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Environmental conflicts in transforming economies: Central and Eastern Europe

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3.1 Introduction

The former communist states of Central and Eastern Europe (see Box 1) are currently undergoing a process of transformation, from authoritarian, planned economies to democratic market economies. One of the burdens of the past in this part of Europe is excessive damage to the environment. This chapter relates these environmental problems to the ideological, economic and political characteristics of the former societal system in this part of Europe. Another main theme is the environmental consequences of the current transformation from a planned to a market economy. The intention will be to show that environmental problems in Central and Eastern Europe have their origins in both the nature of the political system and the level of economic development.

The chapter begins with a overview of three different types of environmental problems in Central and Eastern Europe: air pollution, nuclear disasters and hazardous waste. A feature which they all have in common is their international dimension (section 3.2). I shall then look at the main characteristics of the former communist states, compare Eastern and Western economies, and discuss the transformation of the former communist states (section 3.3). I shall go on to outline the conflicts of interest involved in the process of international co-operation on environmental issues (section 3.4) and subsequently examine environmental policies in the post-communist era (section 3.5). The chapter will finish with some concluding remarks (section 3.6).

3.2 Current environmental problems in the region

Publications on Central and Eastern Europe give numerous examples of excessive forms of environmental pollution and of wastage of materials and energy. Yet the environment is not in a poor condition in all parts of Central and Eastern Europe. There

Central and Eastern Europe

The terms *Central* and *Eastern* Europe will crop up frequently in this chapter. The term *Eastern Europe* is often used in the literature to refer to the former communist countries in Europe. However, it seems odd to refer to the very small part of Europe that lies West of the former Iron Curtain as 'Western Europe' and to use the term 'Eastern Europe' to refer to the immense area between Germany and Asiatic Russia. Moreover, people in countries like the Czech Republic, Hungary and Poland consider their country as belonging to Central Europe and not to Eastern Europe. We shall endeavour to respect this preference. Although there is no state border between the two, we will use the term *Central and Eastern Europe* to designate the area in question. The Eastern border of Europe is formed by the Ural mountains. Again, there is no legally recognised, formal boundary. The former Soviet republics of Ukraine, Belarus and Moldova, together with the Baltic republics of Estonia, Latvia and Lithuania, became independent countries within Europe after the break-up of the Soviet Union. Russia itself, consists of a European part, west of the Ural mountains, and an Asiatic part stretching out as far as the Pacific coast. Forms of environmental damage which have affected the Asiatic part of the Russian Federation will also be discussed in this chapter. The Caucasus forms the geographical and legal boundary between Russia and the republics of Georgia and Azerbaijan. Together with Armenia, these republics are sometimes considered as European and sometimes as Asian. For the purpose of this chapter, they will be considered as being part of Europe.

are large areas in countries like Poland and Russia which have been virtually untouched by human activities (see Box 2).

However, there are many *hot spots* of extreme forms of environmental pollution, nuclear risk and landscape destruction too. The *Environmental Action Programme for Central and Eastern Europe* distinguishes regional and local hot spots. The 'Black Triangle', the heavily polluted area on the borders of the Czech Republic, Germany and Poland, is one of these regional hot spots. Local hot spots are often to be found in places where lignite power plants and metal smelters are located. The town of Copsa Mica in Rumania is an apt example of a local hot spot. As a consequence of the presence of dust and gases, significant losses of lung function were found among children in this city. In the same sample of children 73% recorded either 'weak or very weak' scores in an IQ test, although only 30% would be expected to do so under normal circumstances. This extremely low score was ascribed to high lead exposures affecting neurobehavioural responses (Environmental Action Programme for Central and Eastern Europe, 1993, pp.II-7.).

