AGÊNCIA PORTUGUESA DO AMBIENTE
Ministério do Ambiente e do Ordenamento do Território

National Implementation Plan for the Stockholm Convention

Portugal

January 2010

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Contents

Figures

Tables

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Chapter 1 – Introduction

Persistent Organic Pollutants (POPs) include numerous synthetic substances belonging to various chemical groups. Unlike the vast majority of organic compounds, the aromatics (i.e. containing one or more benzene rings) tend to be very stable. The biphenyl molecule, a precursor of PCBs (polychlorinated biphenyls), is composed of two of these rings. Aromatic hydrocarbons can become even more stable when one or more hydrogen atoms are replaced by halogens (fluorine, chlorine, bromine or iodine). Chlorine has been widely used in this way, finding a multitude of applications in agriculture (biocides) and industry (solvents, cleaning agents, plastics, etc.). The twelve POPs (aldrin, dieldrin, endrin, chlordane, DDT, heptachlor, toxaphene, mirex, hexachlorobenzene, polychlorinated biphenyl compounds, dioxins and furans) regulated by the Stockholm Convention are all aromatics.

In addition to being highly toxic and stable, POPs are also characterized by their ability to accumulate in living tissues, particularly in the adipose tissue, which is proportional to their liposolubility – a phenomenon called bioaccumulation. Because they are hydrophobic, in aquatic environments they are only found in living organisms or organic matter, where they reach much higher concentrations than in the surrounding environment (non-polar molecules such as POPs only become soluble in compounds with similar properties).

POPs can be found in every continent. Although present in solid or liquid state at ambient temperature, most POPs are volatile and can therefore also exist in the gaseous state. The chemical characteristics of each compound, such as volatility, polarity or solubility, explain their relative tendency to disperse through air, or adsorb to fatty tissue or sediments. The balance established between the different phases – solid, liquid and gaseous – is dynamic, with constant and mutual exchanges between them.

Once in the atmosphere, a molecule can be transported thousands of kilometers before depositing on the soil or other environment. The more volatile POPs can remain in the air for days or even weeks, hence the almost uniform concentration around the globe. The less volatile persistent pollutants, however, usually evaporate in temperate and tropical regions, where temperatures are higher, and condense in the cooler, higher latitudes, as the energy is not sufficient to cause a change of state. This results in the progressive accumulation of pollutants near the poles.

Despite this homogenizing effect, the concentration of persistent pollutants tends to be higher near the places where they are formed and released due to the time it takes for the balance to be reached. This applies in particular to dioxins.

In water, most POPs are so insoluble that they are deposited on the surface of sediments or even in living organisms, traveling short distances from their point of origin. The amount of pollutants stored in this way is much higher than the amount dissolved, while the amount in the air can be considered almost negligible. The release of POPs directly to water is usually a local or regional problem.

Aquatic ecosystems

Because it continuously filters water and sediments, the benthic fauna can accumulate large quantities of POPs. The level of bioaccumulation achieved by aquatic organisms is, however, limited. This is due to

the enduring tendency to achieve a state of equilibrium between tissues and environment. When a fish feeds on zooplankton, for example, it is increasing its concentration of persistent pollutants.

Uses

POPs have a wide range of applications of which the following examples are among the most relevant. However, alternatives with less environmental impact are already are available for most of these applications.

- Tires and oil derived substances used in asphalt, fuels, lubricants;
- Plastics for multiple uses;
- Resins used in adhesives, waterproofing and paints;
- Intermediate chemicals used to make other chemicals;
- Liquid solvents, used to keep other compounds in solution, for example in paints and cleaning products;
- Surfactants (products used in detergents to promote interaction between the product and the material it is applied to);
- Elastomers (synthetic rubber such as neoprene);
- Chemicals from rubber processing;
- Plasticizers (used in plastic to give flexibility);
- Pesticides;
- Pharmaceuticals;
- Fragrance and flavoring (the industries regularly use synthetic materials so that the products have the taste and smell they want);
- Dyes and pigments (widely used in car paint through to clothes and even food).

Objective of Portugal´s NIP

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty signed by 151 States and regional organizations for economic integration with the aim of protecting human health and the environment from persistent organic pollutants.

Parties to the Convention are required to develop and endeavor to implement a national implementation plan (NIP) on how they carry out their obligations under the Convention.

Portugal´s NIP will be subject to periodic reviews and updates in the future, in response to the dynamic nature of the Convention.

Organization of the National Implementation Plan for the Stockholm Convention

Portugal's NIP is organized into 9 chapters. Chapter 1 provides an introduction to the Stockholm Convention; Chapter 2 briefly characterizes Portugal; Chapter 3 describes the situation in Portugal in relation to POPs at national, EU and international level; Chapters 4, 5 and 6 present evaluations on pesticide POPs, intentional and unintentional POPs, respectively; Chapter 7 describes the effectiveness of legislation and policies regarding the management of air pollutant emissions; Chapter 8 indicates

institutions with ability to carry out reviews and assessments of POPs; and Chapter 9 presents the strategies and action plans for reducing emissions to the environment and impact on human health.

Stockholm Convention

Overview of the Convention

The negotiations on the Convention on Persistent Organic Pollutants (POPs) were completed in December 2000, under the auspices of the United Nations Environment Program (UNEP).

The Convention was adopted at the Conference of Plenipotentiaries in May 2001. The Community, and its then fifteen Member States and eight of the new Member States signed the Convention on 22 May 2001.

Based on the precautionary principle, the Convention provides a framework to eliminate the production, use, import and export of twelve priority POPs, their safe handling and permanent disposal and elimination or reduction of unintentional releases of certain POPs. The text of the Conventions also defines the rules of addition of new chemicals to its annexes.

The control measures defined by the Convention have been implemented by EU legislation, namely through Regulation (EC) 850/2004 of the European Parliament and Council of 29 April 2004 on persistent organic pollutants which amended the EU Directive 79/117/EC, Regulation (EC) 304/2003 of the European Parliament and Council of 28 January 2003 concerning the export and import of hazardous chemicals and the Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and terphenyls (PCBs/PCTs). The Council approved the Convention, on behalf of the European Community, through the Council Decision CS/12649/04 of 14 October 2004. The Convention entered into force on 17 May 2004. Portugal ratified the Convention by national Decree 15/2004 of 3 June.
The Convention is an important tool that must operate in conjunction with other multilateral environmental agreements such as the Rotterdam and Basel Conventions and the Strategic Approach to International Chemicals Management (SAICM), in order to enable effective management of chemicals at international level.

The twelve POPs

By ratifying the Stockholm Convention, the Parties agree to manage and control the twelve POPs and to a formal process to consider the addition of other substances to the Convention. The twelve POPs that were included when the Convention entered into force (2004) fall into three broad categories: pesticides, industrial chemicals and unintentionally produced POPs.

Pesticides

Aldrin – A synthetic organochlorine insecticide, aldrin rapidly transforms into dieldrin in the environment or the body. It has been widely used as an insecticide in agriculture, veterinary medicine and vector control (disease transmitters); it has also been used against worms, beetles and termites. Though prohibited and restricted in many countries, others continue to apply it primarily in termite control.

Dieldrin – Used for similar functions as aldrin, but mainly in termite control. It accumulates in fatty tissue as it passes up the food chain.

Endrin – A highly toxic persistent organochlorine insecticide, endrin is estimated to persist in soil for as much as 14 years. It is poorly soluble in water and generally not found in the air except when recently applied to a field. Introduced in 1951, endrin has been used to control birds in buildings and insects and rodents in fields and orchards; it is applied in the production of cotton, corn, sugar cane, apples and flowers. Several countries have banned endrin from the market while in many others its use is still permitted.

Chlordane – A broad-spectrum insecticide known for its toxic effects and ability to persist and bioaccumulate in fatty tissues of fish, birds and mammals. It is stable in soil, decomposing slowly by exposure to UV rays but traces can remain in the soil for decades. It is poorly soluble in water. Introduced in 1945, chlordane was used in large quantities as an insecticide for the control of termites and insects whose larvae feed on roots. Chlordane has been used as a pesticide in corn and citrus crops, amongst others, and has also been used in cattle and home gardening. It is currently banned in several countries.

DDT – This persistent and bioaccumulative organochlorinated compound was recognized as a powerful insecticide in the 1930s. It continues to be used to combat malaria in some 20 countries; every year 300 million new cases of malaria worldwide are registered, of which 1 million result in death – the majority in sub-Saharan Africa. More than 80 countries have already banned or restricted the use of DDT.

Heptachlor – Highly toxic, persistent in the environment and bioaccumulative, Heptachlor has been found in remote ecosystems; in soil, it has half-life of two years. Heptachlor is primarily used to control soil insects and termites. It was also used against pests in cotton, grasshoppers and to combat malaria; it is off the market in several countries around the world, including Portugal.

Hexachlorobenzene (HCB) – HCB is a synthetic crystalline compound, produced for the first time in the 1940s and used as a fungicide. It is characterized by its toxicity, to be highly persistent in the environment and with significant indices of bioaccumulation. HCB has been widely used as a fungicide to protect the seeds of onions, wheat and sorghum; the production of HCB has been banned in many countries; it has been found in diverse pesticides as a contaminant and is released in urban waste incineration.

Mirex – Considered one of the most stable and persistent pesticides in soil, sediments and water, with a half-life of up to 10 years, mirex is poorly soluble in water but easily binds to soil particles in such a way that it will not easily be leached into groundwater. Mirex was previously used as an insecticide to kill ants, caterpillars, termites and other insects; it is still used for these purposes in some countries.

Industrial Chemicals

Polychlorinated Biphenyls (PCBs) – A family of 209 compounds which structure consists of 2 interconnected benzene rings in which hydrogen atoms may be replaced by chlorine atoms, in variable number. PCBs withstand high temperatures and are not easily flammable, are poor conductors of electricity and have a high chemical stability. These characteristics make PCBs suitable for refrigeration, as lubricants and in insulation; their properties, however, make PCBs a danger to the health of workers who use them and to the sustainability of ecosystems; PCBs are gradually transported towards the poles where they have been accumulating. First marketed in 1929, PCBs rapidly spread throughout the world due to their various applications; they have been widely used in converters and capacitors, heat exchangers, hydraulic systems, industrial oils, paints, adhesives, plastics and flame retardants; most

countries banned the production of PCBs in the 1970s but there are significant amounts in circulation. It is estimated that around two-thirds of PCBs already produced are still in use or are in the environment – whether controlled or uncontrolled.

Hexachlorobenzene (HCB) – HCBs have also been used as solvents and as additives in the production of rubber, PVC plastic, rockets, ammunition, wood preservatives and dyes.

Toxaphene – This is an insecticide composed of more than 670 chemicals; since it is not very soluble in water it is mostly found in the air, soil or in sediments in river banks and lakes. It was one of the most widely used pesticides in the 1970s; toxaphene was used for pest control in cotton, cereals, fruit trees and vegetables, among other crops. It was also used in the extermination of undesired fish species and in anti-parasitic products in livestock and poultry production. It is currently banned in many countries; large quantities of toxaphene are still applied in Africa, where most of its production is located.

Unintentionally produced POPs

Dioxins and Furans – are made of pairs of benzene rings linked together by one or two oxygen atoms, respectively; these chemicals (know simply as furans) can practically be found everywhere due to their multiples sources, persistence in the environment and potential to be transported long distances. Furans are not very soluble in water, given their organic nature, and are thus difficult to excrete by living organisms. They accumulate in fat and bioaccumulate along the food chain.
Dioxins and furans do not have any commercial value and arise as waste from various chemical reactions, especially those involving the incomplete combustion of chlorinated substances; sources of dioxins and furans include: hospital, municipal and industrial waste sludge, and the incineration of hazardous waste; cement kilns, especially those that burn hazardous waste; metal smelting and refineries; bleaching of paper pulp; production, processing and disposal of chlorinated plastics and other chemicals. Dioxins deposited on trees and fields will again be released into the atmosphere over time, after a fire.

Hexachlorobenzene (HCB) –A byproduct of the manufacture of various chlorinated solvents, pesticides and other processes involving chlorine, HCBs are released as a result of certain combustion processes.

PCBs –Byproducts of certain combustion processes.

Chapter 2 – Portugal, Integral Part of the Stockholm Convention

Generic Characterization of Portugal

The Portuguese Republic is comprised of Continental Portugal, as well as the archipelagos of Madeira and Azores, two Autonomous Regions. Continental Portugal is administratively divided into Provinces and Districts, which in turn are grouped into 5 Regions (North, Center, Lisbon and Tejo Valley, Alentejo and Algarve).

The Autonomous Region of Azores is organized into three districts and 19 municipalities. The nine islands that comprise the archipelago of the Azores present significant differences between them, biophysically, economically and socially.

The Archipelago of Madeira is divided into two main islands: the Island of Madeira and the Island of Porto Santo. In addition, there are two groups of islands – the Desertas Islands and the Selvagens Islands. The administrative division of the archipelago consists of 11 Municipalities.

The Government of Portugal holds overall responsibility for ensuring fulfillment of the international commitments arising from the Stockholm Convention.

The Ministry for Environment and Spatial Planning is responsible for managing the development of the National Plan, and implementing the Stockholm Convention in collaboration with other Ministries.

Consequently, in 2006 (Joint Order 517/2006, of 30 June) the Coordination Committee (CCPoP) was created, with the Ministry for Environment, Spatial Planning, and Regional Development. It currently comprises representatives of the Ministries of Economy and Innovation (which includes Industry), Agriculture, Rural Development and Fisheries (which includes Fisheries and Agriculture), Health, and the Autonomous Regions of Madeira and Azores.

Within the Ministry, persistent organic pollutants are the responsibility of the Secretary of State of the Environment, who delegates competencies in this area to the Portuguese Environment Agency.

Geography and Climate

Portugal is located in the extreme southeast of Europe, with approximately 1 450 km of coastline, presenting a series of topographical transitions from North to South. Surface area covers 91 906km^2 on the mainland; 1 200km of border are shared with Spain. The largest rivers in Portugal - the Douro, Tejo, Guadiana and Minho, cross this border. National rivers are shorter and irregular. The main national rivers are Vouga, Mondego and Sado.

North of the Tejo River, the land is mountainous. Altitudes are generally over 400m, peaking at 1 991m, with the exception of the plains of the Tejo and Vouga river basins. The soils are primarily acidic, although there are moderate soils in the Central region. South of the Tejo, in the Alentejo region, the primary elevation is in the 50-400m range, with primarily acidic but also neutral soil. In the far South, the Algarve shows a continual coastal plain (altitude between 0-50m), with variable soil from acidic in the plateau, progressing to neutral, and predominantly alkaline in the plains.

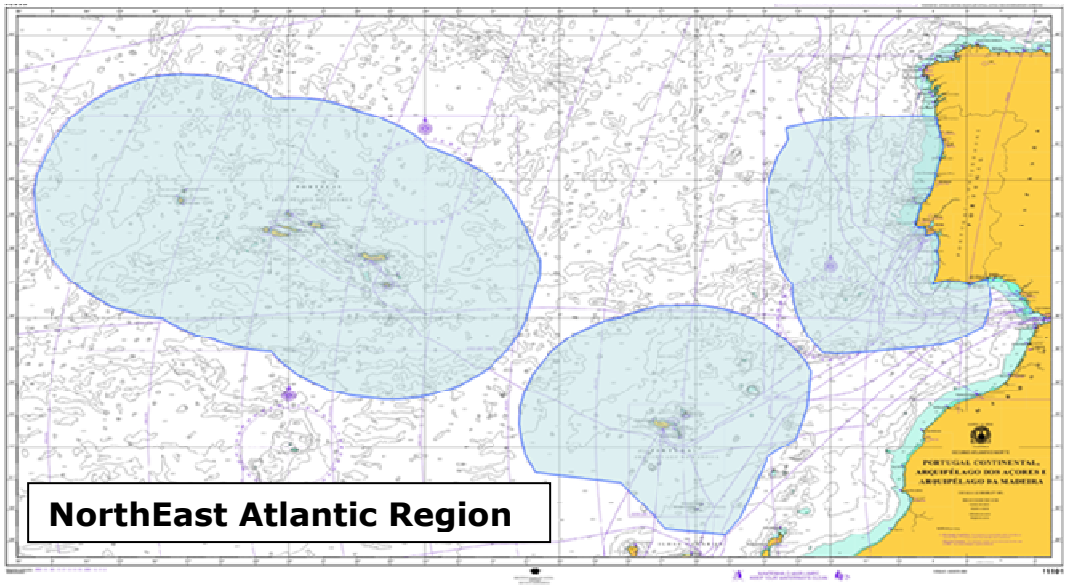

Figure 2.1 Portugal´s EEZ.

