	106	111	109	103	107
Oilseeds	421	377	404	354	356	445	506	417
Potatoes	181	170	164	172	178	196	189	183
Citrus	0	0	0	0	0	0	0	0
Vineyards	0	0	0	0	0	0	0	0
Tree fruits	24	23	22	20	18	196	189	183
Vegetables	151	143	141	149	147	137	136	131
Total	**4 388**	**3 908**	**3 939**	**4 047**	**4 254**	**4 674**	**4 611**	**4 228**

Table 4.14.2: Volume of PPP used *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	6 239	5 802	6 337	6 709	6 770	8 038	7 982	7 564
Sugar beets	527	760	774	843	842	880	818	822
Maize	72	82	126	152	173	134	101	89
Oilseeds	318	383	416	455	489	491	725	458
Potatoes	760	786	927	910	871	919	1 465	1 816
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	128	131	174	159	149	176	157	137
Vegetables	413	738	586	674	575	377	348	458
Total	**8 457**	**8 683**	**9 340**	**9 904**	**9 869**	**11 014**	**11 595**	**11 344**

Table 4.14.3: Dosage of PPP used *(kg AI / ha)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	1.9	2.0	2.2	2.2	2.1	2.4	2.4	2.5
Sugar beets	2.7	3.9	4.0	4.3	4.2	4.5	4.3	4.5
Maize	1.4	1.1	1.3	1.4	1.6	1.2	1.0	0.8
Oilseeds	0.8	1.0	1.0	1.3	1.4	1.1	1.4	1.1
Potatoes	4.2	4.6	5.7	5.3	4.9	4.7	7.8	9.9
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	5.3	5.7	7.9	8.0	8.3	0.9	0.8	0.7
Vegetables	2.7	5.2	4.2	4.5	3.9	2.7	2.6	3.5
Total	**1.9**	**2.2**	**2.4**	**2.4**	**2.3**	**2.4**	**2.5**	**2.7**

Table 4.14.4: Index of volume of PPP used *(1992 = 100)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	100	93	102	108	109	129	128	121
Sugar beets	100	144	147	160	160	167	155	156
Maize	100	115	176	212	241	187	140	125
Oilseeds	100	121	131	143	154	155	228	144
Potatoes	100	103	122	120	115	121	193	239
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	100	102	136	124	116	137	122	107
Vegetables	100	179	142	163	139	91	84	111
Total	**100**	**103**	**110**	**117**	**117**	**130**	**137**	**134**

Table 4.14.5: Share of PPP volume used *(%)*

	1992	1993	1994	1995	1996	1997	1998	1999
Cereals	74	67	68	68	69	73	69	67
Sugar beets	6	9	8	9	9	8	7	7
Maize	1	1	1	2	2	1	1	1
Oilseeds	4	4	4	5	5	4	6	4
Potatoes	9	9	10	9	9	8	13	16
Citrus	-	-	-	-	-	-	-	-
Vineyards	-	-	-	-	-	-	-	-
Tree fruits	2	2	2	2	2	2	1	1
Vegetables	5	8	6	7	6	3	3	4
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 4.14.6: Top 5 active ingredients applied to cereal crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chlormequat-chloride	GR	:	:	:	:	:	1 245	1 017	780
Fenpropimorph	F	361	332	248	299	344	549	699	730
Isoproturon	H	1 224	1 111	1 219	1 085	979	1 603	1 625	1 117
Mecoprop-p	H	c	c	c	c	c	c	c	c
Pendimethalin	H	:	177	285	456	523	498	376	723
Others		c	c	c	c	c	c	c	c
Total		**6 239**	**5 802**	**6 337**	**6 709**	**6 770**	**8 038**	**7 982**	**7 564**

Table 4.14.7: Top 5 active ingredients applied to sugar beet crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Chloridazone	H	c	c	c	c	c	c	c	c
Ethofumesate	H	26	57	60	56	50	47	37	31
Glyphosate	H	30	38	39	35	39	56	72	66
Metamitron	H	186	225	218	215	255	284	152	138
Sulphur	F	125	231	269	275	192	245	320	392
Others		c	c	c	c	c	c	c	c
Total		**527**	**760**	**774**	**843**	**842**	**880**	**818**	**822**

Table 4.14.8: Top 5 active ingredients applied to maize crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Atrazine	H	51	69	109	135	155	123	92	81
Chlorpyrifos	I	1	1	1	1	2	:	:	:
Dicamba	H	:	:	:	:	:	:	3	2
Pyridate	H	16	8	14	14	14	10	6	6
Rimsulfuron	H	:	:	:	:	c	c	c	c
Others		4	4	2	2	c	c	c	c
Total		**72**	**82**	**126**	**152**	**173**	**134**	**101**	**89**

Table 4.14.9: Top 5 active ingredients applied to oilseed crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Carbendazim	F	24	28	40	39	46	40	55	50
Metazachlor	H	c	c	c	c	c	c	c	c
Sulphur	F	46	62	58	50	77	84	109	29
Trifluralin	H	7	7	24	25	13	:	39	25
Vinclozolin	F	c	c	c	c	c	c	c	c
Others		c	c	c	c	c	c	c	c
Total		**318**	**383**	**416**	**455**	**489**	**491**	**725**	**458**

Table 4.14.10: Top 5 active ingredients applied to potato crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Dichloropropene	I	:	:	:	:	:	:	c	c
Dimethomorph	F	:	:	c	c	c	c	c	c
Mancozeb	F	402	417	559	563	549	521	607	893
Oxamyl	I	:	:	:	:	:	c	c	c
Propamocarb	F	:	:	c	c	c	c	c	c
Others		359	369	c	c	c	275	251	257
Total		**760**	**786**	**927**	**910**	**871**	**919**	**1 465**	**1 816**

Table 4.14.11: Top 5 active ingredients applied to tree fruit crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Captan	F	20	38	46	40	44	9	10	10
Chlorpyrifos	I	16	16	38	24	20	:	19	19
Dithianon	F	3	4	31	31	18	18	21	22
Simazine	H	24	24	24	24	24	22	20	20
Sulphur	F	3	6	:	:	:	119	72	57
Others		62	43	35	40	43	8	15	10
Total		**128**	**131**	**174**	**159**	**149**	**176**	**157**	**137**

Table 4.14.12: Top 5 active ingredients applied to vegetable crops *(in tonnes of AI)*

Active Ingredient (AI)	Action	1992	1993	1994	1995	1996	1997	1998	1999
Bentazone	H	c	c	c	c	c	c	c	c
Chlorothaloni	F	18	142	98	87	84	18	15	38
Cyanazine	H	:	:	23	38	26	69	64	61
MCPB	H	28	37	43	50	52	62	54	51
Pendimethalin	H	10	37	38	31	45	51	44	149
Others		c	c	c	c	c	c	c	c
Total		**413**	**738**	**586**	**674**	**575**	**377**	**348**	**458**

Chapter 5
Detailed tables by crop

5.1 Cereals

Table 5.1.1: Chemical classes of fungicides applied to cereal crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Azoles	4 585	3 700	3 707	4 179	3 792	3 390	3 494	3 418
Morpholines	3 919	3 113	2 978	3 472	3 593	3 380	3 281	2 852
Inorganic-sulphur	2 901	1 162	773	737	868	1 672	2 368	1 676
Anilinopyrimidils	-	-	64	500	549	930	1 257	1 148
Dithiocarbamates	681	465	468	506	588	883	1 280	919
Strobilurines	-	-	-	-	54	306	593	759
Organic fungicides-other	784	983	561	542	691	543	621	534
Benzimidazoles	999	805	701	584	545	429	369	321
Inorganic-coppers	97	108	123	140	172	222	210	171
Ethylphosphate	1	1	1	1	1	175	277	135
Guanidines	-	-	-	0	1	30	37	123
Dicarboximides	44	32	57	106	72	154	158	103
Oxime-carbamates	-	-	-	-	-	166	93	92
Anilines	22	22	29	30	30	43	110	71
Organophosphates	116	108	146	168	91	119	92	59
Phthalic acids	10	10	15	13	30	72	80	55
Anthraquinones	-	-	0	2	2	16	3	54
Carbamates	7	7	6	46	87	63	102	40
Acylalanines	12	10	14	19	32	46	43	35
Pyrimidinyl-carbinols	4	4	3	3	4	15	7	23
Ureas	4	5	12	13	14	16	16	20
Carboxamides	-	-	-	-	-	-	1	11
Organotin fungicides	12	12	13	15	11	7	8	10
Phenylamides	6	3	7	6	27	20	12	10
Triazines	940	597	489	359	228	97	20	6
Piperazines	0	-	1	2	1	3	4	4
Dinitrophenols	1	0	0	0	1	1	3	3
Phenylpyrroles	-	-	2	6	19	1	2	3
Phenyl-carbamates	-	-	-	-	-	0	3	1
Pyrimidines	138	41	66	54	47	-	-	-
Total	**15 282**	**11 187**	**10 238**	**11 503**	**11 549**	**12 800**	**14 546**	**12 656**

Table 5.1.2: Chemical classes of herbicides applied to cereal crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Ureas	8 428	6 979	6 882	7 579	7 059	8 616	9 933	7 751
Phenoxy carbonic acid	4 855	4 968	4 573	4 378	4 564	5 864	5 915	6 111
Amino-phosphoric-acids	3 502	4 274	4 664	5 474	6 227	4 462	5 366	5 051
Dinitroanilines	895	1 108	1 637	2 526	2 616	1 874	1 894	1 993
Hydroxybenzonitril	561	507	737	771	758	792	852	874
Chloroacetanilides	3	4	4	11	11	622	738	782
Pyridyloxy acetic acid	428	448	493	531	558	418	765	712
Diphenyl-ethers	289	408	383	370	184	1 193	813	680
Aryloxyphenoxy-carboxylic-acid-derivative	299	297	339	416	456	508	574	532
Thiadiazines	245	324	372	381	366	476	460	438
Phenoxy nicotineanilides	172	154	179	231	160	418	433	343
Imidazolinones	147	136	204	151	172	237	279	276
Triazines	258	227	259	288	280	283	233	244
Thiocarbamates	1 034	957	969	1 293	1 538	193	199	195
Sulfonylureas	64	72	156	117	130	298	171	182
Oxyphenoxies	2	5	3	3	2	132	239	143
Organic herbicides-other	2	3	8	12	15	46	80	112
Cyclohexane dione	14	35	67	130	157	17	136	93
Bipyridyliums	149	139	80	135	129	113	89	89
Arylalanines	45	37	85	81	75	112	95	80
Amides	34	34	31	35	31	131	113	79
Pyridinecarboxylic-acids	16	16	15	18	18	52	59	70
Triazinones	31	30	33	41	37	41	40	40
Benzoic-acids (auxins)	181	25	38	38	27	87	92	37
Pyrazoles	30	76	70	65	89	41	38	30
Carbamates	2	2	2	2	0	36	35	26
Phosphinico-amino-acids	-	-	0	2	0	5	8	12
Diazines	20	23	23	20	21	16	11	9
Benzothiazoles	23	19	8	11	5	4	5	8
Azoles	3	3	4	5	5	2	1	1
Benzofuranes	-	-	0	-	-	0	1	1
Bis-carbamates	-	-	-	-	-	3	4	1
Dinitrophenols	-	-	-	-	-	10	3	1
Triazoles	-	-	-	-	-	3	2	1
Uracils	-	-	1	1	1	2	2	0
Anilides	2	2	0	-	-	-	-	-
Halogenated alkanoic acids	1	-	-	-	-	-	-	-
Morphactins	16	4	2	0	-	0	-	-
Total	**21 752**	**21 314**	**22 322**	**25 116**	**25 692**	**27 108**	**29 677**	**26 995**

Table 5.1.3: Chemical classes of insecticides applied to cereal crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organic insecticides-other	4	13	26	65	135	3 583	3 485	4 884
Organophosphates	514	579	843	770	660	744	944	728
Carbamates	203	120	117	144	121	80	107	131
Cyclodiene organochlorines	66	60	71	84	82	92	104	99
Pyrethroids	121	98	126	252	191	84	88	92
Oxime-carbamates	1	0	0	1	1	26	16	18
Organochlorines	0	0	0	0	0	13	17	17
Diazylhydrazines	-	-	-	-	-	0	9	11
Oil, mineral	1	1	1	1	2	13	18	9
Benzoylureas	1	2	2	7	7	5	8	8
Amidines	-	-	2	3	-	2	6	7
Biologicals	4	2	4	6	14	9	4	5
Benzilates	3	3	4	4	5	3	2	3
Organotin fungicides	2	2	2	2	2	2	1	2
Pyrazoles	-	0	0	0	1	0	1	1
Tetrazines	0	0	0	0	0	0	1	0
Methyl-isothiocyanate	-	-	-	-	-	-	16	-
Total	**919**	**881**	**1 198**	**1 340**	**1 219**	**4 656**	**4 829**	**6 015**

Table 5.1.4: Chemical classes of plant growth regulators applied to cereal crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Plant growth regulators	:	:	:	:	:	6 990	7 829	7 464