This section, however, will not focus on local and regional hot spots; rather, it will present three environmental problems with a decidedly international dimension: air pollution, nuclear disasters and hazardous waste. The international effects of air pollution in the Black Triangle are evident, not only for the countries of Central and Eastern Europe but for the entire European continent. Without doubt, the nuclear disasters in Central and Eastern Europe have had a negative impact on an international,

perhaps even global, scale. Finally, the transport of hazardous waste from Western European countries to Central and Eastern Europe is a clear illustration of the international dimension surrounding many contemporary environmental problems.

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Poland's natural treasures

If one were to rely solely on statistical data describing the state of the environment in Poland, one would expect to find nothing more than a biological desert between the Oder,Vistula and Bug rivers. A glance at locally produced information leaflets advertising Polish treasures of nature (which are gloomy, greyish and far from paragons of the art of printing) would actually tend to confirm that impression. Nevertheless, in spite of the news about environmental disasters and the clumsily produced leaflets, the reality of the natural world of present-day Poland is surprisingly rich, beautiful and versatile. One might even go so far as to claim that Poland, with its beauty, uniqueness and rare specimens of fauna and flora, is a natural treasure house of European and even global significance.

According to the latest *Report on the State and Protection of the Environment and on Environmental hazards* (1990), an annual publication of the Chief Statistical Bureau, 5.5 million hectares of land, comprising about 18% of the total area of the country, were under various forms of protection in 1989. This is about five times more than in 1980.

Source: Ministry of Environmental Protection, Natural Resources and Forestry (1991), pp.28–29.

Air pollution: the Black Triangle

Air pollution has for many centuries been recognised as a source of nuisance. In the recent past, air pollution in Western Europe has changed from being primarily a health problem in the 1970s (caused partly by sulphur dioxide (SO_2) emissions), to an acidification problem in the 1980s (caused by sulphur dioxide, nitrogen oxides (NO_x) and ammonia (NH_3) emissions) and finally to a climate change problem in the 1990s (caused mainly by carbon dioxide (CO_2) emissions).

Compared with the situation in Western Europe, sulphur dioxide emissions are still high in Central and Eastern Europe. Air pollution, and in particular air pollution caused by SO_2 and dust emissions, is extremely high in the Black Triangle. The unfavourable natural conditions in the Black Triangle exacerbate air pollution. Western winds transport air pollutants from abroad, while the Giant Mountains of Northern Bohemia and Southern Silesia form a natural barrier, hindering the eastward transportation of locally generated air pollution (Knook, 1991, p.711). The local causes of air pollution are the concentration of electricity production and heavy industry in this area, the use of locally mined and extremely sulphur-rich lignite and brown coal and the use of technologies which are outdated by Western standards. A recent Polish report states that 'the situation within the Upper Silesian region is reminiscent of what prevailed 30 or 40 years ago in the Ruhr Basin in Germany, or the Pittsburgh area (United States),

or in the English or Belgian coal mining districts' (Nowicki, 1992, p.13). Sulphur-rich coal is also one of the main sources of energy for household heating.

Concentrations of sulphur dioxide in the Black Triangle regularly exceed standards for maximum admissible concentrations. A Czech state report concludes from long-term measurements in Northern Bohemia that situations often occur more or less throughout the area in which the maximum admissible concentrations of 150 micrograms of SO_2 per m^3 are exceeded. The citizens of Chomutov can actually expect this critical value to be exceeded 117 days a year (Ministry of the Environment of the Czech Republic, 1990, p.122). There are many indications that air pollution contributes to the poor health of the population of this area (see Box 3).

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Air pollution and health effects in the Black Triangle

Median life expectancy in Poland (67 years for men and 75 years for women) is low compared with Western European countries. In Silesia, life expectancy is at least one year shorter and infant mortality and premature childbirth are extremely high (Ministry of Environmental Protection, Natural Resources and Forestry, 1991, p.36). Although it is not clear to what extent air pollution in general and SO_2 pollution in particular contribute to the poor health of the local population, it is highly probable that SO_2 emissions do play a role.

