

**LA1: LAND USE****H****Concepts and Definitions**

*Land use* refers to the functional division of land for different human purposes or economic activities. (Please refer to the OECD's Glossary of Statistical Terms website at <http://stats.oecd.org/glossary/>)

**Land Types**

*Agricultural land* includes land under scattered farm buildings, yards and their annexes and permanently uncultivated land, such as uncultivated patches, banks, footpaths, ditches, headlands and shoulders.

- *Arable land* refers to all land generally under rotation whether for temporary crops or meadows or left fallow.

- *Land under permanent crops* signifies land used for crops occupying it for a long period of time and which do not have to be planted for several years after each harvest. Land under trees and shrubs producing flowers, such as roses and jasmine, is so classified, as are nurseries (except those for forest trees); permanent meadows and pastures are excluded.

- *Fallow and other agricultural land* is arable land not under rotation that is set at rest for a period of time ranging from one to five years before it is cultivated again. It includes land usually under permanent crops, meadows or pastures, which is not being used for that purpose for a period of at least one year. Arable land which is normally used for the cultivation of temporary crops but which is temporarily used for grazing is included. Also included are scattered farm buildings, that is, isolated buildings not belonging to closed villages or similar rural localities.

- *Land under permanent meadows and pastures* means land used permanently (that is, for five years and more) for herbaceous forage crops. Permanent meadows and pastures on which trees and shrubs are grown are included in this category only if the growing of forage crop is the most important use of the area.

*Forest and other wooded land* includes forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; and windbreaks and shelterbelts of trees with an area of more than half a hectare and a width of more than twenty metres. Rubberwood plantations and cork oak stands are included but land predominantly used for agricultural practices are excluded.

- *Land under forest* refers to land under natural or planted stands of trees, whether productive or not. This category includes land from which forests have been cleared but that will be reforested in the foreseeable future, but it excludes woodland or forest used only for recreation purposes.

- *Other wooded land* refers to land either with a tree crown cover of five to ten per cent of trees able to reach a height of five metres at maturity; or a crown cover of more than ten per cent of trees not able to reach a height of five metres at maturity and shrub or bush cover.

*Built-up and related land* refers to land under houses, roads, mines and quarries, and other facilities, including their auxiliary spaces, deliberately installed for the pursuit of human activities. Land under closed villages or similar rural localities and open land closely related to these activities, such as waste tips, derelict land in built-up areas, junk yards, city parks and gardens, etc, are included in this category. Land occupied by scattered farm buildings, yards and their annexes are excluded.

*Wet open land* refers to non-wooded sites either partially, temporarily or permanently water-logged, the water of which may be fresh, brackish or saline, on blanket or raised peatlands. The water may be either stagnant or running, and is usually shallow, especially if it is saline.

*Dry open land with special vegetation cover* refers to non-wooded land that is covered by low (less than two metres high) vegetation.

*Open land without, or with insignificant, vegetation cover* refers to non-built-up land whose surface is either not covered at all by vegetation or scarcely covered by some vegetation.

*Waters* relate to the part of the national territory to be reported which is covered by surface waters. The national territory to be reported is defined as the surface enclosed by all inland borders and, if applicable, the normal base-line on the seaward side.

*Total area* is the total area of the country, including area under inland and tidal water bodies but excluding uninhabited islands.

*Total land area* is the total area excluding area under inland water bodies (major rivers, lakes, etc).

**Method of Computation**

Data on land use was compiled from questionnaires distributed to Member States/Associate Members through UNSD/UNEP/CARICOM collaboration according to the categories mentioned above.

**Indicator Relevance**

Land use is one of the most direct ways to examine changes in environmental quality. Changes measured over various time periods can indicate the extent to which man has modified the basic land resource of a country for agriculture, silviculture, industry, commercial establishments, human settlements, transport, recreation, waste disposal and other uses. The data for this indicator are intended to provide a general overview of the trends in land use that have occurred over the past years and to provide more specific information on present uses of land.

Information on land use change is also critical for integrated and sustainable land use planning. Such information is useful in identifying opportunities to protect land uses or to promote future allocation aimed at providing the greatest sustainable benefits for people.

