

## AGRICULTURE

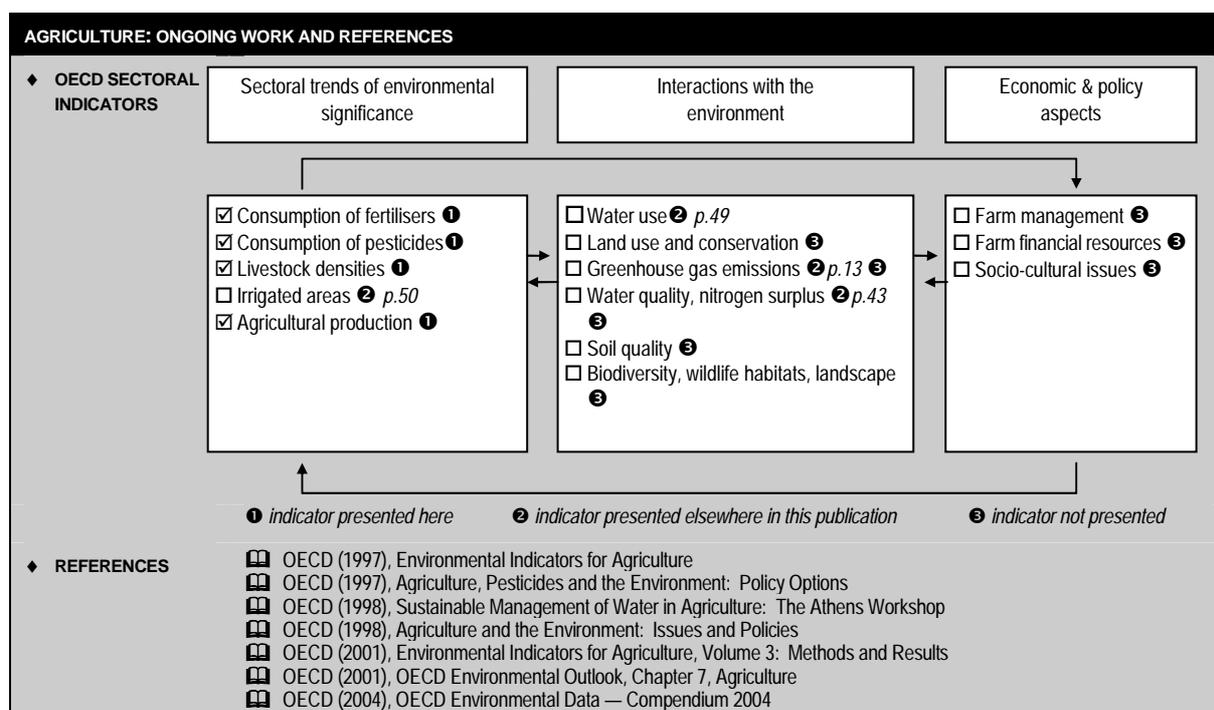
*The economic and social significance of the agricultural sector has been declining in most OECD countries for decades. Agriculture's environmental effects can be negative or positive. They depend on the scale, type and intensity of farming as well as on agro-ecological and physical factors and on climate and weather. Farming can lead to deterioration in soil, water and air quality, and to loss of natural habitats and biodiversity. These environmental changes can have important implications for the level of agricultural production and food supply, and can limit the sustainable development of agriculture. But farming can also provide sinks for greenhouse gases, conserve biodiversity and landscapes and help prevent floods and landslides.*

*The main environmental concerns related to agriculture include nitrogen and phosphorus run-off from excessive commercial fertiliser use, intensive livestock farming and pesticides. Nitrogen and phosphorus, while major plant nutrients, are responsible for water eutrophication and related effects on aquatic life and water quality. Pesticide use adds persistent organic chemicals to ecosystems; these tend to accumulate in the soil and in biota, and residues may leach into surface and groundwaters. The general population can be exposed to pesticides through food. The main challenge is to progressively decrease the negative and increase the positive environmental effects of agricultural production so that ecosystem functions can be maintained and food security ensured for the world's population.*