In the Czech Republic, the lifespans for both men and women vary from 70.3 to 70.5 years. In Northern Bohemia, however, the average life span for men is 2.5–3 years shorter than in the rest of the Czech Republic (for women it is 1.5–2 years shorter) (Krivsky, 1991, p.18).

A study of the former German Democratic Republic (GDR) reports that, in areas with extreme SO_2 pollution, the prevalence of respiratory diseases doubled in the period from 1970 to 1989, although the number of children declined. In Saxony, respiratory diseases have been diagnosed among 50% of the children. Thirty per cent of the children in the extremely polluted areas suffer from eczema (Metz *et al.*, 1991, p.84).

Besides health effects, air pollution has damaging effects on natural features and buildings. In virtually no other region is the damage to the forests as visible as in the mountainous frontier area between the former German Democratic Republic and the Czech Republic. Air pollution is also damaging the historical monuments of the ancient city of Cracow (Poland) and is having a detrimental effect on agricultural production.

The combination of economic activities (i.e. the concentration of mining, electricity production and heavy industry) and physical conditions (i.e. mountains as barriers to the Western winds) in an area which overlaps three different countries makes the Black Triangle a typical example of an international environmental problem. The widespread long-range transport of air pollutants from this area into other parts of Europe has resulted in a further widening of the international dimension.

Nuclear disasters

The 4 November 1976 edition of *The New Scientist*, a popular British scientific journal, contained an article written by a Russian immigrant, a natural scientist called Zhores A. Medvedev. The article mentioned a nuclear disaster which hardly anyone had known about until then. It was supposed to have happened in the Urals in 1957 or 1958 and to have been caused by the discharge of an enormous quantity of radioactive waste (which had been stored underground) into the atmosphere. As a consequence, more than 1000 square kilometres in the Southern Urals had been contaminated, several hundred people had died and thousands of people had been evacuated and hospitalised. A large area would remain a danger zone for decades (Medvedev, 1980, p.4).

The story of this nuclear accident was either dismissed out of hand as pure science fiction or reinterpreted as being about a nuclear reactor blast, rather than an explosion of buried atomic waste. It was not until 1989, more than 30 years after the accident, that the Soviet government admitted that a tank of radioactive waste had indeed exploded at a weapons plant near Chelyabinsk on 29 September 1957. It is now estimated that 271,000 people were exposed to the radioactive cloud that was formed by the explosion.

Today, we know much more about radioactive contamination in this former 'closed' area of the Soviet military industrial complex. In 1947, ten years before the accident described above, nuclear waste was dumped in the Techa river. The dumping continued for several years. It is estimated that, as a consequence, 124,000 people were exposed to radiation (Monroe, 1992, pp.534–6). Less is known of the contaminating effects of several reservoirs containing radioactive waste. On 22 November 1990, the Russian government declared the Chelyabinsk district an ecological disaster zone. The nuclear disaster at Chelyabinsk was, unfortunately, not an isolated event. It paled into insignificance in 1986, when the Chernobyl catastrophe took place.

In the early morning of 26 April 1986, an explosion took place in reactor 4 of the nuclear power plant at Chernobyl, in the Soviet Republic of the Ukraine. Radioactive materials and gases were blown into the atmosphere, forming a plume which moved in a North-westerly direction. What is at present known as the Soviet Republic of Belarus being directly in the path of the plume, was affected even more than the Ukraine by the catastrophe at Chernobyl (see Box 4). The ecological, economic and socio-psychological damage caused by the Chernobyl accident can hardly be overestimated. People will suffer from its consequences for decades, if not centuries to come.