Changes in arable and permanent crop land and wooded areas give important information about a country's endowment in agricultural and forest resources, both from an economic and an environmental perspective. Environmentally, unsustainable land use is an important factor in erosion and desertification. It may also pose a threat to ecosystems and lead to natural habitat loss and landscape changes. Landscape changes which lead, for example, to inappropriate farming and grazing practices or to environmentally insensitive construction or mining activities are significant from a sustainability viewpoint. This indicator acts as a measure for the more specific environmental and natural resource changes significant to sustainable development.

In addition, population growth is driving a rapid increase in the demand for food and fibre. At the same time, rising population density in rural areas diminishes the farm size. Small farmers are forced to extend cultivation to new areas, which are fragile and not suitable for cultivation. Crop intensification, which has contributed significantly to agricultural growth in recent years, can ease the pressure on cultivating new lands but farm practices adopted for raising yields (such as when expanding into new areas) can also, in some situations, result in damaging the environment. Changes in land use over time or between various components may show increased or decreased pressure on agricultural land.

**Data Assessment**

It is assumed that the concept of land use is in accordance with the international definition and is harmonized across the region.

Only seven (7) of the eighteen (18) Member States and Associate Members in the Community provided data for this indicator. Those seven (7), countries were Belize, Dominica, Guyana, Jamaica, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago. The data provided by these countries for this indicator were sparse and contained numerous gaps.

**Data Sources**

Please refer to **Appendix 2.6.1 (a)** for the sources of the data on land use of Member States and Associate Members.

**Evaluation**

Seven Member States reported data on *Land Use* as presented in **Table 6.1** below. Belize reported a total area of 22,966 squared kilometres in 1990<sup>1</sup>. *Agriculture land* represented 2,168 squared kilometres or 9 per cent of total area, *forest and other wooded land* was 16,437 or 72 per cent and other land (*built-up land, wet open land, dry open land with special vegetation cover and open land without, or with insignificant, vegetation cover*) totalling 2,778 or 12 per cent of total area. *Forest and other wooded land* covered 168,789 squared kilometres of the total area in Guyana in 2000.

Dominica reported a *total land area* of 750 squared kilometres throughout the period. Of this, land used for agricultural purposes declined from 190 squared kilometres in 1970 and 1980 to 180 squared kilometres in 1990 then increased to 210 squared kilometres in 2000. *Agriculture land* consisted *arable land*, which declined from 70 squared kilometres in 1970 and 1980 to 50 squared kilometres in 1990 and 2000, *land under permanent crops* which saw increases from 100 squared kilometres in 1970 and 1980 to 110 squared kilometres in 1990 then to 140 in 2000. In Dominica, *forest and other wooded land* remained fixed at 500 squared kilometres throughout the period and data was reported as consisting 460 squared kilometres.

Jamaica reported total area of 10,990 squared kilometres including 10,830 squared kilometres *land area*. *Land under permanent crops* declined from 2,308 squared kilometres in 1978 to 1,776 squared kilometres in 1996 while *fallow and other agricultural land* increased from 1,125 squared kilometres in 1978 to 1,294 squared kilometres in 1996. *Land under permanent meadows and pastures* also reported an increase from 808 squared kilometres in 1978 to 956 squared kilometres in 1996. Jamaica's data on *forest and wooded land* revealed declines for all uses which included *land under forest* (moving from 2,874 in 1989 squared kilometres to 2,839 squared kilometres in 1998) and *other wooded land* (declining from 1337 squared kilometres in 1978 to 421 squared kilometres in 1989 finally to 420 in 1998). Data was also received for *wet open land* which was reported at 24 squared kilometres in 1989 and 23 squared kilometres in 1998, and *land with special vegetation cover* at 121 squared kilometres for both years.

Suriname's total area was 163,820 squared kilometres consisting 156,550 squared kilometres *land area* and 7,270 squared kilometres of *waters*. Total *agriculture land* remained fixed at 1,060 squared kilometres whereas its components, *arable land* and *land under permanent crops* declined from 1980 to 2000 with fluctuations experienced

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<sup>1</sup> Data extracted from the 1989/92 land use study of Belize, with the exception of the value for forest and other wooded land which comes from a revised land use study in 1996/1998.

between years. *Forest and wooden land* fluctuated from 149,400 squared kilometres in 1980 to 148,900 squared kilometres in 1985 then to 150,940 squared kilometres in 1995.