The two archipelagos, Madeira and Azores, are situated in the Atlantic Ocean.

Azores is situated roughly 1 200km West of Continental Portugal, and comprises nine islands of volcanic origin scattered on the North Atlantic over 600km, in a Northwest – Southeast orientation. They are situated between 24º 49' – 31º 1' West longitudinally, and 36º 55' – 39º 45' of latitude North. The archipelago encompasses an area of 2 322km^2, which corresponds to 2.5% of Portugal's surface area, and comprises three groups of islands: the Eastern Group (Santa Maria and São Miguel Islands), the Central group (Terceira, Graciosa, São Jorge, Pico and Faial Islands) and the Western Group (Flores and Corvo Islands). The westernmost side of the archipelago is situated in the island of Flores, approximately 3 900km from the North American sub-continent. The easternmost side is located in the island of Santa Maria, approximately 1 570km off the west coast of Europe. The Exclusive Economic Zone (EEZ) of the Azores is approximately 984 300km^2 and represents 57% of Portugal's EEZ and approximately 30% of Europe's EEZ.

The islands are characterized by rugged terrain with pronounced slopes. The highest point of the archipelago, and also of Portugal, is situated on the island of Pico, at 2 351m. São Miguel is the largest island, with 745km^2, and the smallest island is Corvo, with only 17km^2.

The Madeira Archipelago is situated approximately 1 000km Southwest of Continental Portugal, on the Northeast Atlantic. It is in the Macaronesian biogeographical region, between the parallels of 30º 01' 38" and 33º 07' 34'' North latitude and the meridians 15º 51' 11" and 17º 15' 52" of longitude West. The latitude 30º 01' 38" North is the southern extreme of the Portuguese territory, namely the de Fora Islet, in the Selvagens Islands (approximately 302km from Madeira).

The Archipelago comprises of two inhabited islands (Madeira and Porto Santo), the Desertas Islands, the Selvagens Islands and natural reserves, totaling 798.9km^2. The islands of Madeira and Porto Santo are also the largest, covering an area of 741km^2 and 40.1km^2, respectively. The Desertas Islands have an area of 14.2km^2, whereas the Selvagens Islands have a total area of 3.6km^2, based on information retrieved on-line through the Madeira Regional Statistics Bureau (DREM).

The most significant factors contributing to climatic conditions in Continental Portugal are its latitude, the topography, the influence of the Atlantic Ocean and the continentality. Continental Portugal has a latitudinal extension of only 5º. The areas with the highest altitude fall within 1 000m and 1 500m, with the exception of Serra da Estrela, which reaches 2 000m. With regards to the continentality, the furthest regions from the Atlantic Ocean are approximately 220km.

Although these climatic factors have but a small variation, they cause significant variations in the elements that characterize the climate, such as air temperature and precipitation.

Long term statistical climate analysis (1931 to 2004) for Continental Portugal indicates that from 1972 onwards there has been a tendency towards an increase in average annual surface temperature; 1997 was the hottest of the last 74 years (Figure 2.2).

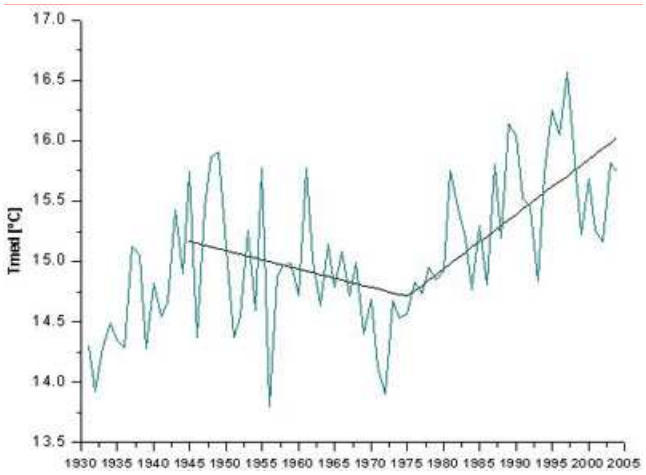

Figure 2.2 Trend in the mean annual air temperature for Continental Portugal, 1931-2004. Source: IM, 2007

Only in 8 of the past 20 years, from the data range 1931 - 2004, have annual mean precipitation rates been above the average for 1961-1990. In 2004, the lowest level of total precipitation occurred since 1931. The seasonal progression of average precipitation amounts between 1931 and 2004 presents a statistically significant systematic reduction of precipitation in spring.

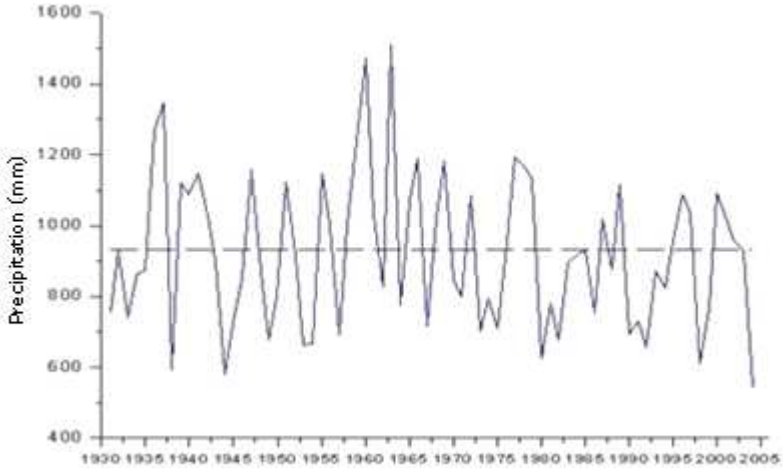

Figure 2.3 Trend in mean annual precipitation, 1931-2004. The dotted line indicates the mean for values from 1961-1990. Source: IM, 2007

The Azores Archipelago is situated in the anticyclone range, and is influenced by the warm effects of the Gulf Stream; it has a moderate maritime climate, with a temperature range of 14-25ºC.

The general climate of the Madeira Archipelago is largely influenced by the Azores subtropical anticyclone and is primarily regulated by the system of Northern and Northeastern trade winds. These cool and humid winds give rise to the characteristic features of an orographic fog, which are formed by the rising, moisture laden air masses on the slopes north of the Archipelago.

The Madeira Island has some specific climatic characteristics, given that the mountain range located in the center of the island forms a clear separation between the climatic conditions and the wind regime for the Northern and Southern slopes. The irregular topography creates asymmetries within the meteorological systems, creating a series of microclimates within the island. The slopes on the South of the Madeira Island are generally more open than the Northern slopes, therefore subjected to a stronger intensity of solar radiation. When the Northeastern trade winds are diverted by the rocky central embankment, atmospheric vortices are formed. This leaves the slopes on the south of the island with few clouds, and winds with less intensity (Caldeira A.M.R. & Lekou S., 1999).

Population and Urban Profile

In the most recent Census in Portugal (31 December 2005), the population of Portugal was estimated at 10 569 592 people, of which 5 115 742 were men and 5 453 850 were women. The increase in population was of 40 337 people compared with 2004, a variation of 0.38%. This is less than the previous year (0.52%), signifying further slowing of already declining growth in the population. A natural balance of 1 937 contributed to the growth, which implies a rate of natural increase of 0.02%, and a net migration of 38 400 individuals, representing a rate of migratory growth of 0.36%.
Source: Statistics Portugal, Estimates of Resident Population

Primary Demographic Indicators, Portugal, 2000-2005

There has not been any substantial change in Portugal's demography in the last decade. Between 1991 and 2001, the age structure in the Portuguese population reflects the general tendency of the more developed countries, however to a lesser extent. The projections indicate a maintenance threshold of ten million inhabitants, with a reduction in the percentage of citizens of working age, resulting in an increase in life expectancy and a reduction of birth rate.

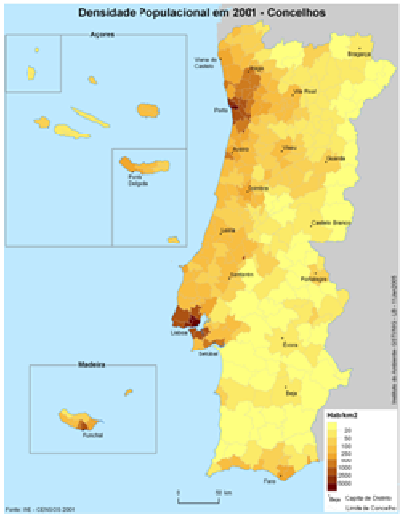

Figure 2.4 Population in 2001 by Municipalities.

The pattern of land use is characterized mainly by medium sized urban areas and a large number of small settlements. This creates a significant dispersion of population and asymmetries at a regional level. These asymmetries are compounded by the aging of the population, particularly in the interior, leading to desertification in some of those areas.

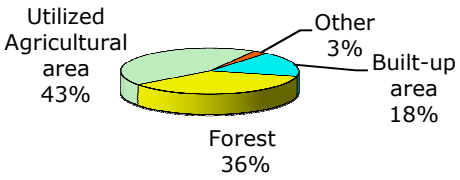

Figure 2.5 Land occupation, according to available data.

According to figures from Statistics Portugal (INE), the variation in resident population and subsequent land use (rise in the number of buildings and homes) continues to occur primarily along the coastline and in urban centers.

The built-up areas of Portugal – including the residential, industrial, commercial and leisure sectors, as well as roads and other technical infra-structures, and excepting outlying buildings, increased significantly between 1990 and 1999: from 15.4% to 17.8% of the land cover, one of the highest proportions in the European Union, along with Holland and Belgium (information provided by the Directorate General for Spatial Planning and Urban Development (DGOTDU) through the joint questionnaire from OECD/Eurostat 2000, in the follow-up of a survey conducted around urban centers, from parish to parish).

In addition to the pressures created by the higher rates of construction on the coastal strip, namely in the municipalities bordering the coastline where over 50% of the population resides, there is also pressure which arises from the intense seasonal variations to the population, in particular during the summer season as well as in more touristic regions.

As an insular region, the Autonomous Region of the Azores faced significant variations in population during the last century, primarily due to migration. Following a significant rise between 1920 and 1960, there was an equally significant decrease, stabilizing the population at 250 000 residents.

The population spread on the Islands is irregular. Over half of the Azores population resides in the island of São Miguel, and over three quarters of the population of the archipelago inhabits the islands of São Miguel and Terceira. Corvo, on the other hand, only accounts for 0.2% of the population of Azores.

Economic Profile

Portugal has been a Member State of the European Union (EU) since 1986. Through the convergence process over the last decades, its economy has fared well, relative to other smaller economies of the EU, supported by significant increases in productivity.

The Portuguese economy registered an average real economic growth of 3.6% per annum during the period of 1996 to 2000 (1.1% higher than the EU average). Appropriate economic policy and a favorable economic environment strengthened by the positive expectations resulting from Portugal adopting the euro contributed to this growth. This growth occurred in a period of low level of inflation and a reduction in the unemployment rate to approximately 4%.

During the period of 2000 to 2004, the national GDP (at 1995 constant prices) indicated an average growth rate of 0.49%, which is much lower than the EU-15 (1.49%). The inflation rate (HICP) was consistently higher than the EU-15, and in 2004 inflation rates for Portugal and the EU-15 were 2.5% and 2.0% in 2004, respectively. The unemployment rate increased both in Portugal and the EU-15, with values in 2004 of 6.7% and 8% of the active population, respectively.

The deceleration in the Portuguese economy was due in part to the decrease in the global economy (the decline in external demand created a reduction in exports), the slowdown in domestic demand (namely from private consumption), the growth of the EU, and the increase in globalization, particularly with the rise of the emerging economies (China, India, Brazil and Russia). There was also a reduction in investments, due primarily to the decrease in housing construction and business investments.

Despite the similarities with the EU in 2004, the GDP *per capita* (at 1995 constant prices) in Portugal is only 45.6% of the average of the EU-15. This demonstrates the development effort required for Portugal to parallel the other EU countries. This effort will occur during a period of accelerated global change, with globalization, challenges in European integration, the greater penetration of new technologies and the emergence of an information and knowledge based society.

Throughout history, economic growth has been associated with energy consumption. However, the growth rate of both depends on energy strategies adopted. In the 1990s, Portugal's energy consumption growth rate closely followed the increase in GDP until 1996.

Despite the gap relative to the EU, Portugal's economy continues to contend with low productivity and a low competitive edge in the markets. Centers of expertise have undergone substantial upgrading over the last decades, but are still significantly involved in activities and markets where new, more competitive operators have entered. These niches may have significant dynamism, but require demanding innovation in the value chain.

Many aspects will require a longer timeframe to shift. Therefore, their impact will not be immediately visible. For example, the substantial improvement in all levels of education, professional development,

and technological innovation will require the creation of many structures in addition to increase in collaboration between universities and enterprise.

The Gross Domestic Product (GDP) for the Autonomous Region of the Azores was of 2 230 million Euros. GDP growth over the period 1995-1998 paralleled that of the national GDP, in spite of slower growth in 1996 and 1997. From 1998 to 2001, the Azores GDP growth surpassed that of the national average.
In 2001, the *per capita* GDP in the Region was 9.4 x 10^3€.inhabitant^{-1}, which was the lowest in the country, where the average figure was 11.9 x 10^3€.inhabitant^{-1}. Still, the *per capita* growth rate of the GDP in the region was significant between 1997 and 2001.

The Gross Value Added (GVA), at regional market prices for 2001 was of 2 032 million Euros, which was unequally divided throughout various regional activities. The service sector remains foremost in the regional economy, as primary sector activities such as agriculture, fishing and the mining industry continue to lose significance, representing less than 9% of the regional GVA.

The tertiary sector remains the most significant employer in the region, accounting for 59% of job postings in 2003. It is evident that the primary sector, which in 1990 contributed over 23% of employment in the area, has decreased substantially. In 2003 the primary sector represented less than 13% of local employment, with the strongest decrease occurring as of 1999. Milk production is the leading employment area in this sector, and the fisheries sector has strong potential.

Between 1990 and 2003, the secondary sector remained relatively constant (28.2% in 2003). The food, beverage and tobacco industries are the strongest of the manufacturing industries in the Region, followed closely by the wood industry.

Within the tertiary sector, the geographical span of the islands within the archipelago, coupled with the distance which separates the Region from continental Portugal, contributes to a significant movement of passengers and goods through airports as well as regional ports.

The unemployment rate within the Region in 2003 was 2.9%, which was significantly lower than the national average, but slightly higher than the previous year (2.6%).

The Gross Domestic Product (GDP) in the Autonomous Region of Madeira reached 3 219 million Euros in 2001 (at market prices). The GDP *per capita* in the region exceeded the national average from 1997. In 2001, the *per capita* GDP was 12% higher than the national value. The tertiary sector was primarily responsible for this, contributing 57% of the total GDP, whereas the secondary sector contributed 30% and the primary sector contributed 13% (PDES 2000-2006).

Due largely to natural constraints as well as the socioeconomic, cultural and historic contexts, the regional economy has focused on agro-tourism. Primarily due to the scarcity of resources and market, as well as competitive disadvantages of insularity, industrial activities have assumed a modest position. However, their rate of growth and development has been on the rise, increasing the Gross Value Added (GVA) by 1.87% in the secondary sector between 1995 and 2001.

Industry

Between 1995 and 2003, the output of the manufacturing industry (MI) towards the GDP decreased 3.3%, changing from 14.6% to 17.9% (Table 2.1).