5.2 Sugar beets

Table 5.2.1: Chemical classes of fungicides applied to sugar beet crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Inorganic-sulphur	926	1 036	1 019	1 547	1 708	2 125	2 480	1 751
Azoles	85	84	90	105	101	136	120	122
Morpholines	13	9		6	20	42	64	86
Organotin fungicides	82	86	82	72	58	64	77	36
Benzimidazoles	24	22	17	17	22	31	29	25
Inorganic-coppers	255	186	187	198	188	116	42	16
Organic fungicides-other	-	1	3	5	54	1	6	8
Dithiocarbamates	47	35	28	18	14	26	5	8
Anthraquinones	-	-	-	-	-	3	3	3
Pyrimidinyl-carbinols	2	2	2	2	3	1	2	1
Ureas	-	-	1	-	-	-	-	-
Total	**1 433**	**1 461**	**1 429**	**1 972**	**2 168**	**2 545**	**2 828**	**2 057**

Table 5.2.2: Chemical classes of herbicides applied to sugar beet crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Triazinones	3 383	3 157	2 830	2 951	3 002	2 995	2 799	2 288
Pyridazinones	1 044	938	917	925	952	1 175	946	934
Amino-phosphonic-acids	175	214	261	298	330	491	585	495
Benzofuranes	415	460	500	460	419	520	481	363
Bis-carbamates	316	343	327	339	291	394	407	339
Uracils	120	128	107	127	133	177	161	141
Thiocarbamates	338	334	360	358	351	171	158	120
Chloroacetanilides	53	68	64	83	75	77	82	87
Oxyphenoxies	28	68	62	72	70	101	74	75
Pyridinecarboxylic-acids	19	42	49	51	50	33	55	55
Quinolinecarboxylic-acids	3	4	18	25	21	58	55	53
Cyclohexane dione	18	20	25	24	23	31	27	28
Sulfonylureas	-	-	11	6	10	22	24	23
Amides	-	-	-	3	5	8	10	14
Bipyridyliums	41	35	36	42	39	-	1	1
Ureas	1	0	1	0	-	-	0	0
Aryloxyphenoxy-carbonic-acid-derivative	4	5	1	1	1	1	2	0
Triazines	7	7	-	-	-	-	-	0
Carbamates	2	2	1	0	-	1	0	-
Phenoxy carbonic acid	36	25	1	1	0	0	-	-
Pyrazoles	6	4	-	-	-	-	-	-
Thiadiazines	1	1	-	-	1	-	-	-
Total	**6 010**	**5 854**	**5 570**	**5 768**	**5 774**	**6 253**	**5 867**	**5 017**

5.3 Maize

Table 5.3.1: Chemical classes of fungicides applied to maize crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Anthraquinones	-	-	-	-	0	-	0	3
Azoles	3	3	3	2	3	2	2	2
Benzimidazoles	-	-	0	-	0	1	1	1
Dithiocarbamates	7	7	7	-	-	-	0	-
Inorganic-sulphur	-	-	-	26	27	14	-	-
Phthalic acids	3	2	3	7	5	-	-	-
Total	**13**	**12**	**13**	**36**	**34**	**17**	**4**	**6**

Table 5.3.2: Chemical classes of herbicides applied to maize crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Chloroacetanilides	2 477	2 291	2 525	2 610	2 922	6 366	7 100	7 506
Triazines	5 230	4 821	4 695	5 534	5 278	4 730	4 294	3 838
Amino-phosphonic-acids	125	168	210	244	276	894	1 150	1 171
Dinitroanilines	282	243	321	395	406	980	812	634
Diazines	455	352	396	581	818	780	733	630
Amides	-	-	121	252	296	420	438	542
Thiadiazines	600	499	445	479	438	422	531	461
Hydroxybenzonitril	237	187	222	265	271	232	301	233
Benzoic-acids (auxins)	59	40	52	74	115	149	177	153
Triketones	242	67	78	138	338	337	256	115
Sulfonylureas	2	12	19	165	30	17	27	104
Diphenyl-ethers	38	228	322	375	211	25	57	98
Organic herbicides-other	203	210	148	48	-	4	62	97
Phenoxy carbonic acid	15	22	34	22	21	50	55	68
Thiocarbamates	1 456	614	601	460	213	21	28	53
Pyridyloxy acetic acid	1	1	1	3	6	30	36	28
Benzoxazines	7	11	15	19	29	26	23	22
Pyridinecarboxylic-acids	1	1	1	1	1	6	10	10
Ureas	39	30	31	20	14	17	27	1
Chloroamides	17	9	4	7	3	4	28	0
Bipyridyliums	21	25	25	26	23	-	-	-
Bis-carbamates	-	-	-	1	-	-	-	-
Dinitrophenols	-	-	-	-	-	146	3	-
Phosphinico-amino-acids	-	3	0	1	-	-	-	-
Pyridazinones	4	3	2	2	-	-	-	-
Total	**11 513**	**9 836**	**10 271**	**11 720**	**11 710**	**15 656**	**16 149**	**15 764**

Table 5.3.3: Chemical classes of insecticides applied to maize crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organophosphates	314	372	395	213	222	368	354	246
Carbamates	141	151	141	133	121	131	137	148
Organic insecticides-other	1	8	16	29	53	3	3	120
Organochlorines	14	2	-	-	-	48	21	32
Pyrethroids	9	17	17	17	20	10	8	10
Cyclodiene organochlorines	-	5	7	8	8	7	11	8
Oxime-carbamates	24	20	31	27	17	14	9	6
Benzoylureas	-	-	-	0	1	1	2	1
Oil, mineral	43	26	34	-	32	16	-	-
Total	**546**	**600**	**641**	**429**	**473**	**599**	**544**	**571**

5.4 Oil seeds

Table 5.4.1: Chemical classes of fungicides applied to oilseed crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Benzimidazoles	151	113	135	169	192	248	362	339
Azoles	127	69	77	89	143	101	128	322
Dicarboximides	113	82	52	135	67	163	232	124
Inorganic-sulphur	167	129	85	103	140	139	160	115
Inorganic-coppers	-	-	-	-	-	-	-	78
Dithiocarbamates	65	40	79	95	100	74	59	75
Morpholines	4	6	39	49	71	95	56	57
Organic fungicides-other	8	8	10	8	2	-	-	2
Guanidines	-	-	-	-	-	2	2	0
Anilines	3	2	1	0	0	-	-	-
Phthalic acids	39	30	35	68	27	-	-	-
Ureas	-	-	1	1	0	-	-	-
Total	**677**	**477**	**514**	**717**	**743**	**822**	**999**	**1 113**

Table 5.4.2: Chemical classes of herbicides applied to oilseed crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Amides	752	380	575	883	1 058	1 248	1 425	1 765
Dinitroanilines	44	170	270	221	161	750	3 175	1 752
Chloroacetanilides	1 160	954	1 003	1 278	1 327	1 610	1 900	1 743
Diphenyl-ethers	-	-	-	-	-	572	506	512
Organic herbicides-other	284	218	249	190	262	278	249	213
Quinolinecarboxylic-acids	-	-	32	70	80	163	191	202
Carbamates	-	-	-	-	-	174	126	122
Triazines	140	151	180	137	139	115	127	115
Alkanamide	250	62	216	305	164	106	106	114
Ureas	12	15	31	39	30	116	88	97
Oxyphenoxies	35	101	103	127	128	56	68	70
Cyclohexane dione	15	19	20	23	30	33	41	42
Pyridinecarboxylic-acids	14	20	24	34	34	10	27	24
Benzothiazoles	23	21	17	15	19	11	9	10
Diazines	9	3	6	4	3	3	3	8
Thiadiazines	9	10	8	3	1	10	5	8
Bipyridyliums	51	61	39	38	28	18	21	4
Phosphinico-amino-acids	-	0	7	6	6	9	8	3
Amino-phosphonic-acids	-	1	2	1	1	0	43	2
Triazinones	-	-	-	-	-	-	-	2
Phenoxy nicotineanilides	-	-	-	-	-	1	1	1
Phenoxy carbonic acid	2	3	2	1	2	0	-	0
Pyridyloxy acetic acid	0	0	0	0	0	1	-	0
Thiocarbamates	3	5	11	-	-	-	-	0
Halogenated alkanoic acids	55	13	4	-	-	-	-	-
Imidazolinones	-	-	0	0	-	2	2	-
Total	**2 859**	**2 208**	**2 799**	**3 376**	**3 476**	**5 286**	**8 124**	**6 809**

Table 5.4.3: Chemical classes of insecticides applied to oilseed crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organophosphates	115	88	151	125	91	40	13	154
Oil, mineral	-	1	6	-	12	-	-	56
Carbamates	56	30	33	32	36	6	23	38
Pyrethroids	29	29	38	40	51	37	44	36
Organic insecticides-other	-	-	6	24	23	1	9	27
Oxime-carbamates	-	-	-	-	-	18	7	5
Cyclodiene organochlorines	9	8	2	5	4	2	-	0
Organochlorines	-	-	-	-	-	10	3	0
Total	**209**	**155**	**236**	**226**	**217**	**115**	**99**	**315**

5.5 Potatoes

Table 5.5.1: Chemical classes of fungicides applied to potato crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Dithiocarbamates	4 758	4 442	4 841	4 619	4 349	5 360	5 406	5 739
Carbamates	-	-	25	25	184	314	522	327
Ureas	281	290	261	368	292	249	263	276
Inorganic-coppers	309	300	301	314	334	306	282	255
Morpholines	-	5	39	53	81	159	192	191
Organic fungicides-other	31	49	30	44	108	130	346	156
Organotin fungicides	217	208	195	197	300	207	125	129
Acylalanines	109	100	78	86	71	82	92	70
Phenylamides	58	50	50	51	45	50	54	52
Ethylphosphate	-	-	-	-	-	21	35	36
Dinitroanilines	-	-	2	8	14	29	50	27
Phthalic acids	7	8	6	10	7	8	21	17
Pyrimidines	-	-	-	-	-	11	11	12
Carboxamides	-	-	-	-	0	17	16	11
Benzimidazoles	1	7	6	5	1	2	5	9
Azoles	37	20	10	22	13	2	1	3
Anilines	14	3	4	5	6	3	3	3
Dinitrophenols	5	13	9	8	-	-	-	1
Dicarboximides	-	-	-	-	-	0	0	1
Inorganic-sulphur	-	-	-	-	1	1	2	0
Triazines	2	3	2	2	1	1	0	0
Organophosphates	7	6	7	5	3	7	1	-
Total	**5 836**	**5 503**	**5 866**	**5 823**	**5 813**	**6 959**	**7 427**	**7 313**

Table 5.5.2: Chemical classes of herbicides applied to potato crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Ureas	209	168	199	227	225	281	266	297
Thiocarbamates	911	649	697	885	1 068	204	196	189
Triazinones	251	214	212	223	249	243	238	168
Bipyridyliums	509	508	440	498	472	189	172	132
Hydroxybenzonitril	1	1	1	1	-	0	-	103
Diphenyl-ethers	0	0	-	-	-	51	54	89
Triazines	97	99	106	97	79	87	69	76
Phosphinico-amino-acids	25	47	45	39	44	43	18	60
Oxyphenoxies	6	7	6	7	6	10	9	54
Dinitroanilines	2	3	5	5	3	27	13	33
Chloroacetanilides	34	30	44	32	32	18	22	17
Organic herbicides-other	162	261	283	213	223	-	2	6
Cyclohexane dione	1	2	2	2	1	3	2	4
Carbamates	6	6	4	4	9	2	2	2
Sulfonylureas	-	0	1	1	2	2	2	1
Dinitrophenols	-	-	-	-	-	6	3	1
Thiadiazines	27	42	18	13	9	8	6	1
Phenoxy carbonic acid	3	3	4	3	2	-	1	0
Bis-carbamates	-	-	9	9	7	-	-	0
Amino-phosphonic-acids	6	19	26	35	32	-	9	-
Aryloxyphenoxy-carbonic-acid-derivative	1	0	0	0	-	-	0	-
Halogenated alkanoic acids	21	22	-	-	-	-	-	-
Imidazolinones	-	-	2	1	0	-	-	-
Total	**2 272**	**2 080**	**2 102**	**2 295**	**2 466**	**1 173**	**1 085**	**1 232**

Table 5.5.3: Chemical classes of insecticides applied to potato crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organic insecticides-other	-	2	3	5	7	703	2 834	1 144
Organophosphates	251	216	221	224	193	316	334	428
Oxime-carbamates	4	3	2	3		112	100	96
Carbamates	103	79	61	83	74	42	40	32
Pyrethroids	17	18	21	25	31	18	15	18
Biologicals	-	-	-	-	-	0	0	13
Organochlorines	-	-	-	-	-	0	20	13
Cyclodiene organochlorines	6	13	11	12	12	8	9	2
Benzoylureas	0	0	0	0	0	1	0	0
Oil, mineral	2	1	0	1	1	-	-	-
Tetrazines	2	2	2	2	1	-	-	-
Total	**385**	**334**	**320**	**354**	**318**	**1 200**	**3 353**	**1 746**