Trinidad and Tobago's *total land area* was reported at 5,130 squared kilometres. *Agriculture land* increased from 1,100 squared kilometres in 1970 to 1,330 squared kilometres in 2000 with increases for *arable land* by 32 per cent from 570 squared kilometres in 1970 to 750 squared kilometres in 2000 and *land under permanent crops* by 9 per cent from 430 squared kilometres in 1970 to 470 squared kilometres in 2000. Total *forest and other wooden land* was reportedly 2,400 squared kilometres in 1970 and 2,300 squared kilometres in 1990 and 2,349 squared kilometres in 2002.

*Total land area* of St. Vincent and the Grenadines was reported at 390 squared kilometres. *Agricultural land* increased during the period from 110 squared kilometres in 1970 to 160 squared kilometres in 2000 while *forest and other wooden land* remained fixed at 140 squared kilometres.

Table 6.1 – Land Use : 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002

Unit = km<sup>2</sup>

Country	Year	Agricultural land				Total	Forest and other wooded land		
		Arable land	Land under permanent crops	Land under permanent meadows and pastures	Fallow and other agricultural land		Land under forest	Other wooded land	Total
BZ	1990	...	...	...	...	2,168	...	...	16,437
DM	1970	70	100	...	...	190	...	...	500
	1980	70	100	...	...	190	...	...	500
	1990	50	110	...	...	180	500	-	500
	2000	50	140	...	...	210	460	...	...
GY	2000	...	...	...	...	...	...	...	168,789
JM	1978	-	2,308	808	1,125	...	...	1,337	...
	1989	...	...	...	...	...	2,874	421	3,295
	1996	-	1,776	956	1,294	...	...	...	...
	1998	...	...	...	...	...	2,839	420	3,259
VC	1970	60	40	...	...	110	...	...	140
	1980	50	50	...	...	120	...	...	140
	1990	50	70	...	...	140	70	...	140
	2000	70	70	...	...	160	60	...	...
SR	1980	670	110	...	...	1,060	...	...	149,400
	1985	...	...	...	...	...	...	...	148,900
	1990	550	150	...	...	1,060	...	...	...
	1995	650	100	...	...	1,060	...	...	150,940
	1999	...	...	...	...	...	...	...	...
	2000	440	80	...	...	1,060	...	...	...
TT	1970	570	430	...	...	1,100	...	...	2,400
	1980	700	460	...	...	1,270	...	...	2,300
	1990	740	460	...	...	1,310	...	...	...
	2000	750	470	...	...	1,330	...	...	...
	2002	208	155	39	13	...	...	...	2,349

Table 6.1 Contd. Land Use : 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002

Unit = km<sup>2</sup>

Country	Year	Built-up and related land	Wet open land	Dry open land with special vegetation cover	Open land with/ without insignificant, vegetation cover	Total land area	Waters	Total area of the country
<b>BZ</b>	1990	84	2,686	...	8			22,966
<b>DM</b>	1970	...	...	...	...	750	-	750
	1980	...	...	...	...	750	-	750
	1990	...	...	...	...	750	-	750
	2000	...	...	...	...	750	-	750
<b>GY</b>	2000	...	...	...	...	...	...	...
<b>JM</b>	1978	...	...	...	...	10,830	160	10,990
	1989	...	24	121	...	10,830	160	10,990
	1996	...	...	...	...	10,830	160	10,990
	1998	...	23	121	...	10,830	160	10,990
<b>VC</b>	1970	...	...	...	...	390	-	390
	1980	...	...	...	...	390	-	390
	1990	...	...	...	...	390	-	390
	2000	...	...	...	...	390	-	390
<b>SR</b>	1980	...	...	...	...	156,550	7,270	163,820
	1985	...	...	...	...	156,550	7,270	163,820
	1990	...	...	...	...	156,550	7,270	163,820
	1995	...	...	...	...	156,550	7,270	163,820
	1999	...	...	...	...	156,550	7,270	163,820
	2000	...	...	...	...	156,550	7,270	163,820
<b>TT</b>	1970	...	...	...	...	5,130	-	5,130
	1980	...	...	...	...	5,130	-	5,130
	1990	...	...	...	...	5,130	-	5,130
	2000	...	...	...	...	5,130	-	5,130
	2002	...	...	...	...	...	...	...