Table 2-1 Variation in GDP by industry subsectors.

	GVA at current market prices	1995		1999		2003	
	Designation	**10^6 EUROS**	**%**	**10^6 EUROS**	**%**	**10^6 EUROS**	**%**
D	**Transformation Industry**	14.447	100,0	17.764	100,0	19.059	100,0
DA	Food, drink and tobacco	2.470	17,1	3.350	18,8	3.836	20,1
DB	Textiles	2.882	20,0	3.231	18,2	3.203	16,8
DE	Paste, paper and card and related articles; printing and publishing	1.576	10,9	1.544	8,7	1.679	8,8
DI	Other mineral products (non metallic)	1.179	8,2	1.546	8,7	1.583	8,3
DL	Electrical and optical equipment	1.063	7,4	1.317	7,4	1.549	8,1
DM	Transport material	681	4,7	1.159	6,5	1.346	7,1
DJ	Metallurgy and metallic products	864	6,0	1.116	6,3	1.162	6,1
DN	Transformation industries.	612	4,2	816	4,6	984	5,2
DD	Wood, bark and related works	653	4,5	856	4,8	907	4,8
DG	Chemical products and synthetic or artificial fibres	1.015	7,0	897	5,1	843	4,4
DC	Leather and leather products	733	5,1	840	4,7	824	4,3
DH	Rubber articles and plastic materials	394	2,7	494	2,8	598	3,1
DK	Machinery and equipment.	339	2,3	517	2,9	395	2,1
DF	Coke, refined petroleum products and nuclear products	-14	-0,1	81	0,5	150	0,8
D	**Transformation Industry as a % of the total export**	17.9		16.4		14.6	
	GDP at market prices	80 827		108 030		130 511	

Source: GEE based on Statistics Portugal (INE) - National Accounts (reference 1995)

The industry sectors with the strongest influence on national production continue to have high human and natural resource demands, although it is clear that their significance is decreasing in this period. The textile sector is an example, as its contribution to the GDP in the manufacturing industry decreased from 20% to 16.8%, as did the pulp, paper and paper products sector (from 10.9% to 8.8%).

Among the most significant sectors, the food, beverage and tobacco industries were the only to register an increase in the GDP, from 17.1% to 20.1%.

Other industrial sectors of high technological significance increased their contributions for the formation of the GDP: the electrical and optical equipment sector had GDP values that rose from 7.4% to 8.1%, and transport materials (vehicles manufacturing) rose from 4.7% to 7.1%.

Several sectors can be assessed as to their impact on the GDP in their expenditure approach, through their significance in the total export of goods and services (table 2.2).

Table 2-2 Trend in Exportation by Industry sub-sectors.

	Exports of Goods and Services	1995		1999		2003	
	Designation	**10^6 EUROS**	**%**	**10^6 EUROS**	**%**	**10^6 EUROS**	**%**
D	**Transformation Industry**	17.977	100,0	23.496	100,0	28.288	100,0
DB	Textiles	4.372	24.3	4.974	21.1	4.822	17.0
DM	Transport material	2.224	12.4	3.912	16.6	4.530	16.0
DL	Electrical and optical equipment	2.330	13.0	3.378	14.4	4.156	14.7
DA	Food, drink and tobacco	1.207	6.7	1.469	6.3	1.908	6.7
DJ	Metallurgy and metallic products	692	3.8	1.142	4.9	1.683	6.0
DK	Machinery and equipment.	748	4.2	1.223	5.2	1.614	5.7
DG	Chemical products and synthetic or artificial fibres	878	4.9	1.116	4.7	1.607	5.7
DC	Leather and leather products	1.487	8.3	1.683	7.2	1.517	5.4
DE	Paste, paper and card and related articles; printing and publishing	1.139	6.3	1.108	4.7	1.461	5.2
DD	Wood, bark and related works	816	4.5	1.081	4.6	1.251	4.4
DI	Other mineral products (non metallic)	783	4.4	886	3.8	1.065	3.7
DH	Rubber articles and plastic materials	327	1.8	590	2.5	1.035	3.7
DN	Transformation industries.	384	2.1	510	2.2	937	3.3
DF	Coke, refined petroleum products and nuclear products	590	3.3	424	1.8	702	2.5
D	**Transformation Industry as a % of the total export**	73.6		73.2		72.0	

	Exports of Goods and Services	24.433		32.089		39.266	
	Total Exports as % of GDP	30.2		29.7		30.1	
	GDP at market prices	80.827		108.030		130.511	

Source: GEE based on Statistics Portugal (INE) - National Accounts (reference 1995)

The manufacturing industry is the key exporting sector. Representing 73% of the total national export of goods and services in 2003, but suffering a loss of 1.6% in 1995 (albeit inferior to what was noted in relation to the GVA).

Textiles continued in 2003 to be the primary industry exporter, representing 17% of total manufacturing exports. However, the industry suffered a strong loss of industrial exports between 1995 and 2003 (-7.3%).

There are two further sectors of significance with regard to their role in manufacturing industry exports: the transport materials sector (manufacture of vehicles) (from 12.4% to 16%) and the electrical and optical equipment sector (from 13% to 14.7%).
During this period, the leather industry suffered a substantial loss in industrial exports, decreasing from 8.3% to 5.4% of the manufacturing industry's total exports.

Waste

Waste has been increasing in quantity as well as diversity in the recent decades throughout the globe, as a result of the rising population, economic growth and the increasing purchasing power of families, which creates environmentally inefficient use of resources.

The current European Union waste management policy is based on the concept of waste management hierarchy. The goals in the Recycling and Waste Management Strategy continue to focus on waste prevention and promotion of reutilization, recycling and recovery, in order to reduce the negative environmental impact of waste. Landfills should be used as a last resort.

In recent years in Portugal, the management of waste has been consolidated with a legal framework which stakes the onus of responsibility on producers of waste to pursue targets for collection, re-utilization and other forms of recovery.

Legislation was enacted in relation to incineration / co-incineration of waste and landfill use, as well as Community and multilateral instruments to control Transboundary movements of waste.

The Decree-Law 178/2006 of 5 September requires the implementation until September 2008 of the National Plan for Waste Management.

Producers are currently responsible for the management of their waste, except with urban waste with daily output under 1 100 liters per producer, in which case the management is undertaken by the municipalities.

Urban Waste:

Urban Solid Waste includes household waste as well as other waste with similar composition. In continental Portugal, 1.2 Kg/person/day of waste is produced, on average (2005).

By 2006, as a result of the growth in infrastructure operation and waste management systems, there were 34 landfills, 8 units of organic recycling, 2 incinerators and 76 transfer units. In addition, there were 179 ecocenters, 26 806 ecopoints and 26 screening units.

Industrial Waste:

Industrial waste is created by the production industry, in addition to waste resulting from the production and distribution of electricity, gas and water.

In 2006, five landfills were in operation for non-hazardous industrial waste (two in the Center region, two in the Lisbon and Tejo Valley, and one in the Alentejo). In addition, three new landfills were in the licensing process (two of which were in the North).

There has been an increasing number of licensed waste management units. Their licensing has been granted either through the National Solid Waste Authority, or the Regional Solid Waste Authorities. In 2006 the list of Non-Urban Waste Management Operators involved roughly 350 licensed units, with the majority in the area of storage and sorting of non-hazardous waste.

Hazardous Waste:

The management options for hazardous waste are based on the installation of the CIRVER (Integrated Centers for the Recovery and Disposal of Hazardous Waste) in addition to the co-incineration in cement kilns, which contributes to the principle of self-sufficiency.

Agriculture and Livestock

The Utilized Agricultural Area (UAA) encompasses around 43% of continental Portugal (1999 figures). This is amongst the highest proportion within the EU countries, despite the decrease that has taken place since joining the European Union in 1986. The increase in land zoned for permanent pasture or grasslands has increased over 16% from 1970 to 1997, comprising 10% of the mainland in 1998. This is due, in part, to the implementation of Common Agricultural Policy.

The economic activity in the agricultural subsector in the last decade has been unstable. This is largely due to its dependency on meteorological conditions. These oscillations directly influence the progression of the Gross Value Added (GVA) of agriculture, which has been decreasing during the period 1970-1997. In fact, Agricultural GVA has seen a decrease in respect to its relative contribution to national GVA, which is a normal occurrence in the growth and modernization of an economy.

The Autonomous Region of Madeira is faced with permanent constraints in its development, resulting from its physical discontinuity as well as particularly intense structural restrictions, namely its limited dimensions and landscape orography. There has been a considerable decrease in recent years in utilized agricultural land. The average farmland size has also decreased. In the Madeira Island, the territorial area above 1 000 meters in altitude represents a fourth of the total surface area and 11% has slopes under 16%. These physical conditions create strong limitations to agriculture, settlements, creation of basic infrastructures, and the operation of service networks.

In the last decade, livestock production has been relatively stable. In the context of a relative reduction in agricultural GVA figures compared with the national GVA, as well as the annual oscillations of the agricultural GVA, livestock production has seen stable, albeit moderate, growth.

Livestock farming in the Autonomous Region of Madeira is limited. Family farms are very common as an addition to agricultural activity, taking advantage of unused production. Traditionally, the majority of family farm production of swine, goats, poultry and rabbits is intended for own consumption.
The tendency in the livestock industry is to increase the production efficiency over the number of farms.
In 2003, the most important agricultural crops in the Autonomous Region of the Azores, based on production quantities, were maize (154 thousand tonnes), potatoes (18 thousand tonnes), sugar beets (5 thousand tonnes), tea (116 tonnes) and tobacco (104 tonnes). The estimates on wine production are around 33 thousand hectolitres.

Between 1993 and 2003, agricultural production decreased in excess of 40% (42.3% on average). This mostly affected sugar beet and wine production. Maize (directly linked to the farming sector) and tobacco have had a minor decrease in production, while tea was the only agricultural product to see an increase in production.

Within the farming sector, milk production in the Region reached 492 million litres in 2003, an increase of 16.5% in relation to 1998. Dairy products decreased by approximately 40% to 25 830 tonnes, opposite to the increase in milk production, which rose by approximately 30%.
Along with the increase in milk production, a process of intensification and resizing of livestock farms between 1995 and 2001 caused a decrease of roughly 8% in the number of total operational farms. Cattle in the Region increased significantly from 1995 to 2003, similarly to dairy cows, which had an increase of approximately 28%.

The increase in milk production should be followed closely, as problems could occur if the levels exceed the milk quotas set by the European Union for the Autonomous Region of the Azores.

In 2003, meat production was 27 thousand tonnes, which followed a continuous increase in production since 2000 from only 24 thousand tonnes. Slaughtered, as well as live cattle which were exported were primarily responsible for the increase.

Land Use and Biodiversity

It is consensual that knowledge and conservation of nature and biodiversity, beyond intrinsic value, is of great interest to humanity, both to the production of economic wealth and the satisfaction of basic needs such as food security and public health in the present and the future.

In comparison with other countries in the European Union, Portugal boasts an abundant and diversified natural heritage, and with it, a responsibility to protect what could be considered a European heritage. Because of this, there is an increasing collaboration between the European Union and the national government bodies to engage in conservation. This should not be understood as a reduction in national sovereignty, but rather as an opportunity to develop in all areas.

Endangered Species

The strongest threats to biodiversity are the destruction, degradation and fragmentation of natural habitats, resulting from human actions.

Of all the assessed species, 42% were among three categories of threat – "critically endangered," "endangered," and "vulnerable," as well as the categories "almost endangered" and "regionally extinct."

Freshwater and migratory fish represented the highest percentage of entities classified in the categories of "endangered" or "almost endangered" (69%).
Source: ICN – Institute for Nature Conservation, 2005

Classified Areas

In continental Portugal, there are 29 Special Protection Zones as well as 60 Sites which, combined, account for roughly 20.5% of the land, in addition to 109 010ha of marine area.

Together, the land areas considered under protection from the Birds and Habitats Directive and the Protected Areas Network account for approximately 21.3% of the continental land mass, as well as 111 206ha of marine area.

Continental Portugal's area classified under the protection of the Birds and Habitats Directives is equivalent to 10 and 17%, respectively, of the EU-25 territory, not including the marine area classified under the same Directives.

Biological Agriculture

In 2006, biological agriculture accounted for 7% of the Utilized Agricultural Area (UAA). The Alentejo continues to have the highest percentage of all regions.

In the same year, 74% of land dedicated for biological agriculture was utilized for pastures and fodder.

Areas that have integrated protection have been on the rise, and in 2006, reached around 33 000ha.

Forest Areas

In 2005, continental Portugal had roughly 3 412 000 hectares of forest, which accounts for approximately 38% of the land cover. The Alentejo region contained the highest percentage of forests (43%), followed by the Central region (42%) and Lisbon / Tejo Valley (39%).

The figures from the National Forest Inventory in 2005/2006 indicate that in the past 10 years, there has been a slight increase in forested areas in continental Portugal, rising from 3 349 000 hectares to 3 412 000 hectares due to the growth in the Alentejo region (78.1 thousand hectares), Algarve (28.5 thousand hectares) and Lisbon / Tejo Valley (25.3 thousand hectares).

There was a decrease in bush land, and the agricultural and social areas increased 55.4 thousand hectares and 17.8 thousand hectares respectively.

Areas affected by forest fires increased to 213 thousand hectares, with the eucalyptus and maritime pine being the foremost species affected in 2003 and 2005.

Cork, maritime pine and eucalyptus were the most common trees in continental Portugal, and together occupied around 79% of forested areas. However, during the reference time period, pine trees were reduced by 27% due to forest fires as well as the pine wood nematode, whilst eucalyptus trees diminished slightly, and cork increased roughly 3% due to reforestation efforts resulting from the agricultural policy, namely through the use of abandoned farmland.

There are about 300 thousand hectares of young trees, predominantly leafy varieties that are more adapted to the seasons, which occupy abandoned agricultural land, and contribute towards better productivity and biological diversity.

In 2005 there were 35 697 forest fires in continental Portugal, which account for 338 262ha of affected area.

The number of forest fires, in addition to the affected areas on continental Portugal and in the Protected Areas Network (RNAP) increased in relation to the annual average in the past 13 years (1999-2004).

Autonomous Region of Madeira

In the Tertiary period, the Autonomous Region of Madeira was covered with dense laurel evergreen forests, which developed at an altitude of 300-500m. Below that level, coastal vegetation (thickets of gorse) dominated the landscape up to 100m of altitude.

With the recognition of the indigenous forests, the importance to the regional water cycle, as well as their significance in zoology, botany and geography, the Madeira National Park was created in 1982. It covers two thirds of the island's territory, including areas with distinct protection status. In 1991, forests accounted for 58 000 hectares.

Autonomous Region of Azores

The Azores archipelago, as well as the Archipelago of Madeira, the Canary Islands and Cape Verde, are part of the Macaronesian Biogeographical Region. In comparison with the other Macaronesian archipelagos, the Azores contains little biological diversity as a result of factors such as isolation and geographical dispersion, geological age, active volcanism, and its position during the Pleistocene glaciation. Human impact and land use had different levels of impact on the islands, but the intensive use of the coast and resource use has affected the Regional biodiversity.

Despite the recent efforts in the Region with species classification and knowledge, there is more to be done in the areas of taxonomy, given it is an endemic insular region.

There are 27 indigenous species of mammals, including 25 cetaceans (grouped in 7 families). Two of these species are land mammals – the Azores Bat (*Nyctalus azoreum*), an endemic species, and a recent addition, the Madeira Bat (*Pipistrellus maderensis*) which is an endemic species of Macaronesia.

The marine ichthyofauna from the Region is abundant and diverse, with 460 species ([1]) – of which 44 are cartilaginous fish (Chondrichthyes) and 416 are bony fish (Osteichthyes). However, only the rockfish (*Centrolabus caeruleus*) and the sculpin (*Scorpaena azorica*) are endemic. There are also five turtle species in the Azores waters, in addition to a non-native land reptile, the wood lizard (*Lacerta dugessi*).