There was no way of maintaining secrecy about the Chernobyl catastrophe, if only because its consequences were felt abroad. On 28 April, 53 hours after the accident, the radioactive plume was detected at the nuclear power plant at Forsmark in Sweden. It was later found that 170,000 reindeer in the Swedish part of Lapland had been seriously contaminated as a consequence of the Chernobyl accident. Fall-out from Chernobyl was registered in every country of the Northern hemisphere (Medvedev, 1990a, pp.194–220). Although the era of *perestroika* and *glasnost* had started a year before with the appointment of Mikhail Gorbachev as Secretary-General of the

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Consequences of the Chernobyl disaster in the Soviet Republic of Belarus

In Belarus alone, 257,000 hectares of agricultural land and 1.34 million hectares of forest were taken out of production (Marples, 1992, p.423). Hundreds of thousands of people had to be removed as a consequence of the catastrophe. The official number of human fatalities caused by the accident is 31. Unofficial sources, however, have estimated the death toll at between 6000 and 7000. There has been a sharp rise in recent years in the number of new cases of thyroid cancer, particularly in Belarus.

Region of Belarus	1986	1987	1988	1989	1990	1991	1992	Total
Brest	0	0	1	1	6	5	5	18
Vitebsk	0	0	0	0	1	3	0	4
Gomel	1	2	1	2	14	38	13	71
Grodno	1	1	1	2	0	2	6	13
Minsk	0	1	1	1	1	4	4	12
Mogilev	0	0	0	0	2	1	1	4
Minsk city	0	0	1	0	5	2	1	9
Total	2	4	5	6	29	55	30	131

The sharp rise in the number of new cases of thyroid cancer is generally regarded as being a consequence of the spread of radioactive iodine during the first eight days after the catastrophe. However, it will remain uncertain for decades as to whether people suffering from cancer are victims of the Chernobyl catastrophe. Illustrative of the uncertainties regarding the impact on human health is the situation among immigrants from Belarus, Russia and the Ukraine in Israel. They formed the association 'SOS Chernobyl'. According to this association 100,000 'victims of Chernobyl' arrived in Israel between 1990 and 1992. They are dissatisfied by what they consider a lack of concern for their medical problems by the Israeli authorities (Chernobyl Conference, 1992, p.21). As in the former Soviet republics it is not possible to determine how far health problems can be ascribed to the direct radiation effects, the indirect effects of the catastrophe disrupting living and working circumstances, other forms of environmental pollution or the disintegration of the former Soviet Union and its republics.

Uncertainty is also a consequence of suddenly heightened levels of radiation at unexpected times and places, caused by the Chernobyl accident. To give just one example, on 9 February 1991, Izvestia informed its readers that heightened levels of radiation had been registered as a consequence of the Chernobyl accident in the famous seaside resort of Sotsji on the border of the Black Sea. Radioactive particles were said to have been transported by rain.

communist party of the Soviet Union, information about the nature and impact of the Chernobyl catastrophe came late and remained limited. (See also Liberatore, 1995, in book one of this series, who discusses the responses made by different countries to the Chernobyl accident.)

Hazardous waste

In general, there are no vested interests involved in receiving polluted air or radioactive fallout from neighbouring countries. However, the same cannot be said of the receipt of waste from abroad. Waste may be imported legally or illegally, with or without the consent of the authorities of the receiving countries. I will not discuss waste in general, but focus on hazardous waste (including waste in liquid form) in particular. The term 'hazardous waste' covers both toxic chemicals and radioactive substances though usually they are treated as quite separate categories. Radioactive substances are subject to different regulatory processes. Hazardous and radioactive wastes are the subject of Chapter 6 in this book.

The implementation of legislation in Western countries on the processing or disposition of hazardous waste has led to steep rises in handling costs. To avoid these costs, hazardous waste came to be exported to countries where costs are lower. Since the revolutions of 1989, Eastern European countries have become a favourite destination for hazardous waste from Western countries. In fact, the transportation of hazardous waste to this area actually started earlier than 1989. The former German Democratic Republic (GDR), Poland and Rumania are among the countries to which hazardous waste from Western Europe has been (and indeed still is) transported.