Table 6.1 (b) Percentage distribution of Land Use : 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002

							(Percent)		
Country	Year	Agricultural land				Total	Forest and other wooded land		
		Arable land	Land under permanent crops	Land under permanent meadows and pastures	Fallow and other agricultural land		Land under forest	Other wooded land	Total
<b>BZ</b>	1990	...	...	...	...	9.4	...	...	71.6
<b>DM</b>	1970	9.3	13.3	...	...	25.3	...	...	66.7
	1980	9.3	13.3	...	...	25.3	...	...	66.7
	1990	6.7	14.7	...	...	24.0	66.7	-	66.7
	2000	6.7	18.7	...	...	28.0	61.3	...	...
<b>GY</b>	2000	...	...	...	...	...	...	...	...
<b>JM</b>	1978	-	21.0	7.4	10.2	...	...	12.2	...
	1989	...	...	...	...	...	26.1	3.8	30.0
	1996	-	16.2	8.7	11.8	...	...	...	...
	1998	...	...	...	...	...	25.8	3.8	29.6
<b>VC</b>	1970	15.4	10.3	...	...	28.2	...	...	35.9
	1980	12.8	12.8	...	...	30.8	...	...	35.9
	1990	12.8	17.9	...	...	35.9	17.9	...	35.9
	2000	17.9	17.9	...	...	41.0	15.4	...	...
<b>SR</b>	1980	0.4	0.1	...	...	0.6	...	...	91.2
	1985	...	...	...	...	...	...	...	90.9
	1990	0.3	0.1	...	...	0.6	...	...	...
	1995	0.4	0.1	...	...	0.6	...	...	92.1
	1999	...	...	...	...	...	...	...	...
	2000	0.3	0.0	...	...	0.6	...	...	...
<b>TT</b>	1970	11.1	8.4	...	...	21.4	...	...	46.8
	1980	13.6	9.0	...	...	24.8	...	...	44.8
	1990	14.4	9.0	...	...	25.5	...	...	...
	2000	14.6	9.2	...	...	25.9	...	...	...
	2002	...	...	...	...	...	...	...	...

**Table 6.1 (b) Contd. Percentage distribution of Land Use : 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002**

		(Percent)						
Country	Year	Built-up and related land	Wet open land	Dry open land with special vegetation cover	Open land with/ without insignificant, vegetation cover	Total land area	Waters	Total area of the country
<b>BZ</b>	1990	0.4	11.7	...	0.0			100.0
<b>DM</b>	1970	...	...	...	...	100.0	-	100.0
	1980	...	...	...	...	100.0	-	100.0
	1990	...	...	...	...	100.0	-	100.0
	2000	...	...	...	...	100.0	-	100.0
<b>GY</b>	2000	...	...	...	...	...	...	100.0
<b>JM</b>	1978	...	...	...	...	98.5	...	100.0
	1989	...	0.2	1.1	...	98.5	...	100.0
	1996	...	...	...	...	98.5	...	100.0
	1998	...	0.2	1.1	...	98.5	...	100.0
<b>VC</b>	1970	...	...	...	...	100.0	-	100.0
	1980	...	...	...	...	100.0	-	100.0
	1990	...	...	...	...	100.0	-	100.0
	2000	...	...	...	...	100.0	-	100.0
<b>SR</b>	1980	...	...	...	...	95.6	4.4	100.0
	1985	...	...	...	...	95.6	4.4	100.0
	1990	...	...	...	...	95.6	4.4	100.0
	1995	...	...	...	...	95.6	4.4	100.0
	1999	...	...	...	...	95.6	4.4	100.0
	2000	...	...	...	...	95.6	4.4	100.0
<b>TT</b>	1970	...	...	...	...	100.0	-	100.0
	1980	...	...	...	...	100.0	-	100.0
	1990	...	...	...	...	100.0	-	100.0
	2000	...	...	...	...	100.0	-	100.0
	2002	...	...	...	...	...	...	...

**LA2: USE OF FERTILIZERS BY TYPE AND YEAR****H****Concepts and Definitions**

*Fertilizers* are compounds given to plants to promote growth. They are usually applied either via the soil, for uptake by plant roots, or by foliar feeding, for uptake through leaves. Fertilizers can be organic (composed of organic matter), or inorganic (made of simple, inorganic chemicals or minerals). They can be naturally occurring compounds such as peat or mineral deposits, or manufactured through natural processes (such as composting) or chemical processes (such as the Haber process).

*Use of fertilizers by type and year* refers to the yearly extent of fertilizer use in agriculture per unit of agricultural land area.