5.6 Citrus

Table 5.6.1: Chemical classes of fungicides applied to citrus crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Inorganic-coppers	120	117	148	122	197	153	180	198
Ethylphosphate	199	145	139	200	231	307	163	174
Organotin fungicides	9	9	8	6	5	67	69	67
Dithiocarbamates	251	172	181	104	121	56	57	52
Benzimidazoles	-	-	-	-	2	6	9	7
Acylalanines	3	2	4	5	7	7	8	7
Phenylamides	10	11	3	2	1	1	0	0
Phthalic acids	1	1	11	6	4	-	0	-
Total	**592**	**456**	**494**	**444**	**568**	**597**	**485**	**505**

Table 5.6.2: Chemical classes of herbicides applied to citrus crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Amino-phosphonic-acids	498	612	662	702	824	1 386	1 147	844
Triazines	134	140	128	104	133	153	173	185
Uracils	35	34	36	26	36	35	42	42
Ureas	23	24	26	22	27	22	24	21
Pyridazinones	-	-	5	2	4	5	7	6
Pyridinecarboxylic-acids	-	-	-	-	-	1	1	4
Pyridyloxy acetic acid	-	-	-	-	-	1	3	3
Diphenyl-ethers	1	1	2	2	2	9	9	2
Quinolinecarboxylic-acids	-	-	-	-	-	0	1	2
Dinitroanilines	-	-	-	-	-	1	2	1
Phosphinico-amino-acids	21	16	23	26	28	20	16	0
Bipyridyliums	91	88	94	99	125	-	-	-
Phenoxy carbonic acid	29	28	26	28	2	0	15	-
Triazoles	0	0	0	1	0	0	-	-
Total	**832**	**942**	**1 001**	**1 012**	**1 179**	**1 633**	**1 440**	**1 109**

Table 5.6.3: Chemical classes of insecticides applied to citrus crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Amidines	7	4	9	4	4	1	1	0
Benzilates	8	8	9	8	6	4	2	5
Benzoylureas	0	0	1	17	6	4	3	2
Carbamates	26	20	31	28	28	2	1	3
Cyclodiene organochlorines	16	26	36	16	39	4	3	3
Oil, mineral	706	612	1 668	1 488	1 153	13	78	102
Organochlorines	20	9	7	7	15	1	2	25
Organophosphates	504	473	572	576	408	362	388	764
Oxime-carbamates	79	57	59	44	36	18	22	25
Organic insecticides-other	46	15	18	20	20	8	6	16
Pyrazoles	-	-	-	-	-	1	2	3
Pyrethroids	5	5	5	4	2	1	1	1
Tetrazines	0	0	-	0	-	0	1	2
Ureas	-	-	1	0	0	0	-	-
Total	**1 417**	**1 231**	**2 415**	**2 213**	**1 717**	**421**	**510**	**950**

5.7 Vineyards

Table 5.7.1: Chemical classes of fungicides applied to vineyard crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Inorganic-sulphur	78 032	93 246	84 877	93 516	96 788	97 684	87 354	84 726
Inorganic-coppers	5 148	4 400	4 080	4 227	4 530	5 802	6 796	6 842
Dithiocarbamates	4 619	5 707	4 415	5 494	4 964	5 144	5 021	4 696
Phthalic acids	2 138	2 598	2 574	2 191	2 199	2 714	2 496	2 638
Ethylphosphate	1 672	2 784	2 769	2 965	2 682	2 561	2 495	2 362
Ureas	471	523	453	436	437	503	435	442
Azoles	195	175	251	265	227	183	184	279
Morpholines	-	49	38	57	80	74	88	174
Anilines	254	284	258	259	272	253	245	174
Anilinopyrimidils	-	-	33	50	72	126	144	143
Dicarboximides	140	245	237	236	204	174	155	139
Acylalanines	112	113	92	101	112	115	112	117
Strobilurines	-	-	-	-	-	5	24	100
Dinitrophenols	60	64	59	62	72	61	78	90
Phenylamides	107	98	92	88	84	76	78	81
Anthraquinones	106	137	63	118	130	105	93	75
Organic fungicides-other	16	17	16	26	19	54	27	54
Phenylpyrroles	-	-	-	8	13	20	27	40
Benzimidazoles	47	72	68	65	73	53	40	34
Organotin fungicides	10	4	4	3	3	27	20	25
Pyrimidinyl-carbinols	7	8	6	5	7	27	24	23
Organophosphates	4	5	6	6	6	8	21	11
Phenyl-carbamates	-	-	-	-	-	11	0	6
Pyrimidines	-	-	-	-	-	-	-	2
Piperazines	0	1	1	0	0	-	0	-
Total	**93 140**	**110 532**	**100 390**	**110 181**	**112 973**	**115 778**	**105 957**	**103 274**

Table 5.7.2: Chemical classes of herbicides applied to vineyard crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Amino-phosphonic-acids	954	1 153	1 380	1 594	1 676	1 644	1 947	1 929
Triazines	1 389	1 150	1 403	1 429	1 374	1 312	1 106	889
Inorganic-herbicides	344	340	342	403	413	636	718	706
Triazoles	407	383	383	436	428	461	466	397
Ureas	185	307	345	452	567	789	677	392
Dinitroanilines	100	-	2	1	2	191	226	288
Pyridazinones	79	89	82	101	77	83	89	88
Bipyridyliums	264	243	153	261	263	62	67	57
Benzonitrile	304	442	297	253	12	36	38	50
Cyclohexane dione	0	0	-	-	-	68	44	33
Phosphinico-amino-acids	37	59	46	58	53	43	57	30
Amides	14	14	12	13	12	13	13	14
Phenoxy carbonic acid	41	32	5	2	4	6	6	8
Diphenyl-ethers	0	0	0	0	0	1	1	2
Pyridyloxy acetic acid	-	-	-	-	-	0	1	1
Alkanamide	-	-	-	-	-	4	-	-
Organic herbicides-other	-	-	-	-	-	-	17	-
Total	**4 119**	**4 212**	**4 451**	**5 004**	**4 881**	**5 348**	**5 472**	**4 885**

Table 5.7.3: Chemical classes of insecticides applied to vineyard crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organic insecticides-other	60	55	49	36	38	974	1 231	2 578
Organophosphates	541	579	586	560	486	783	730	596
Oxime-carbamates	148	155	130	122	126	80	71	86
Oil, mineral	50	63	54	30	147	165	51	38
Carbamates	60	29	50	136	114	32	42	37
Benzilates	27	27	24	31	27	33	39	32
Benzoylureas	2	4	6	9	12	21	21	18
Pyrethroids	20	24	24	25	22	20	21	18
Organochlorines	43	36	27	23	24	25	13	16
Cyclodiene organochlorines	4	12	4	9	20	22	16	9
Organic herbicides-other	-	-	-	-	-	-	-	7
Diazylhydrazines	-	-	1	3	3	4	3	4
Organotin fungicides	3	2	6	3	4	4	3	2
Oil, vegetable	-	0	-	33	-	6	-	2
Pyrazoles	-	-	-	0	0	0	4	2
Biologicals	0	2	1	2	5	8	4	2
Tetrazines	14	12	13	11	8	4	2	1
Amidines	0	0	0	0	0	1	0	-
Total	**972**	**999**	**976**	**1 033**	**1 035**	**2 183**	**2 251**	**3 448**

5.8 Tree fruits

Table 5.8.1: Chemical classes of fungicides applied to tree fruit crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Inorganic-sulphur	5 388	5 733	5 948	6 256	5 049	6 261	5 720	4 948
Dithiocarbamates	3 078	3 713	3 355	3 609	2 918	2 735	2 715	2 475
Inorganic-coppers	1 276	1 045	1 096	1 076	1 195	1 247	1 390	1 455
Phthalic acids	1 631	1 658	1 582	2 051	1 806	1 204	874	704
Anthraquinones	218	222	250	271	273	331	327	296
Anilines	174	211	227	314	331	263	267	293
Benzimidazoles	129	157	153	139	189	197	165	131
Ethylphosphate	50	35	48	55	73	55	68	98
Azoles	96	86	94	101	126	90	88	91
Guanidines	100	100	97	101	91	74	98	86
Anilinopyrimidils	-	-	-	-	5	33	63	64
Dicarboximides	20	27	30	44	31	92	60	46
Dinitrophenols	102	106	94	93	73	43	43	34
Piperazines	32	25	31	43	45	60	82	24
Organic fungicides-other	56	51	42	33	46	35	32	17
Pyrimidines	24	26	27	33	25	7	8	10
Organotin fungicides	13	11	11	9	6	6	10	10
Pyrimidinyl-carbinols	3	5	5	4	6	8	10	10
Morpholines	-	-	1	1	1	1	3	5
Organophosphates	3	3	3	3	3	2	4	4
Phenylpyrroles	-	-	-	-	-	0	0	1
Acylalanines	0	0	0	0	1	0	0	0
Carbamates	-	-	-	-	-	2	-	-
Total	**12 393**	**13 214**	**13 094**	**14 236**	**12 294**	**12 757**	**12 055**	**10 843**

Table 5.8.2: Chemical classes of herbicides applied to tree fruit crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Amino-phosphonic-acids	104	146	238	270	322	411	454	394
Bipyridyliums	298	270	284	304	313	230	193	223
Triazines	133	109	131	117	114	118	117	119
Dinitroanilines	17	21	20	21	20	65	62	85
Phosphinico-amino-acids	44	77	58	64	57	39	51	38
Ureas	58	60	43	100	98	86	72	35
Phenoxy carbonic acid	605	500	626	614	313	13	13	14
Pyridazinones	20	23	27	26	33	16	-	12
Uracils	6	6	6	5	6	9	10	8
Diphenyl-ethers	0	0	1	1	1	4	5	5
Triazoles	91	53	99	53	41	19	4	3
Amides	3	3	1	2	3	3	4	3
Benzoic-acids (auxins)	1	0	0	0	1	2	1	1
Organic herbicides-other	0	0	1	0	1	-	-	1
Phenoxy nicotineanilides	-	-	-	0	2	0	0	0
Cyclohexane dione	0	3	4	6	0	0	0	0
Inorganic-herbicides	26	29	73	36	31	16	-	-
Total	**1 407**	**1 301**	**1 613**	**1 619**	**1 356**	**1 032**	**987**	**941**

Table 5.8.3: Chemical classes of insecticides applied to tree fruit crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Oil, mineral	1 156	1 729	1 693	1 670	1 705	2 252	2 280	2 250
Organophosphates	907	919	996	940	857	1 028	1 040	996
Organic insecticides-other	108	128	110	104	102	162	188	268
Carbamates	120	101	116	112	98	98	113	110
Oxime-carbamates	43	40	45	48	50	42	41	39
Amidines	77	82	81	79	96	70	69	33
Benzoylureas	16	23	18	21	22	22	19	27
Pyrethroids	25	22	21	17	15	39	35	21
Cyclodiene organochlorines	15	16	31	27	43	27	28	17
Benzilates	37	29	25	24	20	16	12	16
Diazylhydrazines	-	-	0	2	4	6	7	9
Pyrazoles	-	1	4	7	8	9	8	9
Biologicals	1	1	1	1	2	10	6	9
Organotin fungicides	24	19	16	10	11	10	9	9
Organochlorines	8	4	4	4	4	4	5	7
Oil, vegetable	-	5	-	1	-	9	-	2
Tetrazines	10	10	7	5	1	3	2	1
Ureas	-	-	1	-	-	-	-	-
Total	**2 545**	**3 129**	**3 169**	**3 074**	**3 039**	**3 809**	**3 861**	**3 823**

5.9 Vegetables

Table 5.9.1: Chemical classes of fungicides applied to vegetable crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Inorganic-sulphur	2 160	3 591	2 726	2 882	2 840	1 226	985	1 230
Inorganic-coppers	439	413	421	476	535	534	517	529
Dithiocarbamates	683	512	436	439	381	586	613	514
Organic fungicides-other	207	390	397	473	508	143	128	269
Dicarboximides	315	220	141	113	130	102	102	93
Benzimidazoles	97	96	77	62	68	59	57	41
Ureas	17	20	31	26	27	31	28	33
Acylalanines	39	33	40	56	45	25	23	26
Morpholines	126	63	23	120	101	15	12	18
Azoles	28	30	29	28	29	8	7	13
Phenylamides	9	8	11	9	18	11	6	8
Phthalic acids	33	31	33	40	32	10	12	6
Pyrimidines	28	15	17	23	12	6	-	5
Dinitrophenols	6	8	8	9	8	4	5	4
Anilinopyrimidils	-	-	-	-	-	2	4	3
Phenylpyrroles	-	-	-	-	-	1	2	2
Pyrimidinyl-carbinols	1	2	2	2	2	2	3	2
Organotin fungicides	2	2	2	2	2	3	0	2
Piperazines	-	-	-	-	-	2	1	0
Ethylphosphate	78	101	114	140	119	-	-	-
Total	**4 270**	**5 534**	**4 508**	**4 901**	**4 859**	**2 770**	**2 504**	**2 798**