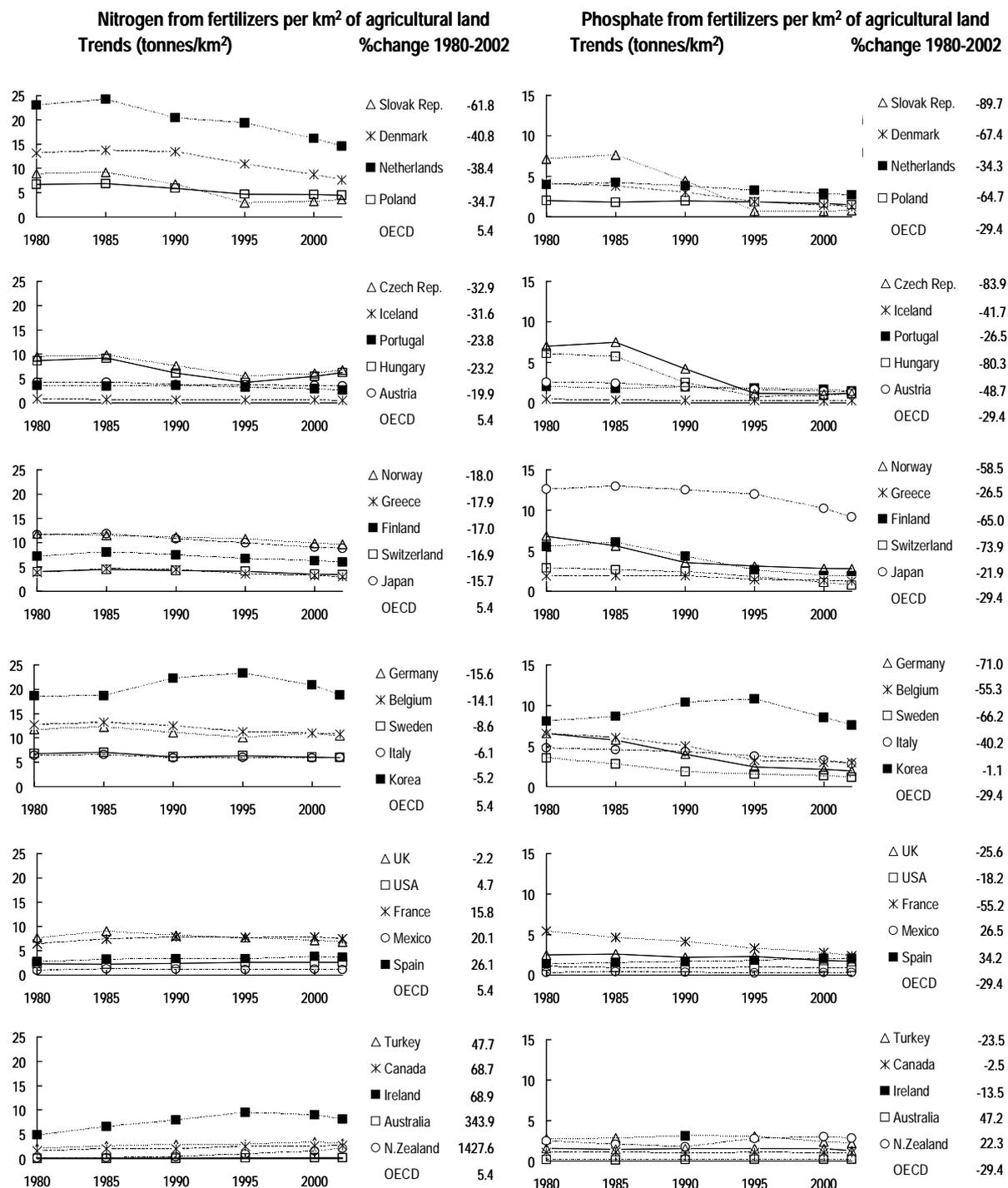
*Indicators presented here relate to:*

- ♦ *intensity of use of nitrogen and phosphate fertilisers in agriculture, reflected through apparent consumption in tonnes of active ingredients (N and P per km<sup>2</sup> of agricultural land). This represents potential pressure on the environment in the absence of effective pollution abatement.*
- ♦ *livestock densities, reflected through the number of head of cattle, pigs, chickens, sheep and goats per km<sup>2</sup> of agricultural land; the amount of N and P generated by livestock manure per km<sup>2</sup> of agricultural land is provided to complete the picture.*
- ♦ *intensity of use of pesticides in agriculture, reflected through apparent consumption or sales expressed in tonnes of active ingredients per km<sup>2</sup> of agricultural land. This indicator does not recognise differences among pesticides in levels of toxicity, persistence and mobility. It can be considered a first step towards a more comprehensive indicator based on an internationally agreed list of substances with appropriate weighting factors. Using km<sup>2</sup> of land where pesticides are actually applied as the denominator would provide important complementary information about intensity of pesticide use.*

*It should be noted that these indicators describe potential environmental pressures, and may hide important sub-national variations. More information is needed to describe the actual pressure.*



## INTENSITY OF USE OF NITROGEN AND PHOSPHATE FERTILISERS 29



**29 INTENSITY OF USE OF NITROGEN AND PHOSPHATE FERTILISERS**

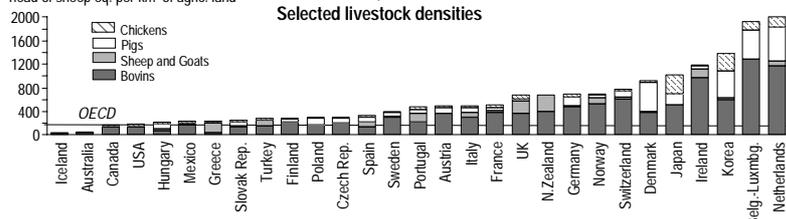