**Types of Fertilizers**

*Nitrogenous fertilizers* refer to the nitrogen content of commercial inorganic fertilizers.

*Phosphate fertilizers* refer to commercial phosphoric acid ( $P_2O_5$ ) and cover the  $P_2O_5$  of super-phosphates, ammonium phosphate and basic slag.

*Potash fertilizers* refer to the potassium oxide ( $K_2O$ ) content of commercial potash, muriate, nitrate and sulphate of potash, manure salts, kainite and nitrate of soda potash.

*NPK Mix*: NPK is an acronym for nitrogen, phosphorus and potassium: the three nutrients that compose a complete fertilizer. They are also the three nutrients plants extract from soil in the greatest quantity and are available in synthetic, organic, and mineral forms.

**Method of Computation**

Data on fertilizers are compiled from industry and non-traditional sources. For developing countries, data generally refer to domestic disappearance based on imported products.

**Indicator Relevance**

The challenge for agriculture is to increase food production in a sustainable way. The use of mineral fertilizers in agriculture to increase cropping power simultaneously increases environmental hazards, such as water and soil pollution, and has toxic effects on other environmental components, interfering with the natural balance of soil micro flora. High levels of nitrate and nitrite in drinking water are a hazard to human health. The actual environmental effects, however, will depend on pollution abatement practices, soil and plant types, and meteorological conditions. Use of fertilizers by type and year makes it possible to assess the fertilizer load on the environment (the accumulation of fertilizers in

the soil, the resulting pollution of surface and groundwater, and the movement of fertilizers through tropic chains and other parts of the environment).

**Data Assessment**

Data on the use of fertilizers was submitted by five Member States and two Associate Members. All reporting Member States/Associate Members followed the internationally recommended definition for the use of fertilizers. This indicator is therefore conceptually harmonized among these countries. Data on the annual imports of fertilizers were used for all countries except Belize where production data was used, since no data on actual use are available.

**Data Sources**

Please refer to **Appendix 2.6.2 (a)** for the sources of the data on the use of fertilizers by type and year of Member States and Associate Member.

**Evaluation**

Data on the use of fertilizers can be seen in **Table 6.2** below for five Member States and one Associate Member. Jamaica followed by The Bahamas and Belize recorded the most fertilizer use with Nitrogenous fertilizers and Potash fertilizers being the most used for all reporting countries followed closely by NPK Mix. Comparing 1998 with the latest year available, all countries with the exception of Jamaica registered declines in the use of Fertilizers with moderate fluctuations in the intervening years. Among Member States, in 1998, the use of fertilizers ranged from a low of 3 tonnes in Anguilla to a high of 51,303 tonnes in Jamaica. Similarly in 2003, Anguilla had the lowest quantity of fertilizer use, 0.27 tonnes, and the highest use of fertilizers was found in Jamaica (52,639 tonnes).

Table 6.2 Use of fertilizers by type and year: 1990,1995,1998-2004

						(Tonne)
Country	Year	Nitrogenous fertilizers	Phosphate fertilizers	Potash fertilizers	NPK MIX	Total
BS	1995		838	...		838
	1998	6,446	45	25,317	0	31,808
	1999	4,363	280	24,129	0	28,772
	2000	5,461	608	7,905	0	13,974
	2001	1,390	364	20,044	0	21,798
	2002	7,213	409	25,042	0	32,664
	2003	3,582	87	21,342	0	25,011
BZ	1998	6,428	4,498	3,219	6,098	20,243
	1999	11,226	6,290	3,199	6,327	27,042
	2000	8,019	4,637	4,674	3,678	21,008
	2001	7,712	5,876	3,816	2,827	20,231
	2002	5,675	7,730	2,921	6,304	22,630
	2003	7,704	5,945	3,293	8,022	24,964
	2004	6,367	5,421	3,286	7,677	22,750
DM	1990	54	0	2	8,526	8,582
	1995	21	23	0	7,089	7,133
	1999	29	0	0	4,202	4,231
	2000	28	0	0	3,062	3,090
	2001	27	0	0	2,501	2,528
	2002	92	0	22	1,003	1,117
	2003	33	0	0	1,863	1,896
2004	116	0	1	3,014	3,131	
JM	1990	13,016	14	400	6,442	19,872
	1995	19,042	224	13,026	23,340	55,632
	1998	25,345	81	10,675	15,202	51,303
	1999	23,313	0	17,080	12,340	52,733
	2000	27,241	63	13,264	11,754	52,322
	2001	16,323	4	10,754	20,774	47,855
	2002	21,877	1	8,222	14,440	44,540
	2003	26,543	21	12,845	13,230	52,639
	2004	24,927	11	17,068	15,702	57,708
VC	1998	1	2	0	5,432	5,435
	1999	10	3	1	4,851	4,865
	2000	8	0	1	5,488	5,496
	2001	3	0	0	2,450	2,453
	2002	1	0	15	3,956	3,972
	2003	14	0	0	3,576	3,590
	2004	1	1	40	3,805	3,846
<b>ASSOCIATE MEMBERS</b>						
AI	1998	0.27	0.08	2.39	0.00	2.74
	1999	0.19	2.67	9.95	0.00	12.80
	2000	8.23	0.18	0.13	0.00	8.54
	2001	0.06	0.00	0.00	0.00	0.06
	2002	0.00	4.93	0.28	0.00	5.21
	2003	0.27	0.00	0.00	0.00	0.27
2004	0.00	0.03	0.01	0.00	0.03	