Since 1979, different types of waste, including hazardous waste from Austria, Belgium, Italy, The Netherlands, Switzerland and West Germany, have been dumped at a landfill site in Schoenberg in the former GDR, near the West German town of Lubeck (Vallette and Spalding, 1990, p.218). Schoenberg is an important though not the only dumping site for hazardous waste of Western origin. Since 1982, when exports to Schoenberg started, more than half a million tonnes of hazardous waste of Dutch origin have been dumped in Schoenberg. The treatment of hazardous waste in The Netherlands would cost ten times as much as the costs of dumping it in Schoenberg (Ouwendijk and Musse, personal communication). In some cases, exports of hazardous waste from The Netherlands to Schoenberg have been stopped as a result of combined protests by German and Dutch pressure groups. However, incidental successes have not put a complete halt to the exports of hazardous waste to Schoenberg and other dumping sites in the former GDR.

Even before the fall of the communist regime, the Polish government tried to limit imports of hazardous waste from abroad. A ban on imports of hazardous waste has been in force since 1989. In that year, a new article was added to the Environmental Protection Act, under which illegal importers of toxic waste faced the prospect of imprisonment. Bernstorff and Puckett claim that what they call 'the vague definition of what constitutes hazardous waste' is one of the biggest problem, in preventing the export of hazardous waste. As they see it:

> When a waste is imported with a recycling pretext or destination, Polish law can allow its importation. This provides an extremely dangerous loophole as nothing, even with the best intentions, can ever be 100% recycled, and most often, vast quantities of hazardous residues will continue to be dumped in Poland. In addition, the new joint ventures with Western companies often make it difficult to decide whether the material crossing the borders of this large country is a raw material or a hazardous waste (Bernstorff and Puckett, 1992, p.35) (see Box 5).

Waste imports in Poland

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The Poles were swiftly 'rewarded' once they opened their borders to industrial companies from the West. The preliminary findings of research conducted by Greenpeace indicate that 22 million tonnes of toxic waste have been offered to Poland during the period since 1989. Of that total, over 46,000 tonnes of toxic waste have actually crossed the open borders from countries like Germany, Austria and Sweden.

At least 72 foreign firms, disposers and brokers have been involved in 64 waste trade schemes with 13 countries. Half of the schemes originated in former West Germany. Complete plants for incinerating waste and 'recycling' used oil have even been offered free, on condition that the plant accepts imports and the residues from these processes necessarily remain in Poland.

Recycling and re-use are often used as pretexts for waste imports. In fact, of those waste schemes where the destination is indicated, 62% claim some form of re-use as a pretext.

Source: Bernstorff and Puckett (1992), p.3.

Notwithstanding the political loopholes, another Greenpeace report concludes that the Polish government had the problem of toxic waste import 'by and large' under control by 1991 (Bernstorff and Totten, 1992, p.5). As a consequence, other countries became targets for waste exports. One of them was Rumania. As in the former GDR in the communist era, the political establishment had vested interests in the import of hazardous waste. A number of officers belonging to the Rumanian Secret Service, the *Securitate*, who also held posts as managers of foreign trade firms, were among the importers involved in these deals (Bernstorff and Totten, 1992, p.9). The post-Ceaucescu regime was overwhelmed by proposals for waste imports from Western companies, often combined with offers to build waste incineration plants. According to Bernstorff and Totten (1992, p.12):

> Within a mere three months after Bleahu [the Minister of the Environment] had taken office, i.e. between October 1991 and January 1992, about 30 waste import proposals had crossed the Minister's desk. Along with several French, Dutch and US projects, the majority of offers were from German, Austrian and Italian companies and involved the construction of waste incinerators free of charge. During their first 10 to 15 years in operation, at least 50% to 60% of the total volume burned in these facilities was to consist of imported wastes. The incinerators were then to be turned over to Rumanian ownership.