According to the "Bird Guide," there are roughly 65 bird species in the Azores, of which 35 species nest in the Region. The remainders are migratory birds, with five species being introduced by Man (partridge, pheasant, roof sparrow, greenfinch and goldfinch).

There are 25 protected areas in the Azores, which are of particular interest in the areas of botany, zoology, ecology, geology and landscaping. They can be grouped into the following areas: Natural

Reserve, Regional Natural Reserve, Protected Landscape, Regional Protected Landscape, Ecological Area and Regional Natural Monument.
Source: SREA, 2003ª

Chapter 3 – State of Portugal on POPs

Overview of the issue

Due to the long-range transport of POPs, a global approach is needed to control these substances. In addition to the stipulations of the Stockholm Convention, Portugal is further committed at international and regional levels.

United Nations Economic Commission for Europe (UNECE) Protocol to the 1979 Geneva Convention on Long-Range Transboundary Air Pollution (CLRTAP) on Persistent Organic Pollutants (POPs)

The Convention on Long-Range Transboundary Air Pollution (CLRTAP) was negotiated at the United Nations Economic Commission for Europe (UNECE) in 1979 and is the first legal instrument with obligations related to air pollution issues at regional scale. In addition to setting the general principles of international cooperation for the reduction of air pollution, the Convention establishes an institutional framework that combines research and policies in this area.

CLRTAP aims to ensure that the parties limit, and as far as possible gradually reduce and prevent air pollution and its transport over long distances, as well as to develop policies and strategies against the emission of air pollutants, through monitoring, research and exchange of information. Portugal ratified this Convention on 29 September 1980.

Additional information can be found at:
http://www.unece.org/env/lrtap/persistent pollutants_h1.htm

Rotterdam Convention on the Prior Informed Consent procedure, to which certain hazardous chemicals and pesticides are subject in international trade – PIC Convention

The 1998 United Nations Convention of Rotterdam, in force since 24 February 2004, regulates the international movement of extremely hazardous chemicals, establishing an international mechanism that prevents the export of products not authorized by the country of destination.

Portugal adopted the Rotterdam Convention on 29 October 2004 with the publication of Decree-Law 33/2004, thus entering into force in Portugal 17 May 2005 (deposit of the ratification instrument on 16 February 2005).

The Convention is intended to prevent or limit international trade, but only to promote shared responsibility between the importing and exporting countries for the protection of public health and of the environment, in relation to the adverse effects of these hazardous chemicals.

POPs listed in the Annexes of the Stockholm Convention are all included in the Rotterdam Convention.

Additional information can be found at: http://www.pic.int/

Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)

The Basel Convention is a global agreement on the problems and challenges posed by the movement and management of hazardous waste. It aims to protect human health and the environment against adverse effects resulting from the production, management, cross-border movement and disposal of hazardous waste and others. The Basel Convention entered into force in 1992 and was amended in 1995. The amendment prohibits the export of all hazardous waste for Parties which are members of the EU and OECD, as well as Lichtenstein to all other Parties to the Convention.

Additional information can be found at: http://www.basel.int/

World Summit on Sustainable Development

The World Summit on Sustainable Development (WSSD) held in September 2002 in Johannesburg, agreed on an intergovernmental plan of implementation, setting the requirements for achieving global sustainable development. The implementation plan includes certain chemical-related goals, including implementation of the existing Conventions on chemicals and the development of a Strategic Approach to International Chemicals Management (SAICM).
http://www.un.org/jsummit

Strategic Approach to International Chemicals Management

The International Conference on the management of chemicals held in February 2006 completed the adoption of a strategic approach to international management of chemicals. SAICM is a global structure designed to improve the management of chemicals. It is a voluntary agreement supported by a high level statement and contains a set of tools for the pursuit of policies and activities aimed at improving the standards of management of chemicals, particularly in developing countries.
http://www.chem.unep.ch/saicm/

European Union

Portugal, as a Member of the European Union, has most of its legislation on the control of chemicals based on European Community legislation.

European Union legislation on Persistent Organic Pollutants

The European Community Implementation Plan includes a list of relevant European legislation. On 24 June 1998, the European Community signed the Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution (CLRTAP) of Persistent Organic Pollutants and on 22 May 2001, the Stockholm Convention. In order to ensure a coherent and effective implementation of the Community obligations under the Protocol and the Convention, the Community adopted Regulation (EC) 850/2004 of the Parliament and the Council, of 29 April on persistent organic pollutants. This regulation establishes measures of production control, marketing and use of substances, in order to protect human health and the environment from POPs.

Council Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) aims at the removal of PCBs and equipments containing PCBs, as soon as possible. It also establishes requirements for the environmentally sustainable disposal of PCBs.

With regard to unintentionally produced POPs, there are several instruments with direct or indirect impact in reducing releases of these substances. The main measures that control the release of these substances are defined in Directive 96/61/EC on Integrated Pollution Prevention and Control (IPPC).

In the European Union, the publication of Directive 96/61/EC of the Council of 24 September on the IPPC (repealed by Directive 2008/1/EC of 15 January), marked the beginning of the implementation of the new policy.

Certain economic activities that potentially carry pollution considered to be significant are covered by the Directive and are defined according to their nature and/or production capacity of the facilities. Operation in facilities with activities covered by IPPC is subject to an Environmental Licence.

National Level

The production, use and disposal of chemicals are a very important sector of the European economy. Most chemicals used on a daily basis have environmental and human health impacts in all stages of their lifecycle, from production, storage and use to their final destination. These impacts can reach levels of concern when products are not adequately handled, by negligence or ignorance of its properties and effects.

The increasing use of these products led to the need to regulate their manufacture, marketing and use, by publication of a set of legal instruments.

In Portugal, legislation in this area is distributed over several institutions.

Applicable legislation, institutions involved and their responsibilities

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
Ordinance 17980, of 30 September 1960	Establishes standards on import activity, manufacture, preparation and sale of pesticides and correlative products				None
Decree-Law 277/99 of 23 July, with amendment introduced by Decree-Law 72/2007 of 27 March	Limits the marketing and use of PCBs and PCTs and establishes conditions for their disposal	Prohibits the marketing of PCBs and PCTs and derogates the conditions from that prohibition. Provides measures for labelling, disposal and transportation.	Directive 85/467/EEC, of the Council, of 1 October 1985 – 6th amendment of Directive 76/769/EEC, amending Annex I with respect to PCBs and adds an Annex II on labelling of products containing PCBs	Entities and Services specific to the competency of the matter.	Fines and accessory sanctions
Decree-Law 347/88, of 30 September and Ordinance 660/88 of 30 September	Ban on marketing phytopharmaceuticals containing active substances referred to in Annex 1.	Ban on marketing compounds in B) organochlorinated and persistent substances: 1) Aldrin 2) Chlordane 3) Dieldrin 4) DDT 5) Endrin 6) HCH 7) Heptachlor 8) Hexachlorobenzene 9) Toxaphene	Directive 79/117/EEC		

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
Decree-Law 47/90, of 9 February	Approximation of the legislative, regulatory and administrative dispositions where reporting to marketing and use of hazardous substances and compounds (e.g. PCBs)		Directive 76/769/EEC of the Council, of 27 July 1976	Entities and Services specific to the competency of the matter.	Fines and accessory sanctions
Ordinance 492/90 of 30 June (with Declaration of Rectification published in D.R. Series I, supplement 201 of 31 August)	Approves the list of cereals subject to control of phytopharmaceutical product wastes and respective limits, in cereals.	For active substances DDT, endrin and heptachlor.			
Decree-Law 306/90, of 27 September	Establishes the competent authorities for emitting sales authorizations for pesticide products.				
Decree-Law 303/91, of 16 August	Amends Decree-Law 306/90				
Decree-Law 108/92, of 2 June	Establishes measures to prevent the dangers certain aerosol dispensers may cause.				
Ordinance 778/92, of 7 August	Approves technical standards concerning the strength and leakage of materials and forms of protection against breaches of aerosol dispensers.				

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
Ordinance 127/94, of 1 March (with Rectification Declarations 78/94, of 31 May, D.R. I Series B, supplement to No. 126 and 107/94 of 30 July, D.R. I Series B supplement No. 175)	Approves the new list of limits of phytopharmaceutical product traces in plant originated products, including fruit and vegetables.	For active DDT, endrin and heptachlor.			
Ordinance 359/94 of 7 June	Defines the general conditions of marketing pre-packaged products.				
Ordinance 749/94, of 13 August	Amends Ordinance 778/92				
Decree-Law 232/94, of 14 September and Ordinance 968/94, of 28 September	Imposes limitations on marketing and use of hazardous substances, as well as mixtures containing them.		Directive 91/173/EC of the Council of 21 March, 1991 – 9th amendment of Directive 76/769/EEC.	Regional Directorates of the Ministry of Economy and Innovation, IGAE Directorate General of Customs.	Fines and Accessory Sanctions
Decree-Law 82/95, of 22 April	Classification, packaging and labelling of hazardous substances		Directive 67/548/EEC and it adaptations to technical and scientific progress	IGA IGAOT IGAE	Fines and Accessory Sanctions
Ordinance 732-A/96, of 11 December	Approves the Regulation for notification of chemical substances and for classification, packaging and				

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
	labelling of hazardous substances				
Decree-Law 264/98, of 19 August, republished in Decree-Law 446/99, of 3 November	Imposes limitations on marketing and use of hazardous substances, as well as mixtures containing them.	Hazardous substances are set in Annex II of the diploma, while Annex I sets conditions of use and marketing of substances listed in Annex II, as well as mixtures containing them.	Directive 94/60/EC of the European Parliament and Council, of 30 June – 14th amendment to Directive 76/769/EEC of the Council of 27 July, adding chlorinated solvents to Annex I, namely Hexachlorobenzene	Directorate General of Enterprise, Regional Directorates of the Ministry of Economy and Innovation, IGAE and Directorate General of Customs and Special Consumption Taxes	Fines and Accessory Sanctions
Decree-Law 330-A/98, of 2 November	Changes and adapts to technical progress the Ordinance 732-A/96				
Decree-Law 209/99, of 11 June	Changes and adapts to technical progress the Ordinance 732-A/96				
Decree-Law 195-A/2000, of 22 August	Changes and adapts to technical progress the Ordinance 732-A/96				
Regulation 1896/2000, of the Commission of 7 September 2000	First phase of the systematic analysis programme on existing biocides				
Decree-Law 256/2000, of 17 October and Declaration of Rectification 16-Q/2000, of 30 December	Limits the marketing and use of some hazardous substances and mixtures containing them. Amends article 4 and Annex II, adding Annex III to Decree-Law 264/98 of 19	Mitigate the harmful effects to human health and to the environment associated with the use of certain hazardous substances and mixtures, in particular pentachlorophenol	Directive 99/51/EC of the Commission, of 26 May – 6th adaptation to technical progress of Directive 76/69/EEC		Fines and Accessory Sanctions

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
	August, republished by Decree-Law 446/99 of 3 November				
Decree-Law 222/2001, of 8 August	Amends and adapts to technical progress the Ordinance 732-A/96				
Decree-Law 121/2002, of 3 May	Establishes the legal regime for marketing biocides.	Establishes National Competent Authorities to proceed with technical evaluation of biocides. Creates the Technical Evaluation Commission for Biocides. Includes Annexes IIA, IIB, IIIA, IIIB, IVA, IVB, V and VI, relative to a generic or additional dataset, necessary for the evaluation of biocide dossiers.	Transposition of Directive 98/8/EC of the European Parliament and Council, of 16 February, 1998 concerning marketing of biocide products.	Directorate General of Protection of Crops, Directorate General of Veterinarian Medicine and Directorate General of Health	Articles 31 and 32
Decree-Law 154-A/2002, of 11 June	Amends and adapts to technical progress the Ordinance 732-A/96				
Regulation (EC) 1687/2002, of the Commission, of 25 September, 2002	Establishes a supplementary period for notification of certain active substances already in the market for use as biocides.				
Regulation (EC)	Exploration and import of				

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
304/2003 of the European Parliament, repealed and replaced by Regulation 689/2008 of 17 June	hazardous chemicals (PIC)				
Decree-Law 72-M/2003, of 14 April	Amends and adapts the technical progress to Ordinance 732-A/96				
Decree-Law 82/2003, of 23 April Decree-Law 260/2003, of 21 October Decree-Law 27-A/2006, of 10 February	Classification, packaging and labelling of hazardous mixtures. Amends No. 2 of article No. 2 of Decree-Law 82/95 Amends Annexes I and V of Ordinance 732-A/96				
Regulation (EC) 2032/2003 of the European Parliament and Council of 29 April	Second phase of the systematic analysis program on existing biocide-active substances				
Regulation (EC) 850/2004 of the Commission of 4 November	In order to protect human health and the environment from POPs, the Regulation provides for the prohibition, gradual elimination or restriction of their production, marketing and use, and the minimization of releases of substances under the	Ban on production, marketing and use of Annex I substances; Restricts the production, marketing and use of Annex II substances, subject to the conditions established in that Annex		Administrative entities to be designated by Member States; European Commission	To be defined by Member States

Document type, No. and Date	Summary	Summary of main provisions	Connection with Community Law	Competent Authorities	Sanctions
	Stockholm Convention on POPs or the 1998 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution, on POPs				
Decree-Law 144/2004, of 15 June	Establishes a link between the various national bodies for the implementation of the synthetic analysis program on existing biocide-active substances				
Decree-Law 65/2006 of 20 March, establishes execution mechanisms of implementation of Regulation 850/2004 of 29 April	Approves the Convention on Persistent Organic Pollutants, adopted on 22 May, 2001, in Stockholm	Defines measures to reduce or eliminate releases of POPs into the environment. Annex A lists the substances to be eliminated and Annex B, the substances subject to restrictions			
Decree-Law 33/2004, of 29 October	Adopts the Rotterdam Convention on the Prior Informed Consent procedure, for certain hazardous chemicals and pesticides in international trade				
Regulation (EC) 1048/2005 of the Commission, of 13 June 2005	Amends Regulation (EC) 2032/2003, of the Commission of 4 November, 2003				

Chapter 4 – Evaluation of pesticide POPs

Production, Import and Export

According to available information, active substances listed in Annex A and Annex B of the Stockholm Convention have not been produced in the past, are not presently being produced, and are not foreseen to be produced in future, in mainland Portugal and the Autonomous Regions of Azores and Madeira.

Although products based on these substances, with the exception of Mirex and PCBs, have been imported and used in agriculture in the past, they were withdrawn from the market following agreements between the former Directorate General for Crop Protection (DGPC) and phytopharmaceutical product companies on 1 January 1974, in the case of dieldrin, heptachlor and DDT, and on 1 January 1986 in the case of aldrin, endrin, hexachlorobenzene and toxaphene. Subsequently, these agreements were framed by Decree-Law 347/88 and Ordinance 660/88, both of 30 September.

Concerning the import and export of pesticide POPs, the information provided by business associations, particularly the National Association of Industry for the Protection of Plants (ANIPLA) indicates that, particularly in recent years, none of its associates has imported, produced, stored, sold or exported any of the pesticide POPs.

Taking into consideration Regulation (EC) 304/2003 on the requirements of the PIC Convention (Prior Informed Consent), which establishes, for various substances including pesticide POPs, a mechanism of exchange of information between exporting and importing countries to allow knowledge of the characteristics of substances and the reasons for the restrictions attached to them, prior to their entry in national territory, and considering that Article 14 of that Regulation mentions the prohibition of exports, from the EU, of POPs already banned in the EU and its articles (Annex V), no import-export activities of the above described POPs are expected in future.

Currently, there are also no pesticides in veterinary use containing any of the withdrawn active substances.

Furthermore, Regulation (EC) 850/2004 of the European Parliament and Council of 29 April 2004 on persistent organic pollutants, amending Directive 79/117/EEC, Article 3, prohibits the production, marketing and use of these substances and preparations containing them.