Table 5.9.2: Chemical classes of herbicides applied to vegetable crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Dinitroanilines	153	220	96	76	79	243	627	641
Thiadiazines	332	444	202	223	378	362	377	426
Thiocarbamates	29	-	29	19	23	326	305	342
Triazines	64	96	156	167	142	154	160	149
Bipyridyliums	308	294	258	300	326	56	140	105
Phenoxy carbonic acid	92	113	63	72	86	87	96	93
Diphenyl-ethers	2	1	2	7	7	3	4	43
Amino-phosphonic-acids	20	75	82	139	117	12	35	38
Triketones	-	-	-	-	-	36	32	36
Cyclohexane dione	8	12	14	14	14	18	19	16
Oxyphenoxies	0	38	35	43	42	20	20	16
Diazines	-	-	-	2	8	11	13	14
Triazinones	5	5	7	8	7	7	7	8
Chloroamides	2	-	2	2	2	5	8	7
Organic herbicides-other	1	1	1	0	0	14	9	6
Ureas	53	32	24	60	63	105	43	5
Chloroacetanilides	291	309	356	386	412	4	2	2
Amides	-	1	1	1	0	0	0	0
Carbamates	7	-	-	-	-	-	-	-
Hydroxybenzonitril	2	3	1	3	8	6	4	-
Phosphinico-amino-acids	1	1	1	1	1	-	-	-
Pyrazoles	18	13	-	-	-	-	-	-
Quinolinecarboxylic-acids	-	9	30	44	58	-	-	-
Uracils	1	1	2	2	2	-	-	-
Total	**1 390**	**1 668**	**1 362**	**1 570**	**1 774**	**1 468**	**1 899**	**1 948**

Table 5.9.3: Chemical classes of insecticides applied to vegetable crops *(in tonnes of AI)*

	1992	1993	1994	1995	1996	1997	1998	1999
Organic insecticides-other	45	46	45	17	16	1 649	1 145	1 919
Oxime-carbamates	78	74	81	86	89	85	98	132
Organophosphates	123	151	160	130	124	59	62	68
Carbamates	97	71	67	81	70	16	16	16
Pyrethroids	16	16	17	28	23	9	8	11
Benzilates	3	3	7	6	4	5	6	6
Benzoylureas	0	0	0	0	2	3	3	4
Cyclodiene organochlorines	3	3	6	6	6	5	3	3
Biologicals	3	4	5	8	9	7	4	2
Organochlorines	3	2	2	2	2	2	2	2
Pyrazoles	-	-	-	-	-	1	-	-
Total	**369**	**371**	**392**	**365**	**346**	**1 841**	**1 347**	**2 164**

Chapter 6
Methodological notes

6.1 Data source

Data included in this publication has been prepared for Eurostat by the European Crop Protection Association (ECPA). The ECPA is made up of seven full member companies: Aventis Crop Science (a merger of AgrEvo and Rhône Poulenc), BASF (which has incorporated American Cyanamid), Syngenta (resulting from the purchase of Zeneca by Novartis), Bayer, Du Pont de Nemours, Dow AgroSciences and Monsanto. Together, these seven companies cover about 90% of the European market of plant protection products.

This large market share ensures that the data displayed are reliable and should provide good estimates of the use of plant protection products (PPPs) in the European Union and in Member States. Although not all components of crop protection in the EU are covered, the data presented is considered to be fairly representative of the total use.

In general, the data is derived from market research surveys. Manufacturers of plant protection products subscribe to projects offered by professional market research institutes. These institutes have established a panel of farmers who have committed themselves to record their PPP use by target crop, target pest, disease or weed, and application rates, among various other parameters.

The information and data resulting from the panel research is then subject to review by the subscribing companies and, when serious inconsistencies occur with regard to companies' proprietary product data, corrections are made.

ECPA has developed a database that compiles identical active ingredients (A.I.) marketed by different companies. This global database is filtered, extracting the volumes for products marketed by the individual companies in such a way that active ingredient volumes cannot, for confidentiality reasons, be allocated to the original source. The rules for the treatment of confidential data are applied: if there are only three or less producers of an active ingredient, then the figures for this substance are not shown in the TOP-5 tables and have been replaced with a 'c'.

Furthermore, active ingredient information has been compiled and structured according to the chemical classes they belong to.

The data reported here represents the total volume of active ingredient (A.I.) used on the observed crops during the respective 'harvest year'. There are substantial differences between volume sold and volume used in one year. Use data is estimated by adding initial stocks and deducting year-end surplus stocks, thus identifying the actual volume used. Therefore the figures included in this publication represent crop year / harvest year actual use while calendar year sales data often also contains stocks, which are not actually consumed in a specific crop year.

For this edition the time series published in the previous publication[1] have been revised to include more components of plant protection, such as data on seed dressing fungicides, which are now included in the "Fungicides" category, nematicides, included in "Insecticides", and cereal growth regulators, presented as a new group. The A.I. volume reported covers more than 90% of the PPP use for the listed crops and product groups.

Using this methodology it is possible to produce data on the use of PPP at the EU-15 level and at national level, with a few exceptions. One exception is data for Belgium and Luxembourg that are always estimated together. The other exception is the Scandinavian countries that due to their minor importance with regard to market share volumes are often reported in a summarised form as the "Nordic Region" (Denmark, Finland, Sweden) without further specifying the individual countries. Nevertheless, where individual country data is available, these are also included here.

Among the EU Member States, only The Netherlands, Sweden and the United Kingdom conduct specific surveys on the usage of pesticides in agriculture. Therefore the ECPA database has a high value for institutional and other users of these data.

When comparing figures from the ECPA / Eurostat database with data from national industry associations, one must be aware that active ingredient volumes reported by the national organisations comprise all uses and chemical classes of crop protection products in calendar year sales.

Large differences may also result between this study and Industry Association data in countries with substantial PPP use in minor crop areas, which are not covered by this study at the EU scale.

For a complete picture of pesticides use, this publication should be seen together with national publications and databases when available.

[1] Plant Protection Products in the EU - Consumption of plant protection products in the European Union- Data 1992-1996, European Commission, 2000- ISBN 92-894-0437-X.

6.2 Crops coverage and calculation methods

The crops covered represent the majority of the significant applications of PPP in the EU. As far as possible, crops are shown at a detailed level. Where a breakdown of PPP use for individual crops is not possible or feasible, crop groups, e.g. "cereals" or "tree fruits" are used instead. Additionally crops are grouped into "arable" (beets, cereals, maize, potatoes, oilseeds) and "speciality" (citrus, pomaceous and stone fruits, vineyards) for analytical purposes. Vegetables are included in "speciality crops" for countries where they are significant.

While data for sugar beets, maize, potatoes, citrus and vineyards are generally allocated directly to the target crops due to their crop-specific action, some compounds with broad use spectrums, where the final target crop is not identifiable, are reported for groups of crops only. This is the case for cereals, fruits and vines, oilseeds, and vegetables containing any of the specified crops in varying ratios. Therefore for comparisons of use, the data at crop group level is the more reliable basis. Whenever possible, PPP use is allocated pro rata to individual crops (wheat and barley; fruit trees and vineyards) according to ratios provided by the reporting company.

Dosages of PPP are calculated dividing the volume of active ingredients used in each crop by the area occupied by this crop. Area of crops are extracted from NewCronos/ theme5/domain zpa_1.

Table 6.1: Breakdown of crops

Crop groups *underlined* are those used for the calculation of crop areas and application rates. For example, the crop areas and application rates given for cereals include only wheat and barley

Crop types	Crop groups	
Arable crops	Cereals:	- *Wheat* (Winter wheat, spring wheat, hard (durum) wheat) - *Barley* (Winter barley, spring barley) - Non specified cereals
	Sugar beets:	- *Sugar beets* - Fodder beets
	Maize:	- Grain corn / maize - Green silage corn / maize
	Oilseeds:	- Rape (Winter rape, spring rape) - Sunflower seeds
	Potatoes:	- Ware- and seed potatoes
Speciality crops	*Citrus:*	- All types
	Vineyards:	- Grapes
	Tree fruits:	- Pome fruits (*Apples, pears, dessert type only*) - *Stone fruits* (Cherries, plums, apricots, nectarines, peaches, etc., only commercial fruit trees/ orchards) - Orchards - Non specified fruits
	Vegetables:	- Brassicas (Cabbages, cauliflower, Brussels sprouts, turnip rape etc.) - Cucurbits (Cucumbers, melons, squash, gherkins, zucchini etc.) - Peas and beans (pulses) for fresh or canned consumption. - Tomatoes - Non specified vegetables

6.3 Plant Protection Products and groups

Active ingredients (A.I.) of PPPs are listed according to their common names as defined in the Pesticides Manual of the British Crop Protection Council (BCPC)[2]. The structure of the A.I.s groups also follows the BCPC classification as far as possible.

The product groups covered are the main constituents of the crop protection portfolio, i.e. fungicides, herbicides, insecticides and also plant growth regulators. Fungicides also comprise compounds used as seed treatments; insecticides also contain acaricides and nematicides. Other active ingredient groups also used in agriculture like molluscicides, rodenticides and growth regulators (except cereal GRs) were omitted as negligible in this context. Also not included are uses of these agents for non-agricultural sectors, e.g. public hygiene.

6.3.1 Fungicides

Fungicides are compounds used to protect crops from diseases caused by fungal pathogens. Fungal diseases threaten crops from the germination phase to harvest and also cause substantial damage to the harvest in storage. Phytopathogenic fungi are ubiquitous and are generally dispersed through the air as spores. When the spores land on the plant surface, they germinate when conditions (temperature, moisture) are favourable, depending on the species of fungus. Once the germinated spores have penetrated the plant epidermis and the fungus mycelium has spread in the plant tissue, it cannot be controlled by classical fungicides. Fungal diseases generally can be controlled only by prophylactic action to prevent germinating spores penetrating the plant tissue. Therefore, classical fungicides are applied frequently to maintain a protective layer of active ingredient, especially during the phase of rapid crop growth and under heavy rainfall conditions. Negligence in the control of fungal diseases can sometimes destroy the complete harvest for a year. Therefore, under intensive cropping systems, monitoring environmental conditions for disease incidence to determine the optimal timing for fungicide applications is indispensable. Modern fungicides frequently also have curative action, as they are systemic, i.e. they are able to penetrate the plant tissue and attack the mycelium in the plant cells.

This curative action, however, is only limited to a brief period after the infection has occurred and can not be relied on as a standard measure. Classical protective fungicides still form the backbone of fungal disease control.

6.3.2 Herbicides

Herbicides are used to control undesirable or noxious plant growth, generally called weeds, in areas dedicated to crop production or in non-crop areas where plant growth is unwanted. Besides keeping competing vegetation at bay in cultivated crops, weed control is necessary to enable or facilitate mechanical harvesting. Also, contamination of harvested seed and grain crops with weed seeds is of concern for the grain trade and the processing industry - for example the flour producers - and contaminated harvests result in substantial cuts in net profits for the farmer.

Herbicides can be either selective or non-selective in their action. Selective herbicides can be applied before the emergence of the weeds or crop or post-emergence. They are generally applied once to a crop in its early development stage, when weeds can do the most damage as they compete for water, nutrients and light. The mode of action of these herbicides is either by uptake through the roots (residual action) or through the leaves (foliar action) of the target weeds. Generally, selective herbicides are classified by the type of target weeds: broadleaf herbicides, grassy weed killers (graminicides) or broad spectrum herbicides, which control grassy weeds and broadleaf weeds in selected crops. Selective herbicides are most frequently used in arable crops, e.g. cereals, sugar beets, potatoes, maize, etc. Selective herbicides are becoming more and more sophisticated. While classical herbicides were active at dosage rates of around 0,5 to 1 kg of active ingredient per ha or more (TCA, for example, controlled couch grass at dosages as high as 60 kg/ha), novel products like sulfonylureas are applied at rates as low as 10 to 25 g/ha. All herbicides are usually broken down or metabolised at the end of the cropping period without leaving detectable residues. Even after years of intensive use on selected areas, there is no record of herbicide accumulation in the soil, which might pose a hazard for subsequent crops.

Non-selective herbicides do not differentiate between crops and weeds in their action and are most frequently used for total vegetation control (T.V.C.) in established

[2] The Pesticide Manual: A World Compendium, Clive Tomlin, British Crop Protection Council, 1997, ISBN: 1-901396-12-6..

crops, e.g. vineyards, orchards or around the farm to keep utility areas free of unwanted plant growth. T.V.C. herbicides can also have residual and/or foliar action. Foliar T.V.C. herbicides are also used to control weed growth in set-aside areas during the idle period or to clean up the fields before they are put back into production. Another important area of use is to desiccate crop foliage of crops to facilitate mechanical harvesting or to kill couch grass (Agropyron repens) in the stubble after harvesting cereals.

6.3.3 Insecticides

Unlike fungicides, insecticides, the classical "pesticides", are applied only when the pest incidence is manifest. They are only applied as protective measure against attack from soil insects when incorporated into a seed dressing. Insecticides can act via contact, inhalation or ingestion on the target pest. Monitoring environmental conditions for pest incidence is indispensable in integrated cropping systems.