One of the reasons why exports from Western European countries to Central and Eastern Europe are able to continue is the conflict of interests between the environmental and trade policies of the European Union. On the one hand, EU member states are encouraged to manage waste as closely as possible to the place where it is generated. On the other hand, waste is considered to be a commodity like any other commodity, whence it should be traded freely unhindered by national borders (Bernstorff and Puckett, 1992, p.38).

3.3 Environmental deterioration and communism

Communism and the exploitation of Nature

The cases of (extreme) environmental damage described above may be considered as symptoms of the damaging effect of the former communist regimes in the states of Central and Eastern Europe (see Box 6). This is without denying the environmental damage caused by other types of societies in other parts of the world. It also needs to be recognised that, during the communist regime, the countries of Central and Eastern Europe were undergoing rapid modernisation through industrialisation, a process which elsewhere has usually been accompanied by exploitation of natural resources and degradation of the environment. Three aspects are particularly important in order to understand the negative impact which communism has had on the environment: ideology, the economic system and the political system.

As regards the role of *ideology*, Marxism, the ideological foundation of the former communist regimes in Central and Eastern Europe, is an example of Western belief in progress by means of the exploitation of Nature. During the Stalinist period, Nature

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Economic and health effects of environmental problems

The main differences between the forms of environmental damage as they occur in Central and Eastern Europe and those which are seen in Western Europe relate to their economic and health effects.

It is clear that some forms of environmental damage in Central and Eastern Europe have an excessive economic impact. In the Chernobyl case in particular, enormous areas of land had to be taken out of production and new housing facilities had to be found or constructed for thousands of people. This case is not the only example of great economic losses as a consequence of environmental deterioration. It has been estimated that, out of the 605 million hectares of land in the former Soviet Union which are available for agricultural production, 157 million hectares have been severely damaged by salination (Yablokov, 1990, p.4). This is one of the reasons for the dependence on imports of grain for the domestic food supply.

Whereas it is seldom possible to prove the existence of any relation in Western countries between environmental decay and negative health trends, Central and Eastern Europe offer an overwhelming list of examples of such relations:

- Overexposure to lead among children (at 37 locations in seven countries).
- Acute (short-term) respiratory/irritant conditions (at 46 locations in ten countries).
- Chronic respiratory conditions (at 29 locations in nine countries).
- Excessive infant and lung cancer mortality (at eight locations in three countries).
- Abnormal physiological development (at 18 locations in seven countries).
- Waterborne methaemoglobinaemia (widespread in six countries).

Source: Environmental Action Programme for Central and Eastern Europe (1993), p.II:20–21.

was considered as an obstacle to further progress (Weiner, 1984, p.75). Scientific disciplines like genetics and ecology, which showed either the limited opportunities available to human beings for changing Nature or the damaging effects which human activities could have on the natural environment, were condemned as bourgeois and counter-revolutionary. Scientists working in these fields, and in genetics in particular, were dismissed, arrested and liquidated. Great projects were started which were aimed at transforming or correcting what were called 'mistakes of Nature'. The term *voluntarism* is often used to refer to the arbitrary and frequently impulsive manner in which sweeping changes in natural conditions were pursued, without any thought being given to the real possibilities for change and the damaging effects which such changes could have. One example of such a large-scale project is the attempt to change the direction of flow of certain stretches of rivers in Siberia and the European part of Russia from northwards to southwards to promote large-scale irrigation and hydro-power projects. The plan was abandoned in 1986.

Planned economies tended to underestimate the value of natural resources, as, parenthetically, market economies still do too. Planned economies, however, had a more severe impact on the environment than market economies as they were more extreme in their denial of value to Nature. According to Marx's theory of the value of labour, natural resources have only a *use value* and not the *exchange value* that market economies attribute to them. Unlike use values, exchange values are expressed in prices. Exchange values derive from the human labour which is invested in a resource's production. So scarcity of a resource, for instance, is reflected in its price. On the other hand, the free, unpriced availability of natural resources (their having a use value only) is considered as an essential feature of a socialist economy. Today, it is often cited as a cause of waste. Prime examples of this are the tendency constantly to shift mining activities in order to obtain easily accessible minerals without being hampered by financial barriers; the excessive irrigation of agricultural land as a result of the free distribution of water; and the quantities of materials and energy which are used in industrial production, which are relatively large by Western standards.