**LA3: USE OF PESTICIDES BY TYPE AND YEAR****H****Concepts and Definitions**

A *pesticide* is any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies. The term pesticide also includes substances intended for use as a plant growth regulator, defoliant, desiccant (agent for thinning fruit or preventing the premature fall of fruit), and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport.

*Use of pesticides by type and year* refers to the type and quantity of pesticides used in (or sold to) the agricultural sector.

**Types of Pesticides**

*Insecticides* are agents of chemical or biological origin that control insects. Control may result from killing the insect or otherwise preventing it from engaging in behaviours deemed destructive. Insecticides may be natural or manmade and include chlorinated hydrocarbons, organo-phosphates, carbonates-insecticides, pyrethroids, and botanical and biological products. Examples include Chlordane and DDT.

*Herbicides* are used to kill unwanted plants. Selective herbicides kill specific targets while leaving the desired crop relatively unharmed. Some selective herbicides act by interfering with the growth of the weed and are often based on plant hormones. Nonselective herbicides, on the other hand, kill all plant material with which they come into contact. Herbicides include phenoxy hormone products, triazines, amides, carbonates-herbicides, dinitroanilines, urea derivatives, sulfonyl urea, bipiridils and uracil.

*Fungicides* are chemical compounds used to prevent the spread of fungi or plants in gardens and crops, which can cause serious damage resulting in loss of yield and thus profit. Fungicides can either be contact or systemic. A contact fungicide kills fungi when sprayed on its surface; a systemic fungicide has to be absorbed by the plant.

*Bactericides* destroy, suppress or prevent the spread of bacteria. Examples are swimming pool chemicals containing chlorine, and products used to control black spot (bacterial blight) on garden plants or in orchards. Disinfectants for household and industrial use are excluded and are not considered pesticides

*Seed treatments* are chemical or biological substances or physical processes applied to seeds or seedlings. They help to protect the seeds and assure optimum emergence of the plant or crop. Application of a chemical to seeds is a very well-targeted method of reducing pest and disease attacks on the growing plant.

*Plant growth regulators* are substances or mixture of substances intended, through physiological action, to accelerate or retard the rate of growth or maturation, or otherwise alter the behaviour of plants or their produce. Additionally, plant regulators are characterized by their low rates of application (high application rates of the same compounds often are considered herbicidal).

*Rodenticides* are pesticides used specifically for controlling rodents, such as mice and rats, and include anti-coagulants.

*Other* refers to pesticides not so far mentioned.

#### **Method of Computation**

Data on pesticide use are usually derived from sales or “domestic disappearance” and expressed as active ingredients. Information on types of active ingredients in use, seasonal doses, rate of application, and variability on use for different crops and regions were used to derive the data for this indicator.

#### **Indicator Relevance**

This indicator serves as a measure of the use and amount of pesticides in agriculture. The major challenge for agriculture is to increase food production in a sustainable way. One important aspect of this challenge is the use of agricultural pesticides, which add persistent organic chemicals to ecosystems. Pesticides can be persistent, mobile, and toxic in soil, water, and air, and can impact humans and wildlife through the food chain. They tend to accumulate in the soil and in biota, and residues may reach surface and groundwater through leaching. Humans can be exposed to pesticides through food.