Lately, biological means of pest control have also been developed, i.e. utilisation of specific insecticidal pathogens such as Bacillus thuringiensis toxin or pest-specific virus toxins for the control of mainly Lepidoptera larvae. Predator insects are also propagated as means of biological pest control. Pheromone traps are frequently used to monitor insect mating periods to determine the optimal timing for defence measures against emerging larvae, before they have penetrated the host tissue where they are uncontrollable by common insecticides. Biological control measures generally are highly sophisticated and call for exact and continuous monitoring of pest incidences. Furthermore, biological insecticidal agents often call for more rather than less applications as they are usually broken down very fast after application. The main target for insecticides in the European Union are aphids, which cause damage to crops not only through their sucking action on tender tissue, but also because they are frequently vectors for virus diseases, and larvae of moths (Lepidoptera). A specific segment in pest control is represented by acaricides used against spider mites, which frequently cause severe damage to the foliage of perennial crops, e.g. citrus, orchard trees and vines.

6.3.4 Growth Regulators

Plant growth regulators are organic compounds that modify or control one or more specific physiological processes within a plant in order to accelerate or retard the rate of the normal growth, flowering or reproduction rate of plants. If the compound is produced within the plant it is called a plant hormone.

For instance, growth regulators are used to reduce the growth of cereals so that they do not become too tall and prone to 'lodging' before harvest.

Plant regulators are characterised by their low rates of application. The recommended dosage is 1kg/ha, high application rates of the same compounds often are considered herbicidal. Growth regulators are often applied together as mixtures with other PPPs. Typical active ingredients are Chlormequat-chloride, Mepiquat-chloride, Ethephon, Cholin-chloride.

In this study only cereal growth regulators have been considered.

Links for further reading

The following list of web-links is a selection of sources that are regularly consulted by the author. It does not present a comprehensive list of all involved institutions, but the sites may provide complementary information to this publication.

European Institutions:

DG Environment:

Commission Communication 'Towards a Thematic Strategy on the Sustainable Use of Pesticides' (2002) COM(2002) 349 final
http://www.europa.eu.int/eur-lex/en/com/pdf/2002/com2002_0349en01.pdf

DG Health and Consumer Protection:

Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market
http://www.europa.eu.int/comm/food/fs/ph_ps/pro/index_en.htm

DG Health and Consumer Protection: Results from the pesticides residues monitoring programme:
http://www.europa.eu.int/comm/food/fs/inspections/fnaoi/reports/annual_eu/index_en.html

DG Eurostat:

Technical Action Plan for the improvement of Agricultural Statistics, TAPAS and Guidance Documents on Pesticides usage surveys:
http://www.forum.europa.eu.int/Public/irc/dsis/pip/library?l=/indicators_pesticides

National Institutions:

Austria - Umweltbundesamt: www.umweltbundesamt.at

Belgium - Ministère des Classes Moyennes et de l'Agriculture: http://cmlag.fgov.be/

Danmark - Danish Environmental Protection Agency: http://www.mst.dk/

Finland - Plant Protection Inspection Centre, KTTK: http://www.kttk.fi/_frames/toralku.htm

France - Ministère de l'Ecologie et du Developpement durable:
http://www.environnement.gouv.fr/actua/proposit/2002/pesticides.htm

Germany - Biologische Bundesanstalt für Land- und Forstwirtschaft, BBA: http://www.bba.de/

Greece - Hellenic Ministry of Agriculture: http://www.minagric.gr

Ireland - Pesticides Control Service (PCS): http://www.irlgov.ie/daff/

Italy - Istituto Nazionale di Economia Agraria, INEA: www.inea.it

The Netherlands - Statistics Netherlands, CBS: http://www.cbs.nl

Portugal - Ministério da Agricultura, do Desenvolvimento rural e das Pescas:
http://www.min-agricultura.pt/

Spain - Ministerio de Agricultura, Pesca y Alimentación, MAPYA: http://www.mapya.es/

Sweden - Kemikalieninspektionen, KEMI: www.kemi.se

United Kingdom - Central Science Laboratory, CSL: http://www.csl.gov.uk

Industry Associations:

European Crop Protection Association, ECPA: http://www.ecpa.be/

International Biocontrol Manufacturers Organisation, IBMA: http://www.ibma.ch/

Croplife International: http://www.croplife.org/

Austria - Fachverband der chemischen Industrie Österreichs: http://fcio.at/

Belgium - Belgian Association of Plant Protection Products Industry, Phytofar: http://www.fedichem.be/EN/SEC/section/section332pen.htm

Danmark - Danish Plant Protection Association: http://www.plantevaern.dk/

Finland - Kasvinsuojeluteollisuus ry, KASTE, mailto: saara.hassinen@kemia.ttliitot.fi

France - Union des Industries de la Protection des Plantes, UIPP: http://www.uipp.org/

Germany - Industrieverband Agrar (IVA): http://www.iva.de/

Greece - Hellenic Crop Protection Association, HCPA: http://www.esyf.gr

Ireland - Animal and Plant Health Association: http://www.apha.ie/

Italy - Associazione Nazionale Imprese Prodotti Fitosanitari (Agrofarma): http://agrofarma.federchimica.it/

The Netherlands - Nederlandse Stichting voor Fytofarmacie, NEFYTO: http://www.nefyto.nl

Portugal - Associação Nacional da Indústria para a Protecção das Plantas, ANIPLA, mailto: anipla@mail.telepac.pt

Spain - Asociación Empresarial para la Protección de las Plantas, AEPLA: http://www.aepla.es/

Sweden - Association of the Swedish Plant and Wood Protection Industry, IVT: http://www.chemind.ihb.se/Kemikontoret-eng/scripts-eng/prod.cfm?pType=IVT

United Kingdom - Crop Protection Association, CPA: http://www.cropprotection.org.uk/

International Organisations:

Food and Agriculture Organization of the United Nations, FAO: http://www.fao.org/ag/

Organisation for Economic Cooperation and Development, OECD: http://www.oecd.org/ehs

World Health Organisation, WHO: http://www.who.int/health_topics/pesticides/en/

Non Governmental Organisations:

European Environmental Bureau, EEB: www.eeb.org

Pesticides Action Network, PAN: http://www.pan-europe.net/

Annexes

From Active ingredients to chemical class

Active ingredients in *Italics*: used in 1992, but not in 1999
Active ingredients in **bold**: new since 1992

Action : F '= fungicide; H '= herbicide; I '= insecticide; GR '= growth regulator

Active Ingredient	Chemical class	ACTION
2,4-D	PHENOXY CARBONIC ACID	H
2,4-DB	PHENOXY CARBONIC ACID	H
A		
ABAMECTIN	ORGANIC INSECTICIDES-OTHER	I
ACEPHATE	ORGANOPHOSPHATES	I
ACETOCHLOR	CHLOROACETANILIDES	H
ACIBENZOLAR	ORGANIC FUNGICIDES-OTHER	F
ACIFLUORFEN	DIPHENYL-ETHERS	H
ACLONIFEN	DIPHENYL-ETHERS	H
ACRINATHRIN	PYRETHROIDS	I
ALACHLOR	CHLOROACETANILIDES	H
ALDICARB	OXIME-CARBAMATES	I
ALDIMORPH	MORPHOLINES	F
ALLOXYDIM	CYCLOHEXANE DIONE	H
ALPHA-CYPERMETHRIN	PYRETHROIDS	I
AMETRYNE	TRIAZINES	H
AMIDOSULFURON	SULFONYLUREAS	H
AMITRAZ	AMIDINES	I
AMITROLE	TRIAZOLES	H
AMMONIUM THIOCYANATE	INORGANIC-HERBICIDES	H
ANILAZINE	TRIAZINES	F
ANTHRAQUI**NONE**	ANTHRAQUINONES	F
ASULAM	CARBAMATES	H
ATRAZINE	TRIAZINES	H
AZINPHOS	ORGANOPHOSPHATES	I
AZINPHOS-E	ORGANOPHOSPHATES	I
AZINPHOS-M	ORGANOPHOSPHATES	I
AZIPROTRYN	TRIAZINES	H
AZOCYCLOTIN	ORGANOTIN FUNGICIDES	I
B		
BACILLUS THURINGIENSIS	BIOLOGICALS	I
BA-POLYSULFIDE	INORGANIC-SULPHUR	F
BENALAXYL	ACYLALANINES	F
BENAZOLIN	BENZOTHIAZOLES	H
BENDIOCARB	CARBAMATES	I
BENFLURALIN	DINITROANILINES	H
BENFURACARB	CARBAMATES	I
BENFURESATE	BENZOFURANES	H
BENOMYL	BENZIMIDAZOLES	F
BENOXACOR	BENZOXAZINES	H
BENTAZONE	THIADIAZINES	H
BENZOXIMATE	ORGANIC INSECTICIDES-OTHER	I
BENZTHIAZURON	UREAS	H

B

BETACYFLUTHRIN	PYRETHROIDS	I
BIFENOX	DIPHENYL-ETHERS	H
BIFENTHRIN	PYRETHROIDS	I
BIOLOGICAL	BIOLOGICALS	I
BITERTANOL	AZOLES	F
BROMACIL	URACILS	H
BROMOFENOXIM	HYDROXYBENZONITRIL	H
BROMOPROPYLATE	BENZILATES	I
BROMOXYNIL	HYDROXYBENZONITRIL	H
BROMUCONAZOLE	AZOLES	F
BUPIRIMATE	PYRIMIDINES	F
BUPROFEZIN	ORGANIC INSECTICIDES-OTHER	I
BUTOCARBOXIM	OXIME-CARBAMATES	I

C

CAPTAN	PHTHALIC ACIDS	F
CARBARYL	CARBAMATES	I
CARBENDAZIM	BENZIMIDAZOLES	F
CARBETAMIDE	CARBAMATES	H
CARBOFURAN	CARBAMATES	I
CARBOSULFAN	CARBAMATES	I
CARBOXIN	OXIME-CARBAMATES	F
CARFENTRAZONE	ORGANIC HERBICIDES-OTHER	H
CHLORBROMURON	UREAS	H
CHLORBUFAM	CARBAMATES	H
CHLORFENVINPHOS	ORGANOPHOSPHATES	I
CHLORFLUAZURON	BENZOYLUREAS	I
CHLORIDAZONE	PYRIDAZINONES	H
CHLORMEPHOS	ORGANOPHOSPHATES	I
CHLORMEQUAT-CHLORIDE	**PLANT GROWTH REGULATORS**	GR
CHLOROTHALONIL	ORGANIC FUNGICIDES-OTHER	F
CHLOROTOLURON	UREAS	H
CHLORPROPHAM	CARBAMATES	H
CHLORPYRIFOS	ORGANOPHOSPHATES	I
CHLORSULFURON	SULFONYLUREAS	H
CHLORTHAL	BENZOIC-ACIDS (AUXINS)	H
CHOLIN-CHLORIDE	**PLANT GROWTH REGULATORS**	GR
CINIDON-ETHYL	PHENOXY CARBONIC ACID	H
CLETHODIM	CYCLOHEXANE DIONE	H
CLODINAFOP	ARYLOXYPHENOXY-CARBONIC-ACID-derivative	H
CLOFENTEZINE	TETRAZINES	I
CLOMAZONE	ORGANIC HERBICIDES-OTHER	H
CLOPYRALID	PYRIDINECARBOXYLIC-ACIDS	H
CLOQUINTOCET	ORGANIC HERBICIDES-OTHER	H
COPPER	INORGANIC-COPPERS	F
COPPER HYDROXIDE	INORGANIC-COPPERS	F
COPPER OXIDE	INORGANIC-COPPERS	F
COPPER OXYCHLORIDE	INORGANIC-COPPERS	F
COPPER SULFATE	INORGANIC-COPPERS	F
CYANAZINE	TRIAZINES	H
CYCLOATE	THIOCARBAMATES	H
CYCLOXYDIM	CYCLOHEXANE DIONE	H
CYCLURON	UREAS	H
CYFLUTHRIN	PYRETHROIDS	I

C

CYHEXATIN	ORGANOTIN FUNGICIDES	I
CYMOXANIL	UREAS	F
CYPERMETHRIN	PYRETHROIDS	I
CYPROCONAZOLE	AZOLES	F
CYPRODINIL	ANILINOPYRIMIDILS	F
CYROMAZINE	ORGANIC INSECTICIDES-OTHER	I