Environmental monitoring of pesticide POPs and their impacts on health

Monitoring of organochlorine pesticide residues, called pesticide POPs, carried out by the former Directorate General for Crop Protection (ex-DGPC), now Directorate General for Agriculture and Rural Development (DGADR), began in 1966 and took place over a period of about 20 years. During this period, tests were carried out on various food products such as milk and dairy products (cream and butter), cooking oil and eggs, analysis on human breast milk and blood, analysis in various aquatic organisms (fish, mussels, oysters) and birds (birds of prey and seagulls), and analysis of water and sediments in the Tejo estuary, Sado estuary and other rivers and artificial lakes. In general, no significant or dangerous levels of residues where found in the tested organisms, nor were the levels of residues found in food products higher than the Maximum Residue Limits (MRLs) set by FAO/WHO, with exception of DDT and dieldrin detected in milk in 1978, although at levels considered not dangerous to the consumer.

Generally, samples collected from the various organisms and extracts revealed the presence of DDT and its metabolites. Traces of dieldrin were also detected in several samples.

Currently, the monitoring data obtained through the National Program for the Control of Pesticide Residues in Products of Plant Origin, carried out officially since 1990, has not showed any pesticide POPs residues above the detection limit of the available analytical methods.

Studies were carried out in the 1960s and 1970s on cow milk and other dairy products, because the use of organochlorine pesticides in treatments for disinfections of stables and fodder was then a common practice. These studies found traces of pp'DDE, op'DDT and pp'DDT, however, in toxicological levels not considered dangerous to the consumer.

Monitoring in coastal and inland waters, biota and sediments carried out by former Environment Institute (IA), now the Portuguese Environment Agency (APA) and former Research Institute of Fisheries and the Sea (IPIMAR), now the National Institute of Biological Resources, I.P. (INRB) held from 1999 to 2004, under Directive 76/464/EEC of 4 May, on the pollution caused by discharges of certain hazardous substances into the aquatic environment of the Community, shows that concentrations of pp'DDT and metabolites (pp'DDE and pp'DDD), aldrin, dieldrin, endrin, hexachlorobenzene and heptachlor in coastal and inland waters, have always been below the detection limit of the analytical method in use.

Figure 4.1 Sampling locations for water, sediments and mussels.

Table 4-1 Pesticides of the Stockholm Convention: Tested samples on surface water from 1999 to 2004.

Substance	Number of tested samples					
	1999/2000	2001	2002	2003	2004	Total
Aldrin	460	276	252	240	160	1 388
Dieldrin	460	276	252	240	160	1 388
Endrin	460	276	252	240	160	1 388
Heptachlor	460	276	252	240	160	1 388
Hexachlorobenzene	460	276	252	240	160	1 388
tDDT	460	276	252	240	160	1 388

Source: APA – LRA

Concentrations of DDT and its metabolites, as well as dieldrin, were recorded in plankton and seston between 1999 and 2001 (Figure 4.2) in coastal, estuarine and inland sediments, as well as in fish and molluscs. In general, the figures indicate that most detected levels in all estuarine and lake systems, in mussels, in fish and molluscs are below the maximum permissible concentrations indicated by ecotoxicological criteria established by the OSPAR Convention.

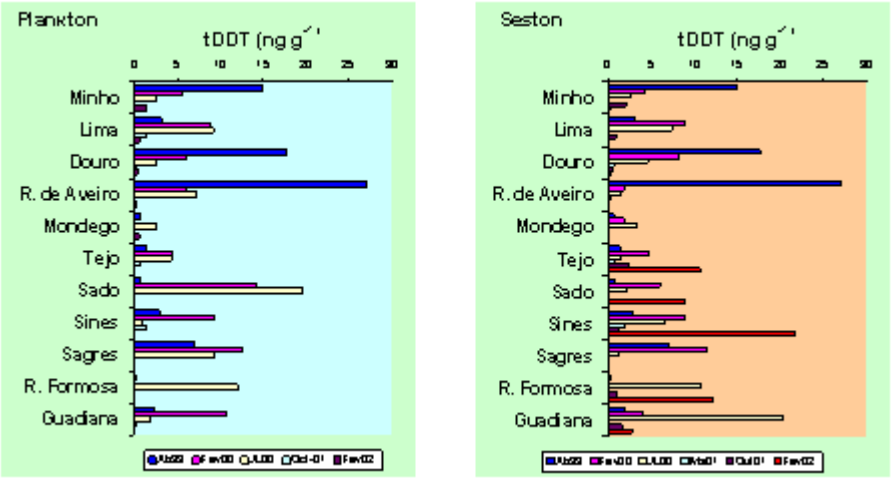

Figure 4.2 Variations in tDDT concentrations, expressed as (ng.g^{-1}, dry weight) in plankton and seston, collected in the various sampling locations between April 1999 and February 2002. (Source: INIAP-IPIMAR/Environment Institute)

In the 1970s, in addition to the studies on environmental contamination, tests were performed on human breast milk and blood, some of which showed high values. Today there is an ongoing study on traces of POPs in breast milk.

In 1991, studies carried out in inland waters of the Azores detected some organochlorine POPs, including aldrin, endrin, cis-chlordane, oxychlordane, heptachlor epoxide, DDT, DDE, DDD, hexachlorobenzene (HCB), hexachlorocyclohexane (α-HCH, β-HCH, γ-HCH) and other organochlorine pesticides such as trans-chlordane and trans-nanochlorine, in Lagoa do Fogo, Lagoa das Furnas and Lagoa das Sete Cidades, lakes. This suggests that the existence of these compounds in the lakes is due to past used agricultural practices, since the findings demonstrate their persistence in aquatic environments, especially in Lagoa do Fogo lake. Polychlorinated Biphenyls (PCBs) were also found in the three above mentioned lakes and according to described in the National Water Plan, the occurrence of trace concentrations of PCBs may be due in part to atmospheric transport, once it considers that these lakes are unaffected by industrial activity.

Studies conducted by Swedish scientists in 1977, in the Autonomous Region of Madeira, revealed the presence of traces of DDT in rocks on high peaks. The presence of this substance was attributed to entrainment by winds from the East, coming from West African countries, where use of DDT in treatments to fight mosquitoes and the Tsetse fly are common.

Under Directive 76/464/EEC, a monitoring program for POPs and other contaminants has been ongoing since 2003, in the Autonomous Region of Madeira, in coastal and inland waters, sediments and biota, in the context of the Project "Hazardous Substances – Assessment of the Quality of Coastal, Inland Surface and Underground Waters of the Autonomous Region of Madeira" in order to evaluate active substances of aldrin, dieldrin, endrin, hexachlorobenzene, PCBs, hexachlor, DDT and its metabolites. Monitoring sediments, water and biota showed that concentrations of substances known as pesticide POPs were below the detection limit of the analytical methods used.

Parametric values for pesticides were defined under national legislation on protection of water intended for human consumption, which resulted from the transposition of Directive 80/778/EEC (Decree-Law 74/90 of 7 May), of Directive 98/83/EC (Decree-Law 243/2001 of 5 October) and later of Directive 98/83/EC (Decree-Law 306/2007 of 27 August), among other sections of this Decree-Law, and should be monitored in water by competent institutions when their presence is likely in a particular drinking water supply system.

Moreover, since the implementation of Decree-Law 243/2001, the control of the above mentioned pesticides, carried out by managing institutions of water for human consumption, has been coordinated and centralized by the Regulatory Institute for Water and Waste (IRAR), which is the responsible authority for ensuring the application of the Decree-Law. To date, and since its implementation, monitoring of water intended for human consumption has not revealed any pesticide POPs contaminations.

In the Autonomous Region of Madeira, the competences of the Regulatory Institute for Water and Waste, IP (IRAR) are assigned to the Regional Directorate for Environment, by Regional Decree 21/2004 of 7 August, defining the referred Regional Directorate as the competent authority on quality of water intended for human consumption. The pesticides are not accounted for in the annually defined programmes and consequent analysis as they were not considered pesticides likely to be present in the supply systems for human drinking water in the Region.

The Directorate General of Veterinary Medicine (DGV) has implemented the National Plan for Waste Control (PNCR), running since 1997, which aims to control veterinary drugs and other substances such as pesticide POPs in foodstuffs of animal origin. The substances controlled under this plan include HCB, oxychlordane, DDT, aldrin and PCBs, for which no positive test results have been recorded to date. National animal products are evaluated under the current plan, whose samples are collected in slaughterhouses.

PNCR was created under Decree-Law 148/99 of 4 May. Levels of pesticides for foodstuffs are laid down in Regulation 86/363, Directive 2003/60 and subsequent amendments, and Decree-Law 182/2004 of 29 July.

With respect to impacts on human health, hospital records between 1992 and 2001 relating to external causes of death (CID 9 code) have not identified any case of death caused by poisoning with organochlorine pesticides, a group that includes chlordane, dieldrin, endrin, hexachlorobenzene, toxaphene and DTT, among other pesticide POPs.
In accordance with the laws and the fact that these products are banned in Portugal since 1986, it is not to be expected that there are any pesticide POPs in storage.

For the same reasons, "stocks" of pesticide POPs are also not to be expected. Given this context, the existence of regulations, guidelines and proposals for measures to reduce risk are not justified.

Given the legal provisions in force, the production or use of these pesticide POPs is not foreseen, and thus there is no expectation of contaminations.

Activities, strategies and action plans

Since there is no current expected future production of pesticide POPs, and as they have been long banned from marketing and use, and given the fact that the monitoring on food, humans and the environment, since 1966, consistently indicate the absence of significant levels of traces of pesticide POPs in foods of plant or animal origin, drinking water, environmental compartments (soil, water and sediment) and biota, it seems unnecessary to implement additional strategies and plans of action to control these pesticides. However, it should be noted that given the "National Program for Control of Pesticide Residues in Products of Plant Origin", "National Program for Control of Pesticide Residues in Products of Animal Origin", "Program for Control of Drinking Water Quality" and programs

established to fulfil the Law of Water and the Marine Strategy Framework Directive, any anomalies found with respect to these chemicals should be identified and dealt with under these Plans/National Programs.

Chapter 5 – Evaluation of intentional POPs

Production and application of PCBs

The production and the import of PCBs have been forbidden in Europe since 1985, when their prohibition for commercial use was approved due to their toxicity to reproduction and bioaccumulative effects.

PCBs have been widely used in industry and commerce, due to their characteristics. They can be used in electric, hydraulic, and heat transfer equipments (such as transformers and capacitors).

Other possible uses are in industrial oils, paint, plastics, adhesives and flame retardants.

PCBs may be used in two ways:

- Closed use, such as dielectric fluids in electrical equipment; in these cases, most of their emissions come from leakages, fires and accidents, illegal discharges and irregular eliminations;

- Open use, such as additives to pesticides, flame retardants, sealants, paint, among others in which the emissions come from uncontrolled deposits of these wastes on the soil, migration and emissions to the atmosphere due to evaporation.

Waste incineration, agricultural use of clearance sludge, the combustion of used oils and the reservoirs of PCBs as sea or river sediments, and sludge from maritime ports are sources of minor relevance.

PCBs can still be found in Portugal, either discharged in the environment or still being used, in a controlled way, in different equipment. According to the national inventory for equipment which either contain or are contaminated with PCBs, these compounds can be found in equipment such as air conditioning equipment, capacitors, transformers, induction coils and rectifiers.

The export of wastes including PCBs, for the purpose of elimination, is on-going, considering the requisites of the Stockholm Convention on Persistent Organic Pollutants. In effect, there are no available means in Portugal to proceed with the elimination of this waste, and therefore it is sent to other member states of the European Union. As indicated in the reports related to the movement of waste in Europe, the main destinations of these hazardous wastes, which include waste containing PCBs and other POPs, are Belgium, Germany, France and Spain.

Production and application of HCB

The production of HCB is either intentional or non-intentional. In some cases, although it is present as a by-product in heavy fractions of distillation, there is evidence of isolation and purification up to commercial purity. HCB is a by-product resulting from solvent chloride production, especially perchloroethylene (tetracholoroethylene, PCE, PER, PERC), trichloroethylene (TCE) and carbon tetrachloride. Presently, the production of HCB by these processes has been minimized, and any such production is classified as unintentional POPs. In effect, there is no record of intentional HCB production, to date, in Portugal.

Environmental monitoring of PCBs and HCB and their health impacts

Coastal and inland waters, biota and sediments were monitored from 1999 - 2004 under the Directive 76/464/EC of 4 May on the pollution caused by certain hazardous substances launched into the water environment. This monitoring activity included the analysis of PCBs (17 categories) and HCB. It was carried out by the former Environment Institute, (presently, the Portuguese Environment Agency) and by the former Institute of Fisheries and Sea Research (IPIMAR) (presently the National Institute of Biological Resources (INRB)).

Figures 5.1 and 5.2 show the monitoring network of PCBs along the coastal and inland waters. A summary of the available monitoring results is presented below (Source: IA/INIAP).

Figure 5.1 Sampling locations for water and mussels.

Figure 5.2 Sampling network for sediments and interior waters.

Results of the monitoring activities in coastal waters, in place since 1999, indicate that any amounts of PCB concentrations have always been below the detection limit of the analytical method used.

The levels of PCBs were also monitored (a total of 17 categories) in sediments found in the coastal area, collected near the mouths of the main estuaries and also in two other areas where there is no fluvial discharge. The amounts of all these concentrations are below the concentration levels established by OSPAR (2005) for sediments.

The levels of intentional and unintentional POPs were equally analysed in the biota of the coastal area. The numerous sea species analysed present a wide range of variation of the PCBs. The values found are generally within the levels established by OSPAR (1997), and as such are not likely to cause deleterious effects to organisms.

Monitoring in estuarine areas is carried out in the estuaries of Tejo, Mondego, Sado and Guadiana rivers and also in the Lagoons in Aveiro and Formosa.

Levels of PCBs were analysed in sediments and it was verified that the concentrations with highest average levels were registered in the Tejo and Sado estuaries in 1989, with peak values of 6 and 3.9ng.g^{-1}, respectively. In the Tejo estuary system, 15 years following the sampling referred above, observed levels decreased by 70%. However, in the Sado estuary, levels were consistent for 10 years, then drastically reduced during the last 6 years.

In the Mondego and Guadiana estuaries and in the Lagoons of Aveiro and Formosa, the detected levels were much lower, bewteen 0.02 and 6.9ng.g^{-1}. Most of the values found in all estuarine and lagoon systems are below the ecotoxicological criteria established by the OSPAR (1997).

The average concentrations of PCBs in the estuary species (biota) captured in the Tejo estuary are within the established values by OSPAR (1997). However, for some of those species the variation range exceeds the level of concentrations established in the ecotoxicological criteria not causing any effects on the organisms (10ng.g^{-1}).

The presence of PCBs in inland waters, collected in the water stations as indicated in Figure 5.2, has not been detected since 1999. Similarly, no PCBs in the sediments collected from the same areas have been detected since 1999. For the study of the biota of inland waters, the dorsal muscle and the liver of the barb (*barbus spp.*) were analysed. Since 1999, PCBs levels in this aquatic species have been below the detection limit of the method in use (Source: IA).

HCB was never detected in the monitoring programs conducted.

Relevant orientations and regulation

The most relevant regulations and guidelines at national, EU and international level are presented following.

National Level

Decree-Law 277/99, of 23 June, transposes to national law the provisions of Directive 96/59/EC of the Council of the 16 September, and establishes the rules to which the disposal of used PCBs are subject, repealing Decree-Law 221/88, of 28 June.

Decree-Law 277/99 identifies PCBs as: byphenyls, terphenyls, monomethyl, monomethyl-tetrachlorodiphenyl-methane, monomethyl-dibromo-diphenyl-methane, and any other mixture with these accumulated substances at more than 0.005% in weight.

Decree-Law 277/99 establishes, in particular, the requirements to proceed with the inventory of the equipment containing more than 5dm^3 of PCBs. Directive 792/98 of 22 September establishes, under Article 17 of Decree-Law 239/97 of 9 September, the requirement for the producers of industrial waste to fill out a registration form of industrial waste produced, including waste containing PCBs, and send it annually to the administration.