	Intensity of use of commercial nitrogen and phosphate fertilizers apparent consumption per km <sup>2</sup> of agricultural land					Agricultural production		Agricultural value added
	Nitrogen		Phosphate		Crops	Total	% GDP 2002	
	tonnes/km <sup>2</sup> 2002	% change since 1980	tonnes/km <sup>2</sup> 2002	% change since 1980	% change 1980 - 2003	% change 1980 - 2003		
Canada	2.7	69	1.0	-2	53.2	50.0	2.5	
Mexico	♦ 1.1	20	0.3	26	50.3	59.5	4.1	
USA	♦ 2.6	5	0.9	-18	31.4	35.9	1.6	
Japan	8.8	-16	9.2	-22	-20.8	-6.7	1.4	
Korea	♦ 18.9	-5	7.6	-1	29.9	56.3	4.1	
Australia	0.2	344	0.2	47	129.1	65.5	3.8	
N.Zealand	2.1	1428	2.8	22	85.1	52.1	7.0	
Austria	3.5	-20	1.4	-49	-8.9	3.6	2.4	
Belgium	♦ 10.8	-14	3.0	-55	71.9	32.3	1.3	
Czech Republic	6.8	-33	1.1	-84	..	..	3.8	
Denmark	♦ 7.6	-41	1.2	-67	50.2	25.6	2.6	
Finland	6.0	-17	1.9	-65	10.2	-3.9	3.6	
France	♦ 7.5	16	2.4	-55	3.0	2.2	2.7	
Germany	10.5	-16	1.9	-71	14.9	3.2	1.2	
Greece	♦ 3.0	-18	1.3	-27	17.4	12.5	7.3	
Hungary	♦ 6.2	-23	1.2	-80	-34.3	-23.0	3.8	
Iceland	♦ 0.5	-32	0.2	-42	3.7	-3.7	9.1	
Ireland	8.1	69	2.2	-13	17.2	16.5	3.4	
Italy	6.0	-6	2.8	-40	-18.3	-10.5	2.7	
Netherlands	14.6	-38	2.7	-34	33.6	9.4	2.6	
Norway	9.6	-18	2.8	-59	-23.7	-7.6	1.9	
Poland	4.5	-35	1.6	-65	5.1	-1.0	3.2	
Portugal	2.6	-24	1.5	-26	3.5	33.8	3.7	
Slovak Republic	3.6	-62	0.8	-90	..	..	4.6	
Spain	♦ 3.6	26	2.0	34	37.3	41.9	3.4	
Sweden	♦ 6.0	-9	1.2	-66	-1.9	-3.1	1.8	
Switzerland	3.5	-17	0.8	-74	-8.5	0.6	1.2	
Turkey	♦ 3.1	48	1.2	-24	52.8	45.0	12.4	
UK	♦ 7.5	-2	1.7	-26	14.2	-0.4	1.0	
OECD	♦ 2.3	5	0.8	-29	..	..	2.2	