D

DALAPON	HALOGENATED ALKANOIC ACIDS	H
DAZOMET	METHYL-ISOTHIOCYANATE	I
DELTAMETHRIN	PYRETHROIDS	I
DEMETON-S-METHYL	ORGANOPHOSPHATES	I
DESMEDIPHAM	BIS-CARBAMATES	H
DESMETRYN	TRIAZINES	H
DIAFENTHIURON	UREAS	
DIAZINON	ORGANOPHOSPHATES	I
DICAMBA	BENZOIC-ACIDS (AUXINS)	H
DICHLOBENIL	BENZONITRILE	H
DICHLOFLUANID	ANILINES	F
DICHLORMID	CHLOROAMIDES	H
DICHLOROPROPENE	ORGANIC INSECTICIDES-OTHER	I
DICHLORPROP	PHENOXY CARBONIC ACID	H
DICHLORPROP-P	PHENOXY CARBONIC ACID	H
DICHLORVOS	ORGANOPHOSPHATES	I
DICLOFOP	ARYLOXYPHENOXY-CARBONIC-ACID-derivative	H
DICLORAN	ORGANIC FUNGICIDES-OTHER	F
DICOFOL	ORGANOCHLORINES	I
DIETHOFENCARB	**PHENYL-CARBAMATES**	F
DIFENOCONAZOLE	AZOLES	F
DIFENOXURON	UREAS	H
DIFENZOQUAT	PYRAZOLES	H
DIFLUBENZURON	BENZOYLUREAS	I
DIFLUFENICAN	PHENOXY NICOTINEANILIDES	H
DIMEFURON	UREAS	H
DIMETHACHLOR	CHLOROACETANILIDES	H
DIMETHENAMIDE	AMIDES	H
DIMETHOATE	ORGANOPHOSPHATES	I
DIMETHOMORPH	MORPHOLINES	F
DINICONAZOLE	AZOLES	F
DINITRAMINE	DINITROANILINES	H
DINOCAP	DINITROPHENOLS	F
DINOTERB	DINITROPHENOLS	H
DIOXATHION	ORGANOPHOSPHATES	I
DIQUAT	BIPYRIDYLIUMS	H
DISULFOTON	ORGANOPHOSPHATES	I
DITHIANON	ANTHRAQUINONES	F
DIURON	UREAS	H
DNOC	DINITROPHENOLS	F
DODINE	GUANIDINES	F

E

ENDOSULFAN	CYCLODIENE ORGANOCHLORINES	I
EPOXYCONAZOLE	AZOLES	F
EPTAM	ORGANIC HERBICIDES-OTHER	H
EPTC	THIOCARBAMATES	H
ESFENVALERATE	PYRETHROIDS	I
ETHEPHON	**PLANT GROWTH REGULATORS**	GR
ETHIOFENCARB	CARBAMATES	I
ETHION	ORGANOPHOSPHATES	I
ETHIRIMOL	PYRIMIDINES	F
ETHOFUMESATE	BENZOFURANES	H
ETHOPROPHOS	ORGANOPHOSPHATES	I
ETRIDIAZOLE	AZOLES	F

F

FAMOXADONE	ORGANIC FUNGICIDES-OTHER	F
FENAMIPHOS	ORGANOPHOSPHATES	I
FENARIMOL	PYRIMIDINYL-CARBINOLS	F
FENAZAQUIN	ORGANIC INSECTICIDES-OTHER	I
FENBUCONAZOLE	AZOLES	F
FENBUTATIN-OXIDE	ORGANOTIN FUNGICIDES	F
FENCHLORAZOLE	AZOLES	H
FENFURAM	ORGANIC FUNGICIDES-OTHER	F
FENHEXAMID	ORGANIC INSECTICIDES-OTHER	I
FENITROTHION	ORGANOPHOSPHATES	I
FENOTHIOCARB	CARBAMATES	I
FENOXAPROP	ARYLOXYPHENOXY-CARBONIC-ACID-derivative	H
FENOXAPROP-P	ARYLOXYPHENOXY-CARBONIC-ACID-derivative	H
FENOXYCARB	CARBAMATES	I
FENPICLONIL	PHENYLPYRROLES	F
FENPROPATHRIN	PYRETHROIDS	I
FENPROPIDIN	MORPHOLINES	F
FENPROPIMORPH	MORPHOLINES	F
FENPYRAD	PYRAZOLES	I
FENPYROXIMATE	PYRAZOLES	I
FENQUINCONAZOLE	AZOLES	F
FENTHION	ORGANOPHOSPHATES	I
FENTIN	ORGANOTIN FUNGICIDES	F
FENTIN ACETATE	ORGANOTIN FUNGICIDES	F
FENVALERATE	PYRETHROIDS	I
FIPRONIL	ORGANIC INSECTICIDES-OTHER	I
FLAMPROP	ARYLALANINES	H
FLAMPROP-ISOPROPYL	ARYLALANINES	H
FLAMPROP-METHYL	ARYLALANINES	H
FLUAZIFOP	OXYPHENOXIES	H
FLUAZIFOP-P	OXYPHENOXIES	H
FLUAZINAM	DINITROANILINES	F
FLUBENZIMINE	ORGANIC INSECTICIDES-OTHER	I
FLUCYCLOXURON	BENZOYLUREAS	I
FLUCYTHRINATE	PYRETHROIDS	I
FLUDIOXONIL	PHENYLPYRROLES	F
FLUFENACET	ORGANIC HERBICIDES-OTHER	H
FLUFENOXURON	BENZOYLUREAS	I
FLUMIOXAZIN	ORGANIC HERBICIDES-OTHER	HI
FLUORODIFEN	ORGANIC HERBICIDES-OTHER	H

F

FLUOROGLYCOFEN	DIPHENYL-ETHERS	H
FLUPYRSULFURON	SULFONYLUREAS	H
FLUQUINCONAZOLE	AZOLES	F
FLURENOL	*MORPHACTINS*	H
FLUROCHLORIDONE	ORGANIC HERBICIDES-OTHER	H
FLUROXYPYR	PYRIDYLOXY ACETIC ACID	H
FLURTAMONE	ORGANIC INSECTICIDES-OTHER	I
FLUSILAZOLE	AZOLES	F
FLUTOLANIL	CARBOXAMIDES	F
FLUTRIAFOL	AZOLES	F
FOLPET	PHTHALIC ACIDS	F
FOMESAFEN	DIPHENYL-ETHERS	H
FONOFOS	ORGANOPHOSPHATES	I
FORMETANATE	CARBAMATES	I
FORMOTHION	ORGANOPHOSPHATES	I
FOSETYL	ETHYLPHOSPHATE	F
FUBERIDAZOLE	BENZIMIDAZOLES	F
FURALAXYL	ACYLALANINES	F
FURATHIOCARB	CARBAMATES	I

G

GLUFOSINATE-AMMONIUM	PHOSPHINICO-AMINO-ACIDS	H
GLYPHOSATE	AMINO-PHOSPHORIC-ACIDS	H
GUAZATINE	GUANIDINES	F

H

HALOXYFOP	OXYPHENOXIES	H
HALOXYFOP-M	OXYPHENOXIES	H
HEPTENOPHOS	ORGANOPHOSPHATES	I
HEXACONAZOLE	AZOLES	F
HEXAFLUMURON	BENZOYLUREAS	I
HEXYTHIAZOX	ORGANIC INSECTICIDES-OTHER	I
HYMEXAZOLE	AZOLES	F

I

IMAZALIL	AZOLES	F
IMAZAMETHABENZ	IMIDAZOLINONES	H
IMAZAQUIN	IMIDAZOLINONES	H
IMAZETHAPYR	IMIDAZOLINONES	H
IMIDACLOPRID	ORGANIC INSECTICIDES-OTHER	I
IOXYNIL	HYDROXYBENZONITRIL	H
IPRODIONE	DICARBOXIMIDES	F
ISOFENPHOS	ORGANOPHOSPHATES	I
ISOPROPALIN	ORGANIC HERBICIDES-OTHER	H
ISOPROTURON	UREAS	H
ISOXABEN	AMIDES	H
ISOXAFLUTOLE	AMIDES	H

K

KRESOXIM	STROBILURINES	F

L

LAMBDA-CYHALOTHRIN	PYRETHROIDS	I
LENACIL	URACILS	H
LINDANE	ORGANOCHLORINES	I
LINURON	UREAS	H
LUFENURON	BENZOYLUREAS	I

M

MALATHION	ORGANOPHOSPHATES	I
MANCOZEB	DITHIOCARBAMATES	F
MANEB	DITHIOCARBAMATES	F
MCPA	PHENOXY CARBONIC ACID	H
MCPB	PHENOXY CARBONIC ACID	H
MECOPROP-P	PHENOXY CARBONIC ACID	H
MECOPROP-P	PHENOXY CARBONIC ACID	H
MEFENPYR	ORGANIC HERBICIDES-OTHER	H
MEPIQUAT-CHLORIDE	**PLANT GROWTH REGULATORS**	GR
MEPRONIL	CARBOXAMIDES	F
METALAXYL	ACYLALANINES	F
METALDEHYDE	ORGANIC INSECTICIDES-OTHER	I
METAMITRON	TRIAZINONES	H
METAZACHLOR	CHLOROACETANILIDES	H
METCONAZOLE	AZOLES	F
METHABENZTHIAZURON	UREAS	H
METHAMIDOPHOS	ORGANOPHOSPHATES	I
METHANETETRATHIOL	ORGANOPHOSPHATES	I
METHIDATHION	ORGANOPHOSPHATES	I
METHIOCARB	CARBAMATES	I
METHOMYL	OXIME-CARBAMATES	I
METHOPROTRYNE	ORGANIC HERBICIDES-OTHER	H
METIRAM	DITHIOCARBAMATES	F
METOBROMURON	UREAS	H
METOLACHLOR	CHLOROACETANILIDES	H
METOSULAM	ORGANIC HERBICIDES-OTHER	H
METOXURON	UREAS	H
METRIBUZIN	TRIAZINONES	H
METSULFURON	SULFONYLUREAS	H
METSULFURON-M	SULFONYLUREAS	H
MEVINPHOS	ORGANOPHOSPHATES	I
MINERAL OIL	OIL, MINERAL	I
MONALIDE	ORGANIC HERBICIDES-OTHER	H
MONOCROTOPHOS	ORGANOPHOSPHATES	I
MONOLINURON	UREAS	H
MYCLOBUTANIL	AZOLES	F

N

NALED	ORGANOPHOSPHATES	I
NAPROPAMIDE	ALKANAMIDE	H
NAPTALAM	ORGANIC HERBICIDES-OTHER	H
NEBURON	UREAS	H
NICOSULFURON	SULFONYLUREAS	H
NITROTHAL-ISOPROPYL	ORGANIC FUNGICIDES-OTHER	F
NORFLURAZON	PYRIDAZINONES	H
NUARIMOL	PYRIMIDINYL-CARBINOLS	F

O

OFURACE	PHENYLAMIDES	F
OMETHOATE	ORGANOPHOSPHATES	I
ORYZALIN	DINITROANILINES	H
OXADIAZON	ORGANIC HERBICIDES-OTHER	H
OXADIXYL	PHENYLAMIDES	F
OXAMYL	OXIME-CARBAMATES	I
OXINE-COPPER	INORGANIC-COPPERS	F
OXYDEMETON-M	ORGANOPHOSPHATES	I
OXYFLUORFEN	DIPHENYL-ETHERS	H

P

PARAQUAT	BIPYRIDYLIUMS	H
PARATHION	ORGANOPHOSPHATES	I
PARATHION-M	ORGANOPHOSPHATES	I
PARATHION-METHYL	ORGANOPHOSPHATES	I
PENCONAZOLE	AZOLES	F
PENCYCURON	UREAS	F
PENDIMETHALIN	DINITROANILINES	H
PERMETHRIN	PYRETHROIDS	I
PHENMEDIPHAM	BIS-CARBAMATES	H
PHORATE	ORGANOPHOSPHATES	I
PHOSALONE	ORGANOPHOSPHATES	I
PHOSMET	ORGANOPHOSPHATES	I
PHOSPHAMIDON	ORGANOPHOSPHATES	I
PHOXIM	ORGANOPHOSPHATES	I
PICLORAM	PYRIDINECARBOXYLIC-ACIDS	H
PIPERONYL-BUTOXIDE	ORGANIC INSECTICIDES-OTHER	F
PIRIMICARB	CARBAMATES	I
PIRIMIPHOS	ORGANOPHOSPHATES	I
POXAD	ORGANOPHOSPHATES	I
PRIMISULFURON	SULFONYLUREAS	H
PROCHLORAZ	AZOLES	F
PROCYMIDONE	DICARBOXIMIDES	F
PROFENOFOS	ORGANOPHOSPHATES	I
PROFENOFOS Q	ORGANOPHOSPHATES	I
PROHEXADIONE	ORGANIC INSECTICIDES-OTHER	I
PROMETRYN	TRIAZINES	H
PROPACHLOR	CHLOROACETANILIDES	H
PROPAMOCARB	CARBAMATES	F
PROPANIL	ANILIDES	H
PROPAQUIZAFOP	OXYPHENOXIES	H
PROPARGITE	ORGANIC INSECTICIDES-OTHER	I
PROPAZINE	TRIAZINES	H
PROPHAM	CARBAMATES	H
PROPICONAZOLE	AZOLES	F
PROPINEB	DITHIOCARBAMATES	F
PROPOXUR	CARBAMATES	I
PROPYZAMIDE	AMIDES	H
PROSULFOCARB	THIOCARBAMATES	H
PROSULFURON	SULFONYLUREAS	H
PROTHIOFOS	ORGANOCHLORINES	I
PYMETROZINE	ORGANIC INSECTICIDES-OTHER	I
PYRAFLUFEN-ETHYL	OXYPHENOXIES	H
PYRAZOPHOS	ORGANOPHOSPHATES	F

P

PYRIDABEN	ORGANIC INSECTICIDES-OTHER	I
PYRIDATE	DIAZINES	H
PYRIFENOX	ORGANIC FUNGICIDES-OTHER	F
PYRIMETHANIL	ANILINOPYRIMIDILS	F
PYRIPROXYFEN	**PHENYL-ETHERS**	I