Persistent pesticides can cause adverse environmental effects. Exaggerated use may result from government subsidies and/or failure of pesticide users to internalise health-related costs. Better knowledge of used amounts helps activities aiming at a reduction of the consumption of pesticides to a level strictly adjusted to the actual situation of the farm land. In that way, the toxic emissions from pesticides can be kept at a minimum level.

#### **Data Assessment**

Data on the use of pesticide was submitted by five Member States and two Associate Members although data for Bermuda was reported in dollars as quantities were unavailable. All reporting Member States and Associate Members followed the internationally recommended definition for the use of pesticide. This indicator is therefore conceptually harmonized

among these countries. Data on imports of pesticides were used, since no data on actual use are available.

**Data Sources**

Please refer to **Appendix 2.6.3 (a)** for the sources of the data on the use of pesticides by type and year for Member States and Associate Members.

**Evaluation**

The data presented in **Table 6.3** below on the *use of pesticide* by type and year reveals that pesticide use has fluctuated greatly in most Member States and has declined in The Bahamas and Dominica. *Insecticides, herbicides and fungicides, bactericides and seed treatments* were the principal types of pesticides used in the CARICOM Region. Jamaica reported *use of pesticide* averaging 2,231 tonnes for the period 1998 to 2003 followed by Belize which averaged 1,237 tonnes for the period 1998 to 2004.

Table 6.3 Use of Pesticides by type and year: 1990, 1995, 1998 - 2004

								(tonnes)
Country	Year	Insecticides	Herbicides	Fungicides, bactericides and seed treatments	Plant growth regulators	Rodenticides	Others (including mineral oils)	TOTAL
<b>BS</b>	1998	628	62	281	26	8	66	1,071
	1999	552	34	365	22	20	46	1,040
	2000	806	40	285	29	11	14	1,185
	2001	574	33	261	33	16	3	921
	2002	674	96	102	40	16	10	938
	2003	617	72	61	34	15	4	803
<b>BZ</b>	1995	269	337	330	0	0	0	936
	1998	290	372	222	0	0	0	884
	1999	186	379	206	0	0	0	771
	2000	712	447	155	0	0	0	1,314
	2001	557	392	209	0	0	0	1,158
	2002	1,096	409	315	0	0	0	1,820
	2003	698	428	348	0	0	0	1,474
	2004	494	662	225	0	0	0	1,381
<b>DM</b>	1990	253	196	25	0	5	0	480
	1995	289	195	35	0	9	0	527
	1998	204	101	5	0	6	0	316
	1999	221	128	37	0	10	0	395
	2000	334	104	89	0	8	0	536
	2001	104	77	70	0	5	0	256
	2002	106	68	6	0	5	0	185
	2003	93	69	5	0	6	0	174
	2004	63	93	2	0	5	0	164
<b>JM</b>	1990*	656	489	275	0	26	9	1,454
	1995	426	657	1,439	45	22	1	2,590
	1998	602	649	390	38	54	2	1,735
	1999	682	928	868	11	56	7	2,551
	2000	699	755	729	30	138	9	2,360
	2001	683	864	302	126	25	35	2,035
	2002	620	810	356	225	69	8	2,088
	2003	626	934	856	121	73	7	2,618
<b>VC</b>	1998	300	116	241	0	4	5	666
	1999	284	287	384	0	3	1	959
	2000	324	126	290	1	4	1	746
	2001	155	85	126	0	6	0	373
	2002	207	135	269	1	4	0	616
	2003	235	91	122	5	8	1	463
	2004	378	184	150	0	5	14	731
<b>SR (kg)</b>	2000	378	...	...	...	...	...	...
	2001	262	...	...	...	...	...	...
	2003	503	...	...	...	...	...	...
	2004	483	...	...	...	...	...	...
<b>ASSOCIATE MEMBERS</b>								
<b>AI</b>	1998	52	0	1	0	2	45	100
	1999	31	1	0	0	2	41	74
	2000	35	0	0	0	2	61	98
	2001	52	1	1	2	2	74	132
	2002	82	2	0	1	1	81	167
	2003	154	2	1	0	1	51	208
	2004	57	8	6	0	1	55	127

### Appendix 1.6 Conversion Table

Metric	to	Imperial
62 UK tons		63 tonnes
2205 pounds		1 tonne
2.25 pounds		1 kilogram