♦ See Technical Annex for data sources, notes and comments.

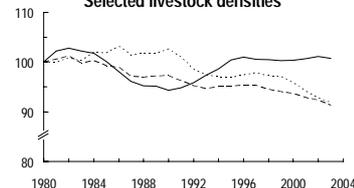
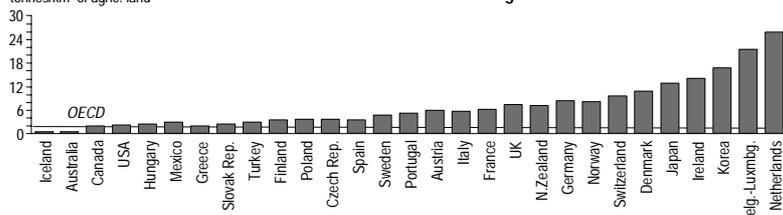
#### STATE AND TRENDS SUMMARY

Overall apparent consumption of commercial nitrogen fertiliser per unit of agricultural land since 1980 has grown in a number of OECD countries, and in the world, while consumption of phosphate fertiliser has decreased. These trends reflect developments aimed at maximising yield per hectare through specialisation and intensification. However major variations among countries exist. More recently the use of commercial nitrogen fertiliser has levelled off, and has declined in a number of countries.

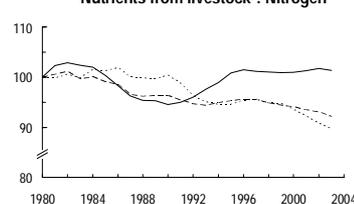
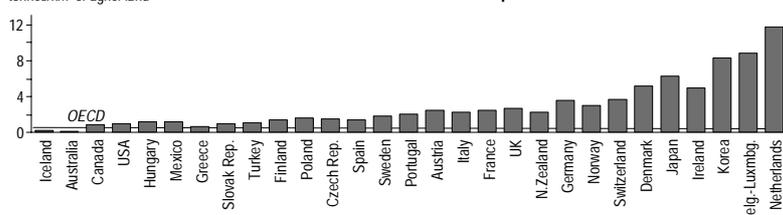
### 31 LIVESTOCK DENSITIES

head of sheep eq. per km<sup>2</sup> of agric. land

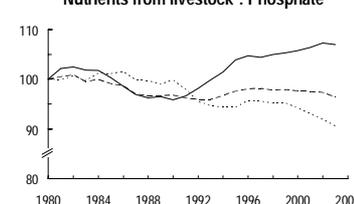
**Trends, Index 1980=100**  
**Selected livestock densities**