Q

QUINALPHOS	ORGANOPHOSPHATES	I
QUINMERAC	QUINOLINECARBOXYLIC-ACIDS	H
QUINOMETHIONATE	ORGANIC FUNGICIDES-OTHER	F
QUINOXYFEN	ORGANIC FUNGICIDES-OTHER	F
QUIZALOFOP	OXYPHENOXIES	H
QUIZALOFOP-P	OXYPHENOXIES	H

R

RAPE OIL	**OIL, VEGETABLE**	I
RESMETHRIN	PYRETHROIDS	I
RIMSULFURON	SULFONYLUREAS	H

S

SETHOXYDIM	CYCLOHEXANE DIONE	H
SIMAZINE	TRIAZINES	H
SODIUM-ARSENITE	INORGANIC-HERBICIDES	H
SPIROXAMINE	**STROBILURINES**	F
SULCOTRIONE	TRIKETONES	H
SULFOSATE	AMINO-PHOSPHORIC-ACIDS	H
SULFOTEP	ORGANOPHOSPHATES	I
SULPHUR	INORGANIC-SULPHUR	F

T

TAU-FLUVALINATE	PYRETHROIDS	I
TCA	HALOGENATED ALKANOIC ACIDS	H
TEBUCONAZOLE	AZOLES	F
TEBUFENOZIDE	**DIAZYLHYDRAZINES**	I
TEBUFENPYRAD	PYRAZOLES	I
TEBUTAM	AMIDES	H
TEFLUBENZURON	BENZOYLUREAS	I
TEFLUTHRIN	PYRETHROIDS	I
TEMEPHOS	ORGANOPHOSPHATES	I
TERBACIL	URACILS	H
TERBUFOS	ORGANOPHOSPHATES	I
TERBUMETON	TRIAZINES	H
TERBUTHYLAZINE	TRIAZINES	H
TERBUTRYNE	TRIAZINES	H
TETRACONAZOLE	AZOLES	F
TETRADIFON	ORGANIC INSECTICIDES-OTHER	I
THIABENDAZOLE	BENZIMIDAZOLES	F
THIFENSULFURON	SULFONYLUREAS	H
THIODICARB	OXIME-CARBAMATES	I
THIOFANOX	OXIME-CARBAMATES	I
THIOMETON	ORGANOPHOSPHATES	I
THIOPHANATE	BENZIMIDAZOLES	F
THIOPHANATE-METHYL	BENZIMIDAZOLES	F

T

THIRAM	DITHIOCARBAMATES	F
TOLCHOFOS	ORGANOPHOSPHATES	F
TOLCLOFOS-METHYL	ORGANOPHOSPHATES	F
TOLYLFLUANID	ANILINES	F
TRALKOXYDIM	CYCLOHEXANE DIONE	H
TRALOMETHRIN	PYRETHROIDS	I
TRIADIMEFON	AZOLES	F
TRIADIMENOL	AZOLES	F
TRIALLATE	THIOCARBAMATES	H
TRIAPENTHENOL	ORGANIC FUNGICIDES-OTHER	F
TRIASULFURON	SULFONYLUREAS	H
TRIAZAMATE	ORGANIC INSECTICIDES-OTHER	I
TRIAZOPHOS	ORGANOPHOSPHATES	I
TRIAZOXIDE	AZOLES	F
TRIBENURON	SULFONYLUREAS	H
TRICHLORFON	ORGANOPHOSPHATES	I
TRICLOPYR	PHENOXY CARBONIC ACID	H
TRIDEMORPH	MORPHOLINES	F
TRIETAZINE	TRIAZINES	H
TRIFLUMIZOLE	AZOLES	F
TRIFLUMURON	BENZOYLUREAS	I
TRIFLURALIN	DINITROANILINES	H
TRIFLUSULFURON	SULFONYLUREAS	H
TRIFORINE	PIPERAZINES	F
TRINEXAPAC-ETHYL	OXYPHENOXIES	GR, H
TRITICONAZOLE	AZOLES	F

V

VALIDAMYCIN	BIOLOGICALS	I
VAMIDOTHION	ORGANOPHOSPHATES	I
VERNOLATE	THIOCARBAMATES	H
VINCLOZOLIN	DICARBOXIMIDES	F

Z

ZETA-CYPERMETHRIN	PYRETHROIDS	I
ZINEB	DITHIOCARBAMATES	F
ZIRAM	DITHIOCARBAMATES	F

Active ingredients by chemical class

Active ingredients in *Italics*: used in 1992, but not in 1999
Active ingredients in **bold**: new since 1992

Action : F = fungicide; H = herbicide; I = insecticide; GR = growth regulator

Chemical class	Active Ingredient	ACTION
ACYLALANINES	BENALAXYL	F
	FURALAXYL	F
	METALAXYL	F
ALKANAMIDE	NAPROPAMIDE	H
AMIDES	**DIMETHENAMIDE**	H
	ISOXABEN	H
	ISOXAFLUTOLE	H
	PROPYZAMIDE	H
	TEBUTAM	H
AMIDINES	AMITRAZ	I
AMINO-PHOSPHORIC-ACIDS	GLYPHOSATE	H
	SULFOSATE	H
ANILIDES	*PROPANIL*	H
ANILINES	DICHLOFLUANID	F
	TOLYLFLUANID	F
ANILINOPYRIMIDILS	**CYPRODINIL**	F
	PYRIMETHANIL	F
ANTHRAQUINONES	**ANTHRAQUINONE**	F
	DITHIANON	F
ARYLALANINES	*FLAMPROP*	H
	FLAMPROP-ISOPROPYL	H
	FLAMPROP-METHYL	H
ARYLOXYPHENOXY-CARBONIC-ACID-derivative	**CLODINAFOP**	H
	DICLOFOP	H
	FENOXAPROP	H
	FENOXAPROP-P	H
AZOLES	BITERTANOL	F
	BROMUCONAZOLE	F
	CYPROCONAZOLE	F
	DIFENOCONAZOLE	F
	DINICONAZOLE	F
	EPOXYCONAZOLE	F
	ETRIDIAZOLE	F

AZOLES *(Continued)*	FENBUCONAZOLE	F
	FENCHLORAZOLE	H
	FENQUINCONAZOLE	F
	FLUQUINCONAZOLE	F
	FLUSILAZOLE	F
	FLUTRIAFOL	F
	HEXACONAZOLE	F
	HYMEXAZOLE	F
	IMAZALIL	F
	METCONAZOLE	F
	MYCLOBUTANIL	F
	PENCONAZOLE	F
	PROCHLORAZ	F
	PROPICONAZOLE	F
	TEBUCONAZOLE	F
	TETRACONAZOLE	F
	TRIADIMEFON	F
	TRIADIMENOL	F
	TRIAZOXIDE	F
	TRIFLUMIZOLE	F
	TRITICONAZOLE	F
BENZILATES	BROMOPROPYLATE	I
BENZIMIDAZOLES	BENOMYL	F
	CARBENDAZIM	F
	FUBERIDAZOLE	F
	THIABENDAZOLE	F
	THIOPHANATE	F
	THIOPHANATE-METHYL	F
BENZOFURANES	BENFURESATE	H
	ETHOFUMESATE	H
BENZOIC-ACIDS (AUXINS)	**CHLORTHAL**	H
	DICAMBA	H
BENZONITRILE	DICHLOBENIL	H
BENZOTHIAZOLES	BENAZOLIN	H
BENZOXAZINES	BENOXACOR	H
BENZOYLUREAS	*CHLORFLUAZURON*	I
	DIFLUBENZURON	I
	FLUCYCLOXURON	I
	FLUFENOXURON	I
	HEXAFLUMURON	I
	LUFENURON	I
	TEFLUBENZURON	I
	TRIFLUMURON	I

BIOLOGICALS	BACILLUS THURINGIENSIS	I
	BIOLOGICAL	I
	VALIDAMYCIN	I
BIPYRIDYLIUMS	DIQUAT	H
	PARAQUAT	H
BIS-CARBAMATES	DESMEDIPHAM	H
	PHENMEDIPHAM	H
CARBAMATES	*ASULAM*	H
	BENDIOCARB	I
	BENFURACARB	I
	CARBARYL	I
	CARBETAMIDE	H
	CARBOFURAN	I
	CARBOSULFAN	I
	CHLORBUFAM	H
	CHLORPROPHAM	H
	ETHIOFENCARB	I
	FENOTHIOCARB	I
	FENOXYCARB	I
	FORMETANATE	I
	FURATHIOCARB	I
	METHIOCARB	I
	PIRIMICARB	I
	PROPAMOCARB	F
	PROPHAM	H
	PROPOXUR	I
CARBOXAMIDES	FLUTOLANIL	F
	MEPRONIL	F
CHLOROACETANILIDES	ACETOCHLOR	H
	ALACHLOR	H
	DIMETHACHLOR	H
	METAZACHLOR	H
	METOLACHLOR	H
	PROPACHLOR	H
CHLOROAMIDES	DICHLORMID	H
CYCLODIENE ORGANOCHLORINES	ENDOSULFAN	I
CYCLOHEXANE DIONE	ALLOXYDIM	H
	CLETHODIM	H
	CYCLOXYDIM	H
	SETHOXYDIM	H
	TRALKOXYDIM	H
DIAZINES	PYRIDATE	H
DIAZYLHYDRAZINES	TEBUFENOZIDE	I

DICARBOXIMIDES	IPRODIONE	F
	PROCYMIDONE	F
	VINCLOZOLIN	F
DINITROANILINES	BENFLURALIN	H
	DINITRAMINE	H
	FLUAZINAM	F
	ORYZALIN	H
	PENDIMETHALIN	H
	TRIFLURALIN	H
DINITROPHENOLS	DINOCAP	F
	DINOTERB	H
	DNOC	F
DIPHENYL-ETHERS	ACIFLUORFEN	H
	ACLONIFEN	H
	BIFENOX	H
	FLUOROGLYCOFEN	H
	FOMESAFEN	H
	OXYFLUORFEN	H
DITHIOCARBAMATES	MANCOZEB	F
	MANEB	F
	METIRAM	F
	PROPINEB	F
	THIRAM	F
	ZINEB	F
	ZIRAM	F
ETHYLPHOSPHATE	FOSETYL	F
GUANIDINES	DODINE	F
	GUAZATINE	F
HALOGENATED ALKANOIC ACIDS	DALAPON	H
	TCA	H
HYDROXYBENZONITRIL	*BROMOFENOXIM*	H
	BROMOXYNIL	H
	IOXYNIL	H
IMIDAZOLINONES	IMAZAMETHABENZ	H
	IMAZAQUIN	H
	IMAZETHAPYR	H
INORGANIC-COPPERS	COPPER	F
	COPPER HYDROXIDE	F
	COPPER OXIDE	F
	COPPER OXYCHLORIDE	F
	COPPER SULFATE	F
	OXINE-COPPER	F

INORGANIC-HERBICIDES	AMMONIUM THIOCYANATE	H
	SODIUM-ARSENITE	H
INORGANIC-SULPHUR	**BA-POLYSULFIDE**	F
	SULPHUR	F
METHYL-ISOTHIOCYANATE	DAZOMET	I
MORPHACTINS	*FLURENOL*	H
MORPHOLINES	ALDIMORPH	F
	DIMETHOMORPH	F
	FENPROPIDIN	F
	FENPROPIMORPH	F
	TRIDEMORPH	F
OIL, MINERAL	MINERAL OIL	I
OIL, VEGETABLE	**RAPE OIL**	I
ORGANOCHLORINES	DICOFOL	I
	LINDANE	I
	PROTHIOFOS	I
ORGANOPHOSPHATES	ACEPHATE	I
	AZINPHOS	I
	AZINPHOS-E	I
	AZINPHOS-M	I
	CHLORFENVINPHOS	I
	CHLORMEPHOS	I
	CHLORPYRIFOS	I
	DEMETON-S-METHYL	I
	DIAZINON	I
	DICHLORVOS	I
	DIMETHOATE	I
	DIOXATHION	I
	DISULFOTON	I
	ETHION	I
	ETHOPROPHOS	I
	FENAMIPHOS	I
	FENITROTHION	I
	FENTHION	I
	FONOFOS	I
	FORMOTHION	I
	HEPTENOPHOS	I
	ISOFENPHOS	I
	MALATHION	I
	METHAMIDOPHOS	I
	METHANETETRATHIOL	I
	METHIDATHION	I
	MEVINPHOS	I
	MONOCROTOPHOS	I
	NALED	I
	OMETHOATE	I
	OXYDEMETON-M	I