In centrally planned economies, furthermore, planning targets were often formulated in physical terms, such as the quantity of material inputs. Producers were therefore encouraged to use large quantities of materials. For many years, the absurd effects of the physical planning targets were featured not only in Western publications, but also in the Soviet press (Tellegen, 1986). As a consequence of the use of physical planning indicators, it was sometimes the case that only large saucepans or thick sheets of paper were available to consumers, as producing small saucepans and thin sheets of paper would require more time and effort in order to meet the same planning targets. Planning targets were generally unrelated to consumer needs. As a consequence, there were both shortages and surpluses of consumer goods.

The final aspect that affords an understanding of why communism had such an impact on the environment is the particular *political system* of these countries. Environmental problems may be conceived of as the 'external' effects of activities undertaken by widely different types of institutions. In general, these activities cannot be stopped, but need to be moderated or changed in order to avoid environmental damage. One cannot simply cease all industrial production, motorised

transport or housing but one may limit them, at least in certain areas, or change them. Outward *countervailing power* is necessary in general in order to change the behaviour of institutions and thus to prevent or limit environmental damage. In the political system of the former communist states, countervailing power was weakly developed. The veil of secrecy in which the Chernobyl disaster and other nuclear accidents were shrouded is a typical example of a political strategy that is designed to avert countervailing power. Although there were certain institutional divisions between the government and the communist party, these did not generate any countervailing power such as would have prevented government decisions from having any damaging environmental effects. Environmental control was integrated within the ministries for different branches of industry whose prime task was the fulfilment of planning targets. In the national report to the UNCED Conference in 1992, this situation was described as follows: 'One of the principal drawbacks of that system in state management of the use of nature and environmental protection was that those functions were distributed among numerous ministries and departments, mostly working in the economy, which means they themselves were users of natural resources. In conditions where openness (glasnost) was a foreign term,