tonnes/km<sup>2</sup> of agric. land

**Nutrients from livestock\*: Nitrogen**

tonnes/km<sup>2</sup> of agric. land

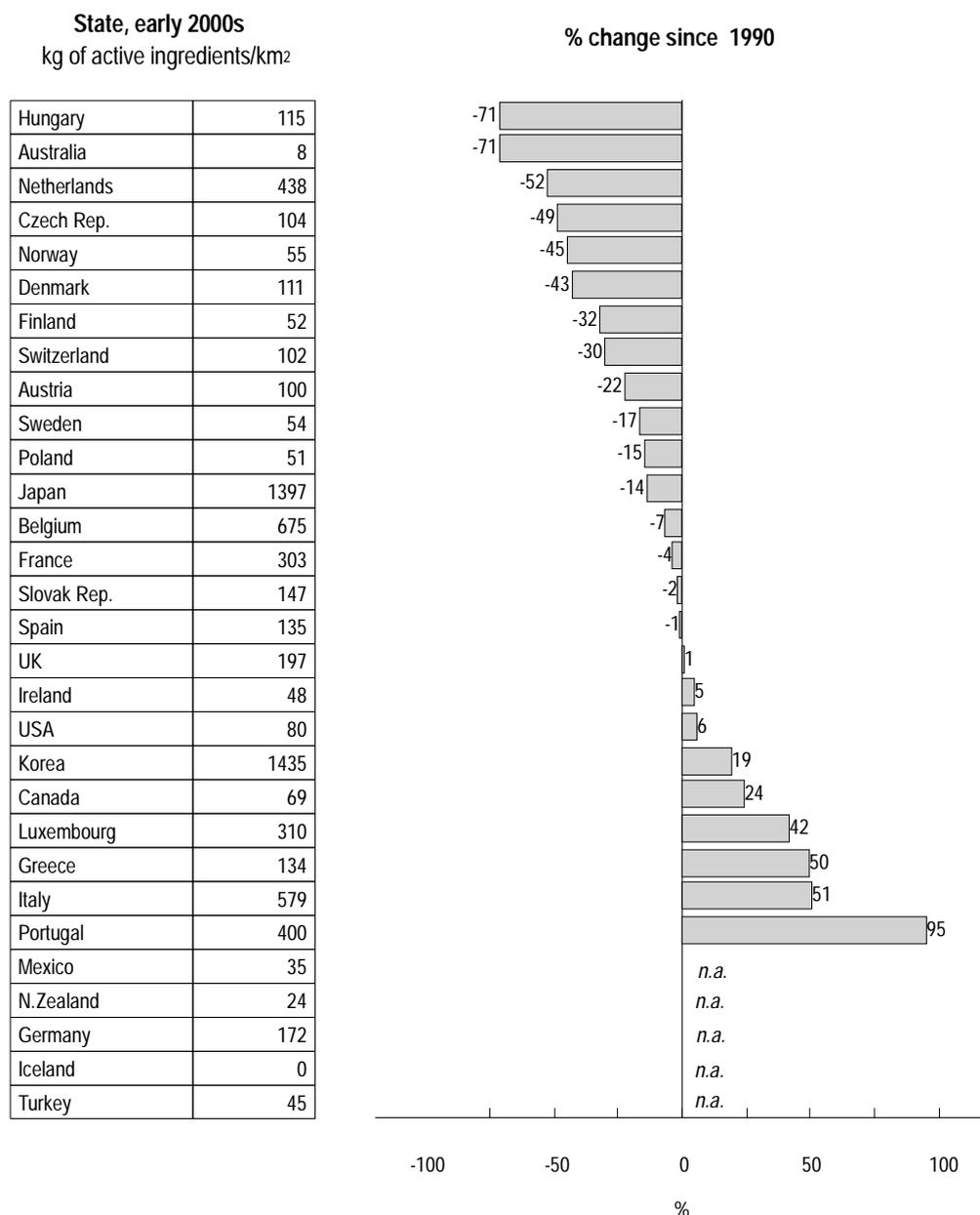
**Nutrients from livestock\*: Phosphate**