ORGANOPHOSPHATES *(Continued)*	PARATHION	I
	PARATHION-M	I
	PARATHION-METHYL	I
	PHORATE	I
	PHOSALONE	I
	PHOSMET	I
	PHOSPHAMIDON	I
	PHOXIM	I
	PIRIMIPHOS	I
	POXAD	I
	PROFENOFOS	I
	PROFENOFOS Q	I
	PYRAZOPHOS	F
	QUINALPHOS	I
	SULFOTEP	I
	TEMEPHOS	I
	TERBUFOS	I
	THIOMETON	I
	TOLCLOFOS	F
	TOLCLOFOS-METHYL	F
	TRIAZOPHOS	I
	TRICHLORFON	I
	VAMIDOTHION	I
ORGANOTIN FUNGICIDES	AZOCYCLOTIN	I
	CYHEXATIN	I
	FENBUTATIN-OXIDE	F
	FENTIN	F
	FENTIN ACETATE	F
OXIME-CARBAMATES	ALDICARB	I
	BUTOCARBOXIM	I
	CARBOXIN	F
	METHOMYL	I
	OXAMYL	I
	THIODICARB	I
	THIOFANOX	I
OXYPHENOXIES	FLUAZIFOP	H
	FLUAZIFOP-P	H
	HALOXYFOP	H
	HALOXYFOP-M	H
	PROPAQUIZAFOP	H
	PYRAFLUFEN-ETHYL	H
	QUIZALOFOP	H
	QUIZALOFOP-P	H
	TRINEXAPAC-ETHYL	GR, H
PHENOXY CARBONIC ACID	2,4-D	H
	2,4-DB	H
	CINIDON-ETHYL	H
	DICHLORPROP	H
	DICHLORPROP-P	H
	MCPA	H
	MCPB	H

PHENOXY CARBONIC ACID *(Continued)*	MECOPROP	H
	MECOPROP-P	H
	TRICLOPYR	H
ORGANIC FUNGICIDES-OTHER	**ACIBENZOLAR**	F
	CHLOROTHALONIL	F
	DICLORAN	F
	FAMOXADONE	F
	FENFURAM	F
	NITROTHAL-ISOPROPYL	F
	PYRIFENOX	F
	QUINOMETHIONATE	F
	QUINOXYFEN	F
	TRIAPENTHENOL	F
ORGANIC HERBICIDES-OTHER	**CARFENTRAZONE**	H
	CLOMAZONE	H
	CLOQUINTOCET	H
	EPTAM	H
	FLUFENACET	H
	FLUMIOXAZIN	HI
	FLUORODIFEN	H
	FLUROCHLORIDONE	H
	ISOPROPALIN	H
	MEFENPYR	H
	METHOPROTRYNE	H
	METOSULAM	H
	MONALIDE	H
	NAPTALAM	H
	OXADIAZON	H
ORGANIC INSECTICIDES-OTHER	ABAMECTIN	I
	BENZOXIMATE	I
	BUPROFEZIN	I
	CYROMAZINE	I
	DICHLOROPROPENE	I
	FENAZAQUIN	I
	FENHEXAMID	I
	FIPRONIL	I
	FLUBENZIMINE	I
	FLURTAMONE	I
	HEXYTHIAZOX	I
	IMIDACLOPRID	I
	METALDEHYDE	I
	PIPERONYL-BUTOXIDE	F
	PROHEXADIONE	I
	PROPARGITE	I
	PYMETROZINE	I
	PYRIDABEN	I
	TETRADIFON	I
	TRIAZAMATE	I
PHENOXY NICOTINEANILIDES	DIFLUFENICAN	H
PHENYLAMIDES	OFURACE	F
	OXADIXYL	F

PHENYL-CARBAMATES	**DIETHOFENCARB**	F
PHENYL-ETHERS	**PYRIPROXYFEN**	I
PHENYLPYRROLES	FENPICLONIL	F
	FLUDIOXONIL	F
PHOSPHINICO-AMINO-ACIDS	GLUFOSINATE-AMMONIUM	H
PHTHALIC ACIDS	CAPTAN	F
	FOLPET	F
PIPERAZINES	TRIFORINE	F
PLANT GROWTH REGULATORS	**CHLORMEQUAT-CHLORIDE**	GR
	CHOLIN-CHLORIDE	GR
	ETHEPHON	GR
	MEPIQUAT-CHLORIDE	GR
PYRAZOLES	DIFENZOQUAT	H
	FENPYRAD	I
	FENPYROXIMATE	I
	TEBUFENPYRAD	I
PYRETHROIDS	ACRINATHRIN	I
	ALPHA-CYPERMETHRIN	I
	BETACYFLUTHRIN	I
	BIFENTHRIN	I
	CYFLUTHRIN	I
	CYPERMETHRIN	I
	DELTAMETHRIN	I
	ESFENVALERATE	I
	FENPROPATHRIN	I
	FENVALERATE	I
	FLUCYTHRINATE	I
	LAMBDA-CYHALOTHRIN	I
	PERMETHRIN	I
	RESMETHRIN	I
	TAU-FLUVALINATE	I
	TEFLUTHRIN	I
	TRALOMETHRIN	I
	ZETA-CYPERMETHRIN	I
PYRIDAZINONES	CHLORIDAZONE	H
	NORFLURAZON	H
PYRIDINECARBOXYLIC-ACIDS	CLOPYRALID	H
	PICLORAM	H
PYRIDYLOXY ACETIC ACID	FLUROXYPYR	H
PYRIMIDINES	BUPIRIMATE	F
	ETHIRIMOL	F

PYRIMIDINYL-CARBINOLS	FENARIMOL	F
	NUARIMOL	F
QUINOLINECARBOXYLIC-ACIDS	QUINMERAC	H
STROBILURINES	**KRESOXIM**	F
	SPIROXAMINE	F
SULFONYLUREAS	AMIDOSULFURON	H
	CHLORSULFURON	H
	FLUPYRSULFURON	H
	METSULFURON	H
	METSULFURON-M	H
	NICOSULFURON	H
	PRIMISULFURON	H
	PROSULFURON	H
	RIMSULFURON	H
	THIFENSULFURON	H
	TRIASULFURON	H
	TRIBENURON	H
	TRIFLUSULFURON	H
TETRAZINES	CLOFENTEZINE	I
THIADIAZINES	BENTAZONE	H
THIOCARBAMATES	CYCLOATE	H
	EPTC	H
	PROSULFOCARB	H
	TRIALLATE	H
	VERNOLATE	H
TRIAZINES	*AMETRYNE*	H
	ANILAZINE	F
	ATRAZINE	H
	AZIPROTRYN	H
	CYANAZINE	H
	DESMETRYN	H
	PROMETRYN	H
	PROPAZINE	H
	SIMAZINE	H
	TERBUMETON	H
	TERBUTHYLAZINE	H
	TERBUTRYNE	H
	TRIETAZINE	H
TRIAZINONES	METAMITRON	H
	METRIBUZIN	H
TRIAZOLES	AMITROLE	H
TRIKETONES	SULCOTRIONE	H
URACILS	BROMACIL	H
	LENACIL	H
	TERBACIL	H

UREAS	*BENZTHIAZURON*	H
	CHLORBROMURON	H
	CHLOROTOLURON	H
	CYCLURON	H
	CYMOXANIL	F
	DIAFENTHIURON	
	DIFENOXURON	H
	DIMEFURON	H
	DIURON	H
	ISOPROTURON	H
	LINURON	H
	METHABENZTHIAZURON	H
	METOBROMURON	H
	METOXURON	H
	MONOLINURON	H
	NEBURON	H
	PENCYCURON	F

European Commission

The use of plant protection products in the European Union — Data 1992-1999

Luxembourg: Office for Official Publications of the European Communities

2002 — 132 pp. — 21 x 29.7 cm

Theme 8: Environment and energy
Collection: Detailed tables

ISBN 92-894-4818-0

Price (excluding VAT) in Luxembourg: EUR 25

..... Eurostat Data Shops

BELGIQUE/BELGIË

Eurostat Data Shop
Bruxelles/Brussel
Planistat Belgique
Rue du Commerce 124
Handelsstraat 124
B-1000 Bruxelles/Brussel
Tél. (32-2) 234 67 50
Fax (32-2) 234 67 51
E-mail: datashop@planistat.be
URL: http://www.datashop.org/

DANMARK

Danmarks Statistik
Bibliotek og Information
Eurostat Data Shop
Sejrøgade 11
DK-2100 København Ø
Tlf. (45) 39 17 30 30
Fax (45) 39 17 30 03
E-post: bib@dst.dk
URL:
http://www.dst.dk/bibliotek

DEUTSCHLAND

Statistisches Bundesamt
Eurostat Data Shop Berlin
Otto-Braun-Straße 70-72
(Eingang: Karl-Marx-Allee)
D-10178 Berlin
Tel. (49) 1888-644 94 27/28
Fax (49) 1888-644 94 30
E-Mail: datashop@destatis.de
URL:
http://www.eu-datashop.de/

ESPAÑA

INE
Eurostat Data Shop
Paseo de la Castellana, 183
Despacho 011B
Entrada por Estébanez
Calderón
E-28046 Madrid
Tel. (34) 91 583 91 67 /
91 583 95 00
Fax (34) 91 583 03 57
E-mail:
datashop.eurostat@ine.es
URL: http://www.datashop.org/
Member of the MIDAS Net

FRANCE

INSEE Info service
Eurostat Data Shop
195, rue de Bercy
Tour Gamma A
F-75582 Paris Cedex 12
Tél. (33) 1 53 17 88 44
Fax (33) 1 53 17 88 22
E-mail: datashop@insee.fr
Member of the MIDAS Net

ITALIA - ROMA

ISTAT
Centro di informazione
statistica — Sede di Roma
Eurostat Data Shop
Via Cesare Balbo, 11a
I-00184 Roma
Tel. (39) 06 46 73 31 02/06
Fax (39) 06 46 73 31 01/07
E-mail: dipdiff@istat.it
URL:
http://www.istat.it/Prodotti-e/
Allegati/Eurostatdatashop.html
Member of the MIDAS Net

ITALIA - MILANO

ISTAT
Ufficio regionale per la
Lombardia
Eurostat Data Shop
Via Fieno, 3
I-20123 Milano
Tel. (39) 02 80 61 32 460
Fax (39) 02 80 61 32 304
E-mail: mileuro@tin.it
URL:
http://www.istat.it/Prodotti-e/
Allegati/Eurostatdatashop.html
Member of the MIDAS Net

LUXEMBOURG

Eurostat Data Shop Luxembourg
46 A, avenue J. F. Kennedy
BP 1452
L-1014 Luxembourg
Tél. (352) 43 35-2251
Fax (352) 43 35-22221
E-mail:
dslux@eurostat.datashop.lu
URL: http://www.datashop.org/
Member of the MIDAS Net

NEDERLAND

Centraal Bureau voor de
Statistiek
Eurostat Data Shop — Voorburg
Postbus 4000
2270 JM Voorburg
Nederland
Tel. (31-70) 337 49 00
Fax (31-70) 337 59 84
E-mail: datashop@cbs.nl

PORTUGAL

Eurostat Data Shop Lisboa
INE/Serviço de Difusão
Av. António José de Almeida, 2
P-1000-043 Lisboa
Tel. (351) 21 842 61 00
Fax (351) 21 842 63 64
E-mail: data.shop@ine.pt

SUOMI/FINLAND

Statistics Finland
Eurostat DataShop Helsinki
Tilastokirjasto
PL 2B
FIN-00022 Tilastokeskus
Työpajakatu 13 B, 2. kerros,
Helsinki
P. (358-9) 17 34 22 21
F. (358-9) 17 34 22 79
Sähköposti: datashop@stat.fi
URL: http: //tilastokeskus.fi/tk/
kk/datashop/

SVERIGE

Statistics Sweden
Information service
Eurostat Data Shop
Karlavägen 100
Box 24 300
S-104 51 Stockholm
Tfn (46-8) 50 69 48 01
Fax (46-8) 50 69 48 99
E-post: infoservice@scb.se
URL: http://www.scb.se/tjanster/
datashop/datashop.asp

UNITED KINGDOM

Eurostat Data Shop
Office for National Statistics
Room 1.015
Cardiff Road
Newport NP10 8XG
South Wales
United Kingdom
Tel. (44-1633) 81 33 69
Fax (44-1633) 81 33 33
E-mail:
eurostat.datashop@ons.gov.uk

NORGE

Statistics Norway
Library and Information Centre
Eurostat Data Shop
Kongens gate 6
Boks 8131 Dep.
N-0033 Oslo
Tel. (47) 21 09 46 42/43
Fax (47) 21 09 45 04
E-mail: Datashop@ssb.no
URL: http://www.ssb.no/
biblioteket/datashop/

SCHWEIZ/SUISSE/SVIZZERA

Statistisches Amt des Kantons
Zürich
Eurostat Data Shop
Bleicherweg 5
CH-8090 Zürich
Tel. (41) 1 225 12 12
Fax (41) 1 225 12 99
E-Mail:
datashop@statistik.zh.ch
URL: http://www.statistik.zh.ch

USA

Haver Analytics
Eurostat Data Shop
60 East 42nd Street
Suite 3310
New York, NY 10165
Tel. (1-212) 986 93 00
Fax (1-212) 986 69 81
E-mail: eurodata@haver.com
URL: http://www.haver.com/

EUROSTAT HOME PAGE
www.europa.eu.int/comm/eurostat/

MEDIA SUPPORT
EUROSTAT
(only for professional journalists)
Postal address:
Jean Monnet building
L-2920 Luxembourg
Office: BECH A4/017 —
5, rue Alphonse Weicker
L-2721 Luxembourg
Tel. (352) 43 01-33408
Fax (352) 43 01-35349
E-mail:
eurostat-mediasupport@cec.eu.int