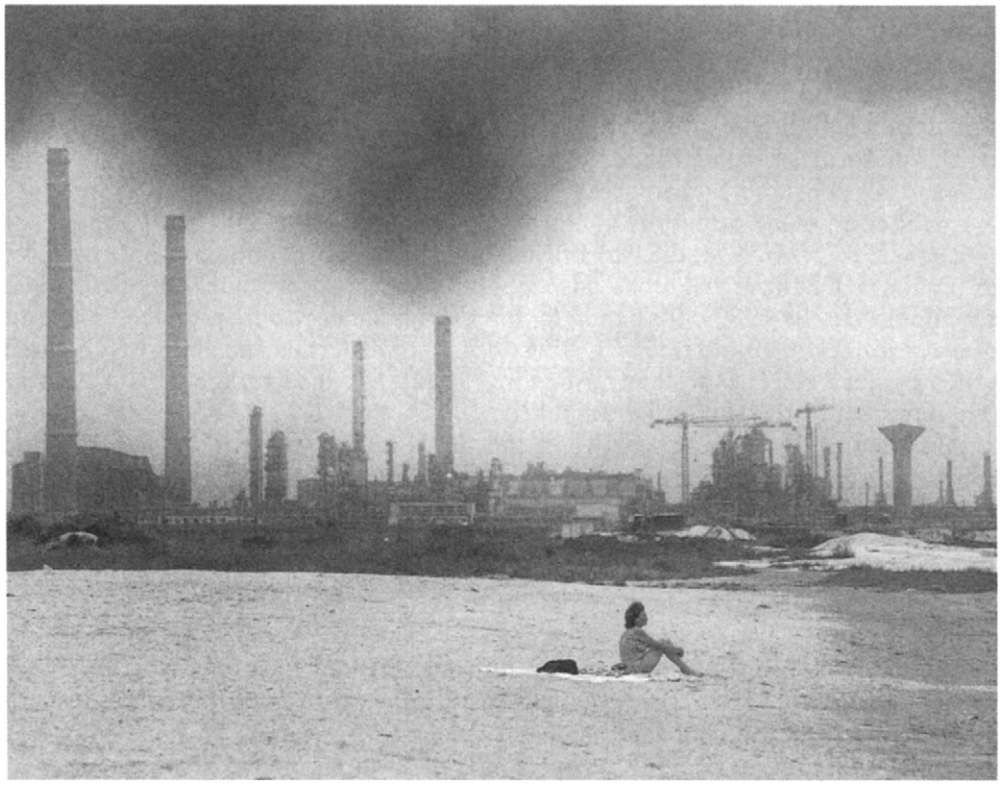

Plate 3.1 Woman sitting on the beach at a Black Sea resort near Constanta, Romania. Photo: Sean Sprague/Lineair

such a system could not be efficient, as outside supervision over their own influence over the state of the natural environment and resources was actually ruled out' (Ministry of Ecology and Natural Resources of the Russian Federation, 1992, p.61).

There was little scope for environmental protest by individual citizens or organised pressure groups. Environmental protest was also hindered by the strong local power of industrial enterprises. Not only did they provide jobs, but they also supplied housing and even built and operated cultural and recreational facilities.

A comparison of Eastern and Western economies

Both planned and market economies have common roots in Western culture as it has developed in Europe over the past few centuries. Their common weakness is a tendency to undervalue freely available natural resources in the form of materials, energy, plants, animals, ecosystems and clean soil, water and air. This weakness, however, is more characteristic of planned than of market economies.

In the former planned economies, prices played a minor role in the supply of material inputs to industrial enterprises. There was a tendency to keep large quantities of materials in stock in order to avoid future scarcity. Yet resource scarcity is a semi-permanent phenomenon in a planned economy. Kornai argues that the pure type of socialist economy is a *resource-constrained system*, where production is limited by the scarcity of resources. On the other hand, capitalism in its classic form is a *demand-constrained system*. Here, production is limited by the demands of consumers (Kornai, 1979, p.804). In the socialist economies, producers paid little or no attention to consumers' preference. Even before the era of *glasnost* and *perestroika*, the lack of financial stimuli to encourage people to make rational use of natural resources was recognised as a basic weakness of the planned economies. In the 1980s, for example, the Hungarian economy produced one unit of *gross domestic product* (GDP) using 40% more materials and energy (e.g. three times as much steel) as well as 50% more capital than the average OECD country (Government of the Hungarian Republic, 1991).

An important difference between the development of market and planned economies may be seen in the development of the price of energy. In the market economies, the two oil crises which occurred in 1973 and 1979 led to a sharp increase in energy prices. Planned economies were protected from this type of resource constraint. As a consequence, the sharp reduction in the energy intensity of production that took place in the West was not mirrored in the communist countries.

The difference in industrial energy use between the East and West is also a matter of difference in energy efficiency resulting, in part, from the different stage of economic development that has been reached. In general, Western countries need less energy than Eastern European countries to produce a given quantity of products. A well-known example is the production of steel. In 1980, Japan used 18.8 gigajoules to produce one tonne of steel, the United States 23.9 and the Soviet Union 31.0 (Chandler, 1985, p.12). The difference between Eastern European

countries and OECD countries is not only caused by differences in energy efficiency, however. Another relevant development is the declining share of industrial production accounted for by various energy-intensive (and polluting) branches of industry, such as steel, concrete and fertiliser production. This is another area in which the OECD countries have left the Eastern European countries far behind (Janicke *et al.*, 1992). Nonetheless, the situation in