\* Data refer to nutrients from cattle, sheep, goats, pigs, horses and poultry

	Selected livestock densities head of sheep equivalent per km <sup>2</sup> of agricultural land								Nutrients from livestock per km <sup>2</sup> of agricultural land		Agricultural production	
	Cattle		Sheep and Goats		Pigs		Chickens		Nitrogen tonnes/km <sup>2</sup> 2003	Phosphate tonnes/km <sup>2</sup> 2003	Livestock prod. % change since 1980	Total % change since 1980
	2003	% change since 1980	2003	% change since 1980	2003	% change since 1980	2003	% change since 1980				
Canada	131.7	8	1.6	93	23.9	41	15.7	66	2.2	0.9	42.8	50.0
Mexico	172.2	2	15.0	-8	16.9	-1	30.2	180	3.2	1.3	82.4	59.5
USA	140.2	-10	1.8	-45	14.5	-8	28.4	93	2.4	1.0	40.6	35.9
Japan	516.2	19	0.9	-36	185.0	9	324.0	12	12.8	6.3	10.3	-6.7
Korea	602.6	38	22.6	146	462.6	483	305.2	185	16.9	8.3	211.3	56.3
Australia	35.8	13	21.7	-21	0.6	28	1.2	119	0.6	0.2	40.9	65.5
N.Zealand	402.4	21	273.7	-42	2.6	-11	7.5	185	7.2	2.3	50.3	52.1
Austria	365.8	-12	10.7	70	97.5	-11	19.5	-18	6.1	2.5	8.0	3.6
Belgium	1281.6	6	11.1	50	483.7	48	150.1	37	21.6	8.9	26.8	32.3
Czech Rep.	206.7	-55	2.7	-62	78.6	-32	17.5	-59	3.7	1.6	..	..
Denmark	391.0	-36	5.4	182	489.4	43	44.7	42	11.0	5.2	22.2	25.6
Finland	222.2	-42	2.7	-32	50.9	-4	13.3	-35	3.6	1.5	-13.6	-3.9
France	385.1	-11	34.3	-13	49.5	43	43.4	36	6.2	2.5	6.4	2.2
Germany	483.7	-28	16.6	-4	154.1	-17	38.7	-12	8.5	3.6	-10.6	3.2
Greece	41.3	-32	165.8	21	10.6	3	19.8	3	2.2	0.7	-6.1	12.5
Hungary	78.8	-55	21.2	-52	86.6	-31	32.9	-41	2.6	1.2	-20.0	-23.0
Iceland	21.2	17	24.8	-41	2.3	287	0.7	-44	0.7	0.2	-3.3	-3.7
Ireland	968.8	33	162.2	181	40.9	126	15.4	71	14.1	5.0	17.4	16.5
Italy	295.4	-11	94.0	46	69.8	24	45.9	-14	5.9	2.3	12.4	-10.5
Netherlands	1167.4	-24	80.6	84	574.1	15	302.7	26	25.9	11.7	3.1	9.4
Norway	528.7	-16	109.4	-51	43.9	-38	19.1	-17	8.3	3.0	-2.5	-7.6
Poland	177.8	-55	1.8	-92	100.4	-10	15.7	-37	3.7	1.6	-16.9	-1.0
Portugal	216.7	9	156.6	18	60.7	-31	54.4	90	5.3	2.1	70.6	33.8
Slovak Rep.	145.8	-62	14.9	-41	59.1	-42	33.4	-10	2.6	1.1	..	..
Spain	132.2	47	91.4	71	80.0	133	26.1	27	3.6	1.5	58.8	41.9
Sweden	307.6	-2	14.3	36	60.5	-17	11.0	-49	4.9	1.9	-3.9	-3.1
Switzerland	616.2	-20	33.9	23	100.3	-28	29.3	25	9.6	3.8	-4.0	0.6
Turkey	162.7	-33	88.6	-48	0.0	-79	33.9	303	3.2	1.2	20.6	45.0
UK	375.5	-17	213.8	76	30.2	-31	60.0	53	7.5	2.7	-4.6	-0.4
OECD	134.3	-9	25.2	-16	21.0	7	21.1	64	2.4	1.0	..	..

♦ See Technical Annex for data sources, notes and comments.

Apparent consumption of pesticides per km<sup>2</sup> of agricultural landSTATE AND TRENDS  
SUMMARY

The intensity of use of pesticides i.e. the apparent consumption of pesticides per km<sup>2</sup> of agricultural land has declined in a number of OECD countries since 1990, though major variations exist among and within countries. The reductions can be explained partly by changing crop prices, greater efficiency in pesticide use as a result of improvements in pest management practices and technologies, and by the use of economic and fiscal instruments. In a majority of countries, changes in pesticide use are closely correlated with fluctuations in annual crop production trends. This indicator describes potential pressure on the environment; it does not recognise differences among pesticides in levels of toxicity, persistence and mobility.