Article 9 of Decree-Law 277/99 further requires the preparation of:

- A national plan for decontamination and or elimination of inventoried equipment and of the PCBs contained therein;
- A project for the collection and elimination of equipment which are not subject to the inventory procedure.

In this framework, the "National Plan for decontamination and/or elimination of inventory equipment and the PCBs contained therein and the project of collection and elimination of equipment which are not subject to inventory procedure" was created in 1999. The Plan outlines the strategy and action plan to be developed with a view to

ensuring better protection for human health and for the environment against the effects of PCBs. The plan of action considers the following:

- Better identification of PCB sources;
- Inventory of the areas potentially contaminated;
- Risk prevention;
- Appropriate treatment through elimination procedures;
- Awareness raising/education;
- Inspection/supervision;
- Monitoring;
- Information to the public.

Regulation exists concerning the management of specific waste flows (i.e., end of life vehicles, waste from electric and electronic equipment and used mineral oils) and waste management (i.e. incineration and disposal of waste in landfill sites) which contain their own provisions concerning the management of waste containing PCBs.

The "Strategic Plan for Industrial Waste" (PESGRI), approved in 1999 and amended in 2001, characterizes the reference situation and defines the strategy and action plan concerning the sustainable management of wastes contaminated with PCBs, public health and strategic management options.

The National Plan for Waste Control (PNCR) implements the requirements of Decree-Law 148/99 of 4 May, and in Decree-Law 185/05 of 4 November.

The goals of PNCR are:

- To detect the illegal consumption of forbidden substances and the abusive consumption of authorized substances.
- To confront veterinarian drug waste with the limits allowed by Council Regulation (EEC) 2377/90 of 26 June.
- To control the concentration of environmental contaminants, under the provision of Regulation 466/2001/EC of 8 March, repealed since 1 March of 2007 by Regulation 1881/2006 of 19 December.

European Union Level

Regulation (EC) 850/2004 of the European Parliament and Council of 29 April 2004, concerning persistent organic pollutants, amends Directive 79/117/EEC. The Regulation entered into force 20 May 2004 and it is directly applicable to all Member-States of the European Union.

The Regulation states, in Article 7, 4) and 5), together with Articles 14 and 17, that the specification of the concentration limits, respectively, in Annexes IV and V should be fixed by Committee procedure. The following limits were established for the different POPs.

Annex IV: Minimum amount of concentrations in waste, to be considered to contain POPs, and as such be subject to the provisions of the Regulation. In such cases the POPs contained in this type of waste should be eliminated or be submitted to irreversible transformation through D9 operations (chemical-physical treatment), D10 (soil incineration) or R1 (used as fuel or used in other processes to generate energy, excluding waste containing PCBs).

Part 2 of Annex V: Maximum concentration of POPs in waste, for such waste (categorized in Annex V), to be able to be permanently stored.

Hence, concentration limits referred in Annexes IV and V of the Regulation should be made known, in the near term, in the context of comitology procedure.

Under Council Directive 96/61/EC of 24 September, a European panel of specialists has created the document "Best Available Technologies (BAT) REFerence" (BREF) concerning industries involved in the treatment of waste containing PCBs. Directive 96/61/EC, concerning integrated pollution prevention and control (IPPC) which is based on environmental licensing considering considered in the Best Available Techniques (BAT) requires, namely, the organization of a system for the exchange of information among Member States and the industries such as to define the BAT.

International level

Management of waste containing POPs is also addressed by the Basel Convention concerning the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The following documents were adopted by Decision VII/13 (COP-7, Basel Convention), which were submitted to the COP-1 of the Stockholm Convention:

- Generic technical guidelines concerning the environmentally appropriate management of waste consisting, containing or contaminated with POPs (document UNEP/CHW.7/8/Add.1/Rev.1).

  This document presents (provisional) limits concerning the "low POPs contents" for biphenyls (PCBs), dioxins and furans and other POPs (pesticides). It also adopts provisional definitions concerning the levels of disposal and irreversible transformation, as well as other environmentally appropriate methods for elimination of waste containing POPs.

- Technical guidelines concerning waste containing biphenyls (PCBs), terphenyls (PCT) and polybromophenyls (PBB) (document UNEP/CHW.7/8/Add.2/Rev.1).

Technical guidelines are currently being prepared concerning, environmentally appropriate management of waste containing or contaminated with dioxins, furans, PCBs or hexachlorobenzene (HCB) not produced intentionally; waste consisting, containing or contaminated with pesticides, within a group of 8 pesticides (aldrin, chlordane, dieldrin, endrin, heptachlor, HCB, mirex and toxaphene) and HCB as an industrial chemical; and waste consisting of, containing or contaminated with dichlorodiphenyltrichloroethane (DDT).

National inventory of equipment contaminated or containing PCBs

The preparation of the national inventory of equipment contaminated or containing PCBs has been taking place since 1994 by the ex-INR, compiling data that exists since 1989 and data reported to date.

Data collected until the end of 2005 indicates that 117 companies belonging to the sectors of energy, transportation, transformation and heavy chemicals industries, have declared to hold about 1 400 tonnes[1] of equipment contaminated with PCBs, mostly consisting of transformers and capacitors (Figure 5.3).

[1] Provisional data

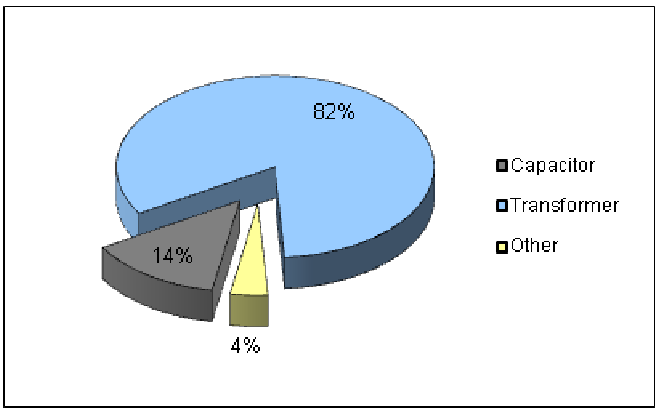

Figure 5.3 Distribution, by type, of the equipment under inventory since 1989, whether in use or not, within the 117 national representative companies.

Figure 5.4 illustrates the geographical distribution of all declared equipment containing PCBs, including those still in use.

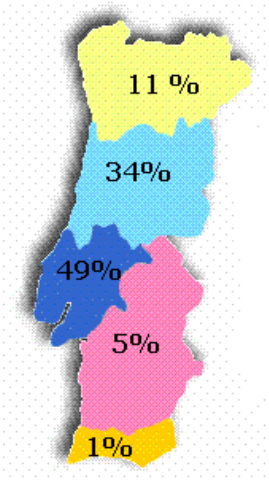

Figure 5.4 Distribution, per region, of the equipment mentioned in the inventory, since 1989, in use or out of use, in the 117 national more significant enterprises.

With a view to obtaining information complementary to that from the inventory, the ex-INR developed in 2004, in cooperation with former General Inspectorate of the Environment, a campaign which involved notifications for 1 200 entities representing most of the existing companies with electrical power above 100kVA.

The update of the inventory also revealed the existence of some small and medium firms that owned equipment still being used which contained PCBs. The assessment of the records made by these firms indicate that, by the end of 2004, there was an estimated 190 tonnes PCBs, of which 93% was found in equipment still in use. The following figure shows the distribution of these companies per region.

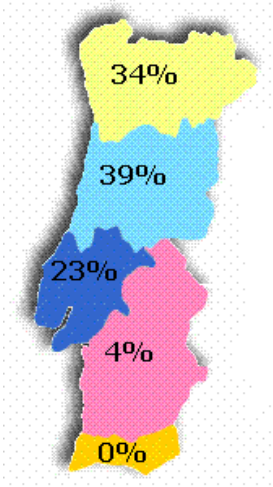

Figure 5.5 Distribution, per region, of the companies that declared to own equipment contaminated with PCBs, before the inventory was updated.

Inventory of waste contaminated with PCBs

With a view to harmonizing prevailing legislation concerning the identification and classification of waste in the European Union, the European Waste Catalogue (EWC) was approved in conformity with Decision 2000/532/EC of the Commission, as amended by Ordnance 2009/2004 of 3 March.

In the legislation referred above, different types of wastes are listed corresponding to a six digital code for each waste and, respectively, two to four digits for chapter and sub chapters which aim, as often as possible, to identify the origin of the waste. The classification of hazardous waste, based on the criteria and characteristics of the hazard is also provided; these hazardous wastes are identified in the EWC.

The EWC codes referring to waste contaminated with or containing PCBs, according to the definition of PCBs in Decree-Law 277/99 of 23 July, are:

- 13 01 01 (*) Hydraulic oils containing PCBs;
- 13 03 06 (*) Insulating mineral oils and chlorinated heat transfer oils, which are not indicated in 13 01 01;
- 16 02 09 (*) Transformers and capacitors containing PCBs;
- 16 02 10 (*) Out of use equipment containing or contaminated with PCBs which are not indicated in 16 02 09;
- 17 09 02 (*) Demolition and construction waste containing PCBs (for example, sealants with PCBs, floorings containing resins with PCBs, glazing sealants containing PCBs, capacitors containing PCBs).

Waste referred in chapter 17 of the EWC code as containing PCBs was identified in Portugal only in 2005, in relation to demolition and construction waste. These wastes do not represent the majority of the waste containing PCBs, and there is not yet a specific regulation for its management. However, a Law-Decree project was developed to establish the rules concerning the management of construction and demolition waste; this document sets out provisions concerning the origin of these hazardous wastes, including waste containing PCBs.

The production of other kinds of waste containing PCBs has changed since 1995 due to deactivation and disposal to an adequate destination of electric equipment, namely transformers and capacitors that worked using oils containing PCBs.

In Portugal, there is still no means available for the elimination of wastes containing PCBs, which are therefore sent to other Member States of the European Union.

Table 5.1 shows the amounts of waste either containing or contaminated with PCBs, which have been sent for elimination processes, since 1995. This information comes from records concerning the waste movement across borders (Source: ex-INR). These values are coherent with the information from the registration maps of industrial waste, according to Ordinance 792/98 of 22 September.

Table 5-1 Amount of waste containing or contaminated with PCBs sent to other Member States of the EU, since 1995 (source: ex-INR).

Year	Quantities (t)	EWC Code
1995-2000	750 (150 t/year)	
2002	171	13 01 01*,16 02 09*
2003	175	13 01 01*,16 02 09*
2004	105	13 01 01*,16 02 09*
2005	111	13 01 01*,13 03 06*,16 02 09*,17 09 02*
2006	198	13 01 01*,16 02 09*,17 09 02*
2007	120	16 02 09*,17 09 02*
Total	1 630	

This information does not indicate a decrease in deactivation of equipment either containing or contaminated with PCBs, due to the existing waste management operators capable of decontamination of equipment, which allows the owners to replace the oils used so far.

The values shown do not specify the proportion relating to oils contaminated with PCBs (13 01 01 (*)) or to contaminated equipment (16 02 09(*)).

Locations Contaminated with PCBs

The priority of the "National Plan for decontamination and/or elimination of inventoried equipment and of the PCBs contained therein and the project on the collection and elimination of equipment which does not require inventory" is the decontamination process for the most potentially contaminated locations with PCBs.

A study was carried out by the ex-INR, in cooperation with the scientific community, on the inventory of contaminated soils, which involves contamination with PCBs. It is not possible yet to present any detailed information about this matter because the data is still under analysis.

There exists a risk of existing contaminations in the bituminous platforms as support systems for large electric equipment containing oils with PCBs and/or in the surrounding soils, whether they are situated indoors or outdoors. However, these are not quantifiable spills.

Remediation measures

The contaminated soils may be decontaminated, *in situ* or *ex situ,* by conventional technologies, depending on the extension of the contamination and how urgent the process is.

Demolition/construction contaminated waste should be sent, after characterization, to a proper landfill site for hazardous waste.

In cases where the pollutant is adsorbed to the bituminous matrix, such as in bituminous platforms or settlements for big electric equipments, some countries do not require the dismantlement but rather impose the application of an exterior insulation and a clear PCBs contaminated site warning. Other situations, related to spillage and to inappropriate dismantling, etc., are not reported in any particular system; however there is some information in different authorities involved in environmental issues.

Inventories and remediation for contaminated soils are of great importance for Portugal, and this subject was included in a document concerning the "Financial Perspectives 2007-2013", for the European Union.

Inventory of HCB contaminated waste

The Portuguese legislation does require monitoring of HCB contaminated waste; therefore there are no registers for this parameter.

Locations contaminated with HCB

Due to the non-existence of records on intentional production of this pollutant in Portugal, locations of contamination due to intentional production of HCB are not available.

Elimination methods of PCBs

Wastes containing or contaminated with PCBs are sent to other Member States for elimination. The elimination methods of waste contaminated with PCBs should take into account published Guidelines and Regulations.

Elimination methods of HCB

Incineration, discharge to the municipal wastewater sewage, and deposition in landfills have been the elimination methods for waste contaminated with HCB, worldwide. Presently, it is recognized that the recommended incineration temperature should be of 1 300ºC with a detention time of 0.25s, in order to achieve an elimination efficiency above 99%. The change in temperature during incineration may lead to the formation of other toxic chlorinated organic compounds.

Monitoring PCBs

Operators of equipment containing more than 5dm^3 of oils, should report, as stated in Decree-Law 277/99 of 23 July, their existence to the Environment Agency, according to the model established in Annex I of the Decree Law, allowing for the concomitant identification of the locations/regions with potential contaminations.

The legal documents for the management of specific waste flows (i.e. used mineral oils, car wrecks, and waste from electric and electronic equipment), set out the requirement of characterizing these wastes contaminated with PCBs or portions thereof, and their selective collection/reception, and dispatch to an appropriate destination. It aims to minimize potential deleterious environmental impacts related to the management of these types of wastes, as well as to improve, in the short term, the inventory of amounts of produced waste.

The existing plans for monitoring PCBs in the environment have already been presented, as well as their results.

With respect to human health, there are no known programs currently running or any results to report.

Degree of information, awareness and education in the target groups

The "National Plan for decontamination and/or elimination of inventoried equipment and of the PCBs contained therein and the project about the collection and elimination of equipment which does not require inventory" includes training/awareness actions for the several entities involved in the life-cycle of PCBs. It also recommends the disclosure of actions through preferred means (such as public administrations, several economical sectors and NGOs), in such a way as to get the most participants possible involved in this process.

Licenses granted by the Ministries for Economy and Environment to the Management Entities of Integrated Systems of specific waste flows, establish obligations concerning awareness raising and and information, taking into account the principle of responsibility of the producers.

Relevant activities of non-governmental stakeholders

There are six companies in Portugal working on the management of waste contaminated with PCBs.

Two of these companies work on the decontamination of waste containing PCBs, travelling to the locations where the waste is located and proceeding with its decontamination, thereby not collecting nor storing it. Therefore, the producers keep the waste, so that legal provisions apply concerning its registration, and information is sent to the proper administration.

The other companies have permits to store hazardous waste. Waste contaminated with PCBs is stored and sent to other Member States of the European Union because there are no proper locations in the country capable of eliminating this kind of waste.

One of the companies works according to both referred procedures.

The activities developed by licensed Managing Operators are also of great relevance for the management of Integrated Systems of specific waste flows, considering the principle of responsibility of the producer. The activities are as follows:

End of Life Vehicles (ELVs)

One Managing Operator was licensed in July 2004 to work on end of life vehicles, provided in the integrated system regulated under the Decree-Law 196/2004 of 23 August.

Among the several functions attributed to this Operator, the following stand out in relation to the ambit of the present National Implementation Plan:

- Building of a national network of operators with proper competencies for the collection, transportation and treatment of ELVs;
- Compliance with objectives of ELVd management (i.e., reuse/recovery and reuse/recycling);
- To register and control the incoming ELVs, and the operators in charge of decommissioning should comply with the rules for managing the pieces, materials and waste containing PCBs;
- Promoting research and development initiatives;
- Promoting awareness raising and information initiatives.

Used mineral oils

One Managing Operator was licensed in July 2005 to operate in the management of used oils, within an integrated system governed by Decree-Law 153/2003 of 11 July.

Functions include:

- Building of a national network of operators with proper training for the collection, transportation and treatment of used oils;
- Compliance with objectives of used oils management (i.e. collecting, regeneration, recycling and recovery);
- Registration and control of used oils, which includes the verification of the presence of PCBs in the collected oils and the determination of PCBs in the used oils likely to be regenerated, and in used oils to be recycled, the peak values permissible are stated in the License of SOGILUB, as well as the test methods to be used;
- Promoting research and development initiatives;
- Promoting awareness raising and information initiatives.

Waste Electrical and Electronic Equipment (WEEE)

Under Decree-Law 230/2004 of 10 December, WEEE includes all components, subsets and consumable materials which are included in the equipment when it is discarded. According to this Decree-Law, all the materials and components within the WEEE should be removed separately, including capacitors with PCBs.

Therefore, it is possible to optimise the control documents concerning the release of PCBs to the environment, as well as obtaining relevant complementary information concerning the levels and origins of the PCBs.

Chapter 6 – Evaluation of unintentional POPs

In Portugal, the main sources of atmospheric emissions of unintentional POPs of industrial origin are linked to the burning of fossil fuels, thermal processes in metallurgical industry, municipal and hospital waste incineration plants, and cement production industry burning non-hazardous waste.
There has also been a significant increase in industrial facilities, such as energy production from biomass, which accounts for 7 installations. 52 hospital waste incineration units have been closed and there is currently only one in operation, incinerating the totality of hazardous hospital wastes.
Domestic combustion sources, relative to wood burning, have not been yet characterized, nor have the 4 crematory units in operation in Portugal.

Pollution sources

Waste incinerators, including co-incinerators of municipal, hazardous or hospital waste, or of sewage sludge

In Portugal there are three municipal solid waste treatment plants (CTRSU) located in S. João da Talha, Crestins and Meia Serra in Madeira Island. There is also a hospital waste treatment unit located at Parque de Saúde de Lisboa (SUCH). These installations are sources of unintentional POPs emissions (dioxins, furans, hexachlorobenzene and PCBs).

S. João da Talha's CTRSU started to operate under trial conditions in April 1999, and under full industrial operation since 15 December 1999.

The plant was designed for a maximum processing capacity of between 490 to 662kton/year for a PCI of 10 460 to 5 860kJ/kg, respectively. This capacity is provided by 3 lines processing lines, each with 672ton/day.

The incineration process, called "mass burning", allows energy recovery, and about 48.5MW of power is generated in the plant.

CTRSU of Crestins started to operate under trial in August 1999 and has been in full operation under contract since 4 January 2000. It involves 2 processing lines with individual capacities of 592ton/day. For a PCI of 7 700kJ/kg, its annual capacity is 380kton.

Similarly to the S. João da Talha CTRSU, the incineration process is based on "mass burning" and the generated power in the plant is 24.7MW, when the 2 lines are running.

The Municipal Solid Waste Incineration Plant (IIRSU) of the Solid Waste Treatment Plant (ETRS) of Meia Serra, in the Autonomous Region of Madeira, started its operations in 6 August 2002. IIRSU consists of two independent incineration lines, each with one kiln, boiler, and a system of flue gas treatment (STG), with the capacity to burn 8 tons of municipal solid waste (RSU) per hour. The unit is designed to be fitted with a third line of incineration in should it be justified by an increase in the volume of Urban Solid Waste. IIRSU was designed in order to comply with emission limits and burning temperatures laid down in Directive 2000/76/EC of 4 December, transposed to Portuguese legislation by Decree-Law 85/2005, of 28 April on waste incineration. Best available techniques (BATs) were used to comply with applicable legislation.

The hazardous hospital waste incineration plant has only one operating line with the capacity of 300kg/hour, which represents 72 000kg/day. The installation is able to incinerate hazardous waste at an average heat of combustion between 3 000 and 3 600kcal (14 184kJ), through a pyrolytic process, but given the current type of waste, the actual capacity of the incinerator is approximately 260kg/hour, totalling about 6 300kg/day. The incineration plant currently uses electricity and, since 2003, natural gas, before which it used propane.
In mainland Portugal there were 53 hospital waste incineration units of which 52 were closed between 20 October 1997 and 5 January 2004. There is therefore currently only one unit in operation (Júlio de Matos Hospital).
Between 1999 and 2003, emissions were monitored from hospital waste incineration plants IRH1 (São João Hospital) and IRH2 (Santo António Hospital) in the city of Porto, which did not have flue gas treatment systems and are now closed. The concentrations of dioxins and furans obtained in and that monitoring period, were respectively 1 000 and 10 to 60 times the emission limit value for new units (0.1 I-TEQ $ng.m^{-3}$) (Directive 2000/76/EC of the European Parliament and Council of 4 December 2000).

Estimates of atmospheric emissions from this activity are recorder in the POPs emissions inventory.

Cement kilns burning hazardous waste

In Portugal there are 6 cement production plants that annually produce around 7 million tonnes of clinker. However, the kilns of these installations do not burn hazardous waste.
The management of hazardous industrial waste is carried out by the 2 new Integrated Centres for Retrieval, Recovery and Disposal of Hazardous Waste (CIRVER) located near Chamusca.

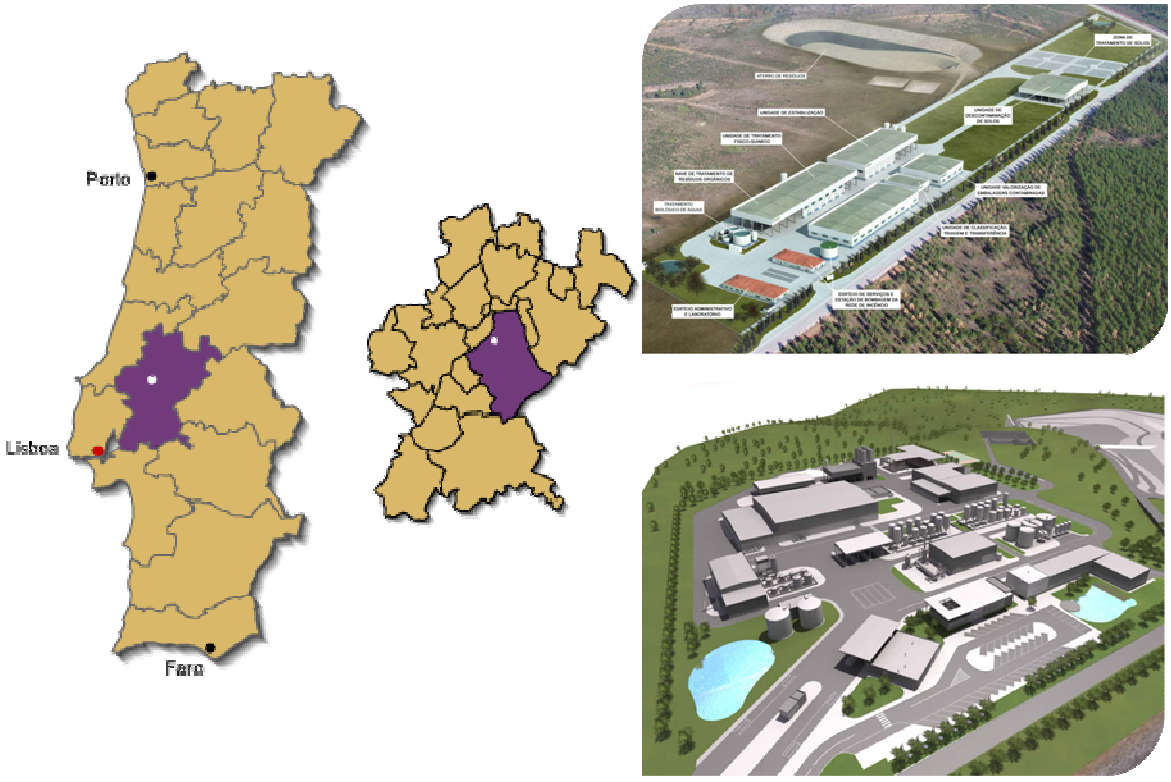

Figure 6.1 Location of the CIRVER.

The main objective of the Integrated Centres for Retrieval, Recovery and Disposal of Hazardous Waste (CIRVER) is to ensure an effective policy of retrieval, recovery and disposal of hazardous waste to ensure a high level of protection of public health and of the environment. The CIRVER are intend to be integrated units that combine the best available techniques at affordable cost, allowing specific solutions for each type of waste in order to optimise the treatment conditions and minimize the cost.

The main advantages of the CIRVER are:

- Optimising the sequence of management operations;
- Use of the best available techniques;
- Access to professionalised intermediaries;
- Minimizing the costs of waste management;
- More effective inspection processes;
- Minimization of environmental risks and incidents.

In accordance with number 3 of Article 1 of Decree-Law 3/2004, of 3 January, the CIRVER necessarily include the following units of retrieval, recovery and disposal of hazardous waste:

- Unit of classification, including laboratory, sorting and transfer;
- Stabilizing unit;
- Unit for treatment of organic waste;
- Recovery unit for contaminated packaging;
- Unit for soil decontamination;
- Physical-chemical treatment unit;
- Hazardous waste landfill.

Estimates of atmospheric emissions from this activity are recorded in the POPs emissions inventory.
The capacities of the different functional units that make up CIRVER ECODEAL and SISAV have been licensed as follows:

Table 6-1 Licensed capacities – CIRVER ECODEAL and SISAV.

Unit	Licensed capacity (ton/year)	
	CIRVER ECODEAL	**CIRVER SISAV**
1. Unit of classification, sorting and transfer	1 061[2]	-
1.1. Waste transfer unit		1 000[3]
1.2. Packaging unwrapping unit	-	32 500
2. Recovery unit for contaminated packaging	2 100	15 000
3. Unit for treatment of organic waste	22 000	-
3.1. Unit for the treatment of used oils	-	80 000
3.2 Physical-chemical treatment unit for organic waste and hydrocarbons	-	76 000
3.3. Biological treatment unit	-	100 000
3.4. Evapo-oxidation unit	-	40 000
4. Physical-chemical treatment unit[4]	8 600	30 000
5. Stabilizing unit	51 550	84 000
6. Soil decontamination unit	11 400	180 000
7. Hazardous waste landfill	116 387	150 000

Production of pulp using elemental chlorine or chemicals that originate elemental chlorine for bleaching

The Portuguese pulp industry consists of 9 sites (2 of them processing recycled paper) that annually produce around 2 million tonnes of pulp from pine and eucalyptus. Companies in this industry have made investments in order to reduce pollutant loads in liquid effluents such that, since 1995, pulp is produced in Portugal without the use of elemental chlorine, or its precursor chemicals, for the purpose of bleaching.

Estimates of atmospheric emissions from this activity are recorded in the POPs emissions inventory.

Thermal processes in metallurgical industry

Thermal processes in the metallurgical industry (secondary production of copper, aluminium and zinc and iron and steel sintering) are non-existing or at most are of insignificant occurrence.

Five electric arc furnace type installations were identified: 2 ironworks, 2 ferrous metals foundries and 1 non-ferrous metals foundry.

Estimates of atmospheric emissions from this activity are recorded in the POPs emissions inventory.

[2] Licensed capacity expressed in tonnes.
[3] Licensed capacity expressed in tonnes.
[4] In CIRVER SISAV this functional unit is called *physical-chemical treatment unit for inorganic waste*.

Outdoor waste burning, including burning in landfills

Since 1990, national legislation on air emissions, specifically Decree-Law 352/90 of 9 November, expressly determines the ban on outdoor burning of any types of municipal, industrial and toxic or hazardous wastes.

With the publication of Decree-Law 78/2004, of 3 April, establishing the new regime to prevent and control air emissions, this prohibition continued to stand, but introduced the exception on the burning of wood and other vegetation based materials in the context of agro-forestry activities, provided they are duly authorized under specific legislation in force.

Domestic combustion sources

The Portuguese reality as to the burning of firewood in the domestic sector has not been extensively characterized both in terms of existing installations and to their consumption levels by different types of equipment. Nevertheless, their emissions were recorded in the POPs emissions inventory.

Combustion of fossil fuels in thermal power stations and in industrial boilers

Estimated emissions of POPs resulting from the burning of fossil fuels (solid or liquid, not including natural gas) in industrial boilers/turbines/engines took into account the sources of Large Combustions Installations (GICs) and other more specific sources.

There are 3 IPPC installations with co-generation boilers/turbines with thermal power over 50MWt which use fuel oil or multifuel.

With regard to thermal power stations, there are 2 IPPC type installations using coal, 3 using fuel oil and 1 using diesel.

The fuel oil type installations are covered by Decree-Law 178/2003 of 5 August. From 1 January 2008 until 31 December 2015, these can only operate 20 000hours/year and will close definitively after this date.

Combustion installations for wood and other biomass fuels

In Portugal there are 7 biomass thermal power stations:

- Biomass Thermal Power Station of Orvalho (Oleiros);
- Biomass Thermal Power Station of Outeiro (Gondomar);
- Biomass Thermal Power Station of Cabeceiras de Basto;
- Biomass Thermal Power Station of Terras de Santa Maria (Oliveira de Azeméis);
- Biomass Thermal Power Station of Mortágua (amplification of the existing station);
- Biomass Thermal Power Station of Vila Velha de Ródão.

Production of chlorophenols and chloranil

There are no facilities in Portugal that use these specific processes and in particular there is no production of chlorophenols and chloranil.

Crematory units

In Portugal there are 4 crematory units located in Lisbon (Alto de S. João e Olivais), Porto and Ferreira do Alentejo. As demonstrated in Figure 6.2, there is a sharp increase in cremation of cadavres since 1997, mainly in the Lisbon furnaces. No data on unintentional POPs emissions has been registered.

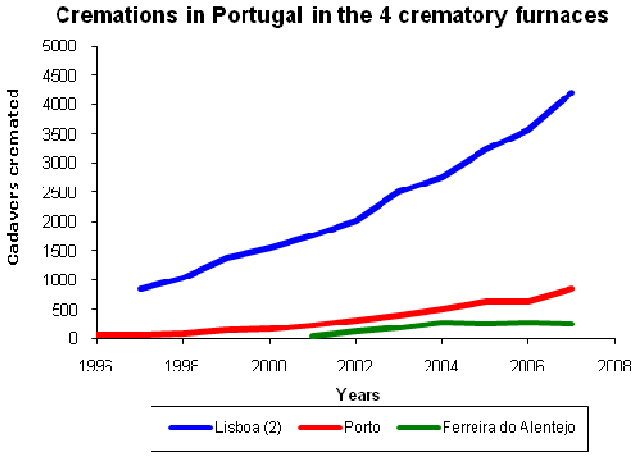

Figure 6.2 Number of cremations in the 4 crematory furnaces in Portugal.

Motor vehicles, particularly those running on leaded gasoline

The production of leaded petrol is prohibited by Community and national legislation (Decree-Law 186/99 of 31 May), which prohibits marketing of leaded fuel from 1 July 1999.

Destruction of animal carcasses

In Portugal, animal carcasses (cattle, sheep and goats) are destroyed in Rendering Units (UTS) and resulting material (MBM) is then disposed of as waste by incineration or co-incineration. In UTSs, carcasses are subject to incineration during 20 minutes at 133 degrees Celsius and a pressure of 3bar, so there is no formation of dioxins, furans or PCBs.

Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction)

Registered textile and leather installations use different technological processes. Chloranil is not used in textile or leather dyeing nor are these two products finished with the use of alkaline extraction, in any of the textile and leather facilities known at national level.

Shredder plants for the treatment of end of life vehicles

According to available information, the specific monitoring of unintentional POPs is not carried out. The End of Life Vehicles Managing Entity was licensed in 2 July 2004 by Order 525/2004, as managing authority for the Integrated System for the Management of End of Life Vehicles, under Decree-Law 196/2003 of 23 August, which transposes Directive 2000/53/EC. Its mission is to organize and manage the reception, treatment and recovery of ELVs and their components and materials, and to promote improved environmental, economic and social performance of its management in Portugal. It aims to organize a Reception/Treatment Network for ELVs.

Directive 2005/64/EC of 25 November introduces the evaluation of the potential of reuse/recycling/recovery of new cars to the system of approval of the Community. Authorities will only grant approval after having proven the vehicle is recyclable to a minimum of 85% by weight, and recoverable to a minimum of 95% by weight. These data will also appear in the "EC vehicle type approval" certificate.

The Tire Managing Entity was licensed on October 7, 2002, and aims at organizing and managing the system for collection and disposal of used tires, under the integrated system created by Decree-Law 111/2001 of 6 April (amended by Decree-Law 43/2004 of 2 March) which sets out the principles and standards for the management of tires and used tires.

Smouldering of copper cables

In Portugal this activity is carried out via a different technological process (mechanical process with separation of the plastics fraction from the metal) so there are no emissions of these particular pollutants.

Used oil refineries

According to available information, the specific monitoring of unintentional POPs is not carried out. There is an entity in Portugal which is dedicated to organizing and conducting an integrated system for the management of used oils (SIGOU). This entity is required to submit a plan of action aimed at achieving the objectives of used oils recovery, which must include the identification of companies that have started procedures for licensing incineration or co-incineration facilities of used oils, according to the provisions on Decree-Law 85/2005 of 28 April, their respective capacity, as well as any other eventual recovery solutions. It must also ensure that treated or recovered oils comply with the maximum limit of 50ppm of PCBs. By legal enforcement (Decree-Law 153/2003 of 11 July), producers of new oils must guarantee the collection of 85% of annually generated used oils and the recycling of 50% of these. A minimum of 25% of collected used oils should be regenerated. Those that cannot be regenerated and recycled will be subject to energy recovery (incineration).

The Integrated System for the Management of Used Oils (SIGOU) entered into force on November 1, 2005 and is funded by a tax – ECO-LUB, fixed at € 0.063/L plus VAT – charged to companies responsible for marketing new lubricants. There are 85 000 tonnes of lubricants that are subject to ECO-LUB. 50 000 tonnes of used oils are expected to be collected in this first year of operation, in around 18 thousand locations scattered throughout the country. In the

initial phase (2005 and 2006), SIGOU will cost a total of 63 Euros per cubic meter of new oil in the market, which means about six million Euros in the first year of operation.

Another entity, a used oil refinery that does energy recovery of used oils, came into operation in November 2002 and is the first Portuguese unit for recycling used oils. It has a capacity to accommodate 16 thousand tonnes resulting from an investment of 12.5 million Euros. The oils are now regenerated and used in motor/generator groups equipped with conventional maritime diesel engines, allowing the export of all the surplus energy, approximately 50GWh/year, to the public power grid.

Conclusion: Some of the activities listed in Part II of Annex C of the Stockholm Convention do not exist in Portugal while others are prohibited by Community and national legislation or use different technological processes with no unintentional POP emissions. Among existing activities, some do not have significant production and its operators have not reported those pollutants. The only significant activity (incineration) reported the presence of dioxins and furans, but with values bellows the legal limit.

In relation to the activities listed in Part III of Annex C of the Stockholm Convention, some do not exist in Portugal while others are prohibited under Community and national legislation or use different technological processes with no unintentional POPs emissions. In some other cases, specific monitoring of unintentional POPs is not carried out, so their relative significance is unknown. There are, however, activities for which assessment and measurement have technical or social challenges (domestic combustion sources and cremation).

Chapter 7 – Current emissions and forecast future emissions

Effectiveness of existing legislation and policies for the management of these emissions

Through national legislation on atmospheric emissions, Operators are required to carry out monitoring of the atmospheric pollutant emissions, but only for those pollutants subject to emission limit values (ELVs).

Given that in response to Decree-Law 85/2005 of 28 April, which transposes into national legislation Directive 2000/76/EC on waste incineration, ELVs were only set for dioxins and furans for this sector. Only those installations covered by the Decree-Law are required to carry out periodic monitoring, at least twice a year.

For other sectors identified in Parts II and III of Annex C of the Stockholm Convention there is no established requirement to monitor POP emissions. There are no legally established ELVs and therefore there are also no requirements for monitoring PCBs or HBC, in any sector of activity.

The implementation of Decree-Law 194/2000 of 21 August, relative to integrated pollution prevention and control, in turn, enables the possibility of applying Best Available Techniques (BAT) in covered sectors and installations, some of which are listed in the above referred Annex of the Convention, which may be an important tool for controlling emissions of these pollutants.

For the implementation of the referred Decree, a registry was created for the IPPC installations that carry out some of the activities listed in Parts II and III of Annex C of the Stockholm Convention (source categories), to which some environmental permits were issued, not requiring, however, any type of monitoring for any of these pollutants and therefore there is no available monitoring data.

All IPPC operators are required to complete a Registry of Pollutants (usually referred to as EPER – European Pollution Emission Register) on the emission of certain pollutants, a total of 52, to air and water (26 pollutants to water and 37 for air).

A "Guidance Document for EPER Implementation" has been produced by the European Commission to aid Member States in interpreting and fulfilling the reporting requirements under the EPER decision. This guideline thus addresses specific issues concerning requirements and formatting of the reports and includes sub-lists of activity-specific pollutants.

With regard to the above mentioned POPs and in relation to activities listed in Annex I of Decree-Law 194/2000 of 21 August (IPPC Diploma):

- Atmospheric emissions: only dioxins, furans and HCB are considered EPER pollutants. With respect to HCB, it can be emitted by activities comprehending production and processing of metals (category 2), organic chemistry (4.1), inorganic chemistry and production of fertilizers (4.2 and 4.3), waste management (5) and surface treatment of materials, objects or products using organic solvents (6.7). PCDD/PCDF are referred to for combustion activities (category 1.1), production and processing of metals (2), mineral industry, except asbestos production (3.1, 3.3, 3.4, and 3.5), organic chemistry (4.1), inorganic chemistry (4.2) and fertilizer production (4.3), waste management (5), processing of sub-products (6.5) and surface treatment of materials, objects or products using organic solvents (6.7).

- Emissions to water: Only HCB is an EPER pollutant and can be emitted in activities of base organic chemistry industry (category 4.1) and surface treatment or products using organic solvents (category 6.7).

Inventory of POPs emissions

The estimation of air pollutant emissions is a responsibility of each State that arises from the need to support the management of air quality and support policies and measures to control air pollution, as well as to respond to Community and international commitments, such as, for example, in the case of Portugal, the Convention on Climate Change and the Kyoto Protocol, and the UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP) and its Protocols.

National inventories of air pollutant emissions were launched in the late 1980s – early 1990s, with initial estimates for NO_X, SO_X and VOCs (volatile organic compounds) from industrial combustion processes. Developments since then have been steady, seeing quantification extended to other pollutants, improved methodologies and inclusion of other emission sources, now covering combustion, industrial processes, use of solvents, agriculture, forests and land use, waste, and others.

The national inventory of POPs emissions is a fundamental tool for the proper quantitative and qualitative understanding and evaluation of national level current emissions of these pollutants and possible trends. Thus, in 2008, Portugal has included estimates of POPs emissions, for the 1990 to 2006 period, in the National Inventory of Air Pollutant Emissions, submitted under CLRTAP.

National totals for dioxins/furans and PCBs, for the reference years, are presented in the figures that follow.

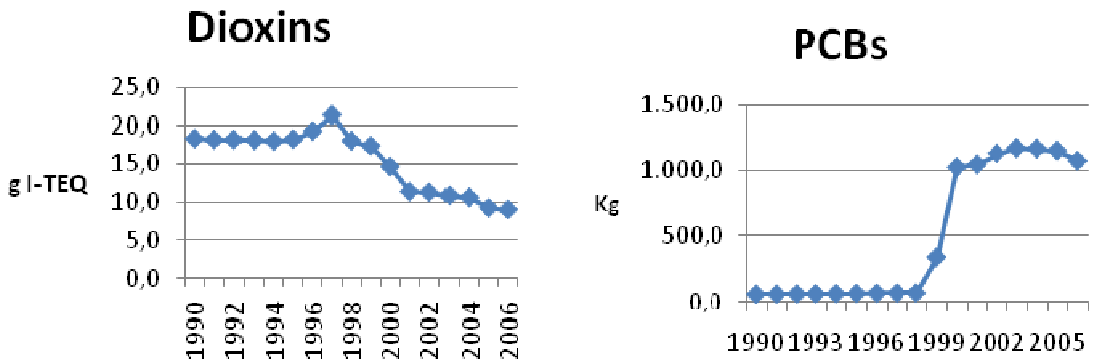

Figure 7.1 Total national estimates for dioxins/furans and PCBs, in atmospheric emissions.

In general terms, the methodology used in estimating emissions of these pollutants consists of the product of an emission factor referenced bibliographically and a characteristic activity-specific value of operation for that source/industry. The following bibliographic sources were used:

- AP-42 (USEPA, 1996; USEPA, 1996b; USEPA, 1998; USEPA, 1998b; USEPA, 1998c);
- EMEP/CORINAIR Emission Factor Handbook (EEA, 2002);
- Stockholm Convention Toolkit (UNEP) for Dioxins/Furan and PAH;

Estimations include the following sectors of activity:

- Public Generation of Electricity and Heat;
- Combustion in Iron and Steel Industry;
- Combustion in Industry of Non-Ferrous Metals;

- Combustion in Chemical Industry;
- Combustion in the Pulp, Paper and Printing Industry;
- Combustion in Food Processing, Drinks and Tobacco Industry;
- Rail Sector;
- Maritime Sector;
- Commercial Combustion and in Institutions;
- Domestic Combustion;
- Combustion in Agriculture, Forestry and Fisheries;
- Solid Waste Disposal on Land;
- Waste Incineration.

Data are considered with prudence, both due to the high uncertainty associated with any first-time emission estimates as well as the need to improve basic available information and methodologies used in the preparation of these estimates.

In the case of PCB emissions up until 1998, only hospital emissions have been included in estimates, and from 1999, all emissions from these sectors have been included.

Chapter 8 – Technical infrastructure for assessment, measurement and analysis of POPs

In Portugal there are several public and private institutions with capacity for the determination, analysis and assessment of POPs in various matrices (Table 8.1).

Table 8-1 Infrastructure for assessment, measurement and analysis of POPs.

Institutions	Acting Area	Information
Environmental Reference Laboratory (LRA) of the Portuguese Environment Agency (APA)	Measuring organochlorine pesticides, PCBs, dioxins and furans, planer PCBs, hexachlorobenzene, PAHs, PBDEs. Matrices: aqueous environment (water, biota sediments), atmospheric air, soils, waste, sludge, oils, flue gas emissions, food products.	UNEP network laboratory. Accredited to EN ISO/IEC 17025
National Institute of Biological Resources (INRB)	Studies of organochlorine pesticides in aquatic ecosystems, including water, sediments and biota. PCBs	
	Measuring traces of organochlorine pesticides in food products.	Accredited to EN ISO/IEC 17025
	Search for organochlorine pesticides in food products	Accredited to EN ISO/IEC 17025
Hydrographical Institute	Measuring organochlorine pesticides and PCBs in water, sediments and biota.	
IAREN	Measuring organochlorine pesticides and PCBs in water.	Accredited to EN ISO/IEC 17025
CITEVE	Measuring organochlorine pesticides and PCBs in water.	Accredited to EN ISO/IEC 17025
EPAL	Measuring organochlorine pesticides and PCBs in water.	Accredited to EN ISO/IEC 17025
AEMITEQ	Measuring organochlorine pesticides in water, soil, sediments, sludge, and food products.	Accredited to EN ISO/IEC 17025
LABELEC	Measuring organochlorine pesticides in water, and PCBs in oils.	Accredited to EN ISO/IEC 17025
IDAD	Sampling of dioxins and furans, planer PCBs and hexachlorobenzene in flue gas emissions	Accredited to EN ISO/IEC 17025

Chapter 9 – Strategy and action plans of the NIPSCN

Policy Statement

Portugal, as a party to the Stockholm Convention and to the UNECE Protocol on POPs, is committed to the implementation and development of these two legally binding instruments.

The integration of policies is not only a condition for the success of environmental policies; it is also a condition for development.

If climate change and energy challenges provide an intersection for relevant environment sector policies, it also holds that for all sectors, from agriculture to forestry, fisheries to tourism, public transports to construction, environmental concerns are connected with development policies.

With regard to waste, Portugal assumes the paradigm of waste as a resource or source of value, prioritising the prevention of waste generation, promoting reuse and recycling, in particular through the promotion of technological innovation measures in order to prolong the use of materials in the economy before returning them in appropriate condition to the environment.

Portugal will available alternatives to landfill solutions for biological treatment of organic matter and energy recovery from non-recyclable materials with high calorific value. Portugal will pay particular attention to waste containing persistent organic pollutants.

Portugal will also increase the recovery of environmental liabilities; especially those associated with industrial sites or abandoned mining sites, mobilizing available Community funds and the recently created Environmental Intervention Fund.

Activities, strategies and action plans for pesticide POPs

Since there is no current production or expected future production of pesticide POPs, and considering that these have been long banned from marketing and use, and given the fact that the monitoring of food, humans and the environment, since 1966, consistently indicates the absence of significant levels of traces of pesticide POPs in foods of plant or animal origin, drinking water, environmental compartments (soil, water and sediment) and biota, it seems unnecessary to implement additional strategies and plans of action to control these pesticides.
However, it should be noted that under the "National Program for Control of Pesticide Residues in Products of Plant Origin", "National Program for Control of Pesticide Residues in Products of Animal Origin", "Program for Control of Drinking Water Quality" and programs established to fulfil the Water Law and the Marine Strategy Framework Directive, any anomalies found with respect to these chemicals may be identified and dealt with under these Plans/National Programs.
In accordance with legislation and the fact that these products are banned in Portugal since 1986, it is not expected that there are any pesticide POPs in storage.
For the same reasons, "stocks" of pesticide POPs are also not expected. Given this context, the existence of regulations, guidelines and proposals for measures to reduce risk are not justified.

Activities, strategies and action plans for unintentional POPs

Reduction Strategy for unintentional POPs

The ongoing objective of the Portuguese Government is to protect human health and the environment from risks caused by dioxins, PCBs and HCB and to reduce the total emissions from anthropogenic sources likely to release these compounds. In recent years, the Government has taken decisions to identify, determine and control the main sources of dioxins, PCBs and HCB, listed in the Stockholm Convention. The main identified sources, such as incinerators and industrial processes, have been controlled through new legislation.

Current emissions come predominantly from a large number of smaller diffuse sources. The inventory data for these diffuse sources have a high level of uncertainty and are difficult to identify, due to a lack of knowledge of the activities, range of conditions and nature of emissions. Additional studies are therefore needed to reduce current uncertainty, to identify and quantify emissions from diffuse sources, in order to provide more precise information about their contribution to the national inventory.

The Portuguese Environment Agency has published the National Methodology for the Register of Atmospheric Pollutant Emissions in order to improve the knowledge of various pollutant emissions.

Improving Source Inventories

Updating of the Atmospheric Emissions Inventory of Dioxins, PCBs, and HCB

The dioxins and PCBs emissions inventory is updated on a yearly basis.

Strategy to Reduce Human Exposure to Dioxins, PCBs and HCB through Food

Entities subordinate to the Ministry of Agriculture, Rural Development and Fisheries carry out various monitoring activities on dioxins and furans, and PCBs in the form of dioxins, in food and animal feed.

The latest Regulation (EC Regulation 199/2006) which entered into force in 2006, sets maximum levels for certain contaminants, including dioxins and furans, and PCBs in the form of dioxins, in foodstuff.

Similarly, Directive 2006/12/EC of 3 February sets relative maximum levels for those pollutants in products used to produce animal feed.

Thus, producers of foodstuffs and animal feed will be encouraged to market products with reduced contamination and, consequently, human exposure to dioxins and furans and PCBs will be reduced.

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