### Appendix 2.6 Sources of Data on Land Use and Agriculture

#### 2.6.1 (a): Source of Data for Table 6.1 – Land Use: 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002

Country	Data Source
Belize	1989/1992 Land Use Study of Belize
Dominica	Central Statistical Office
Guyana	Bureau of Statistics
Jamaica	Statistical Institute of Jamaica
St. Vincent and the Grenadines	Statistical Office
Suriname	General Bureau of Statistics
Trinidad and Tobago	Ministry of Agriculture

**2.6.1 (b): Notes for Table 6.1 – Land Use: 1970, 1978, 1980, 1985, 1990, 1995 - 1996, 1999 - 2000, 2002**

Country	Notes
Belize	<p>Data from the 1989/1992 land use study of Belize, with the exception of the value for forest and other wooded land which come from a revised land study in 1996/ 1998.</p> <p>*: Total land area and waters do not add to the total area of Belize, because it does not account for all water bodies found in mainland Belize and cloud cover.</p>
Dominica	<p>Data for 1995 is based on the agricultural study. 1970 and 1980 data for agricultural land are FAO Unofficial figures. 1990 and 200 data for agricultural land are FAO Estimates. 1970 and 1980 total forest and other wooded land data are FAO estimates. The 1990 total forest and other wooded land data is an unofficial FAO figure.</p>
St. Vincent and the Grenadines	<p>1970, 1980, 1990 and 2000 agricultural land data are FAO estimates. 1990 total forest and wooded land data is also an FAO estimate. 1980 total forest and other wooded land data is an unofficial FAO figure.</p>
Trinidad and Tobago	<p>The data provided only represents lands managed for agricultural use. These lands are state leased and are zones for agricultural production by the Town and Country Planning Division. The total land under agricultural production is greater than the figures provided and are outside the scope of the Land Administration Division's databases. The national soil maps may provide some information regarding total land capability but the monitoring of actual land use are not within the division's jurisdiction.</p> <p>*: Forest and wooded areas are classified together as part of food crops and agro forestry. Because of multi-cropping practices, no distinction can be made. The area of 368.32 squared kilometres for forest is part of the total agricultural lands.</p> <p>1970, 1980, 1990 and 2000 agricultural land data are FAO estimates. 1970, 1980 and 1990 total forest and other wooded land are unofficial FAO figures.</p>

**2.6.2 (a): Sources of Data for Table 6.2 - Use of Fertilizers by Type and Year: 1990, 1995, 1998 - 2004**

Country	Data Source
The Bahamas	Trade Section, Department of Statistics
Belize	Environmental Statistical Unit/Ministry of Natural Resources and Environment
Dominica	Central Statistical Office
Jamaica	Statistical Institute of Jamaica
St. Vincent and the Grenadines	Statistical Office
Anguilla	Customs Office

**2.6.2 (b): Notes for Table 6.2 - Use of Fertilizers by Type and Year: 1990, 1995, 1998 - 2004**

Country	Notes
Belize	Information refers to fertilizer production by fertilizer companies in Belize.
Dominica	Data refer to annual imports.
Jamaica	This data represents the total imports. Some fertilizers are also exported.
St. Vincent and the Grenadines	These figures represent imports of fertilizer.
Anguilla	This data is the imports of the mentioned fertilizers and not the usage. It is, therefore, assumed that all imports are consumed within the specific year.

**2.6.3 (a): Sources of Data for Table 6.3 - Use of Pesticides by Type and Year: 1990, 1995, 1998 - 2004**

Country	Data Source
The Bahamas	Trade Section, Department of Statistics
Belize	Central Statistical Office: Trade Data
Dominica	Central Statistical Office
Jamaica	Statistical Institute of Jamaica
St. Vincent and the Grenadines	Statistical Office
Suriname	General Bureau of Statistics
Anguilla	Customs Office

**2.6.3 (b): Notes for Table 6.3 - Use of Pesticides by Type and Year: 1990, 1995, 1998 - 2004**

Country	Notes
Belize	Information provided is based on imports.
Dominica	Data refer to annual imports.
Jamaica	*: Rodenticides include anti-sprouting products, plant growth regulators, and similar products in 1990.
St. Vincent and the Grenadines	The figures represent imports of pesticides.
Suriname	General Bureau of Statistics
Anguilla	This data is the imports of the abovementioned pesticides and not the usage. It is, therefore, assumed that all imports are consumed within the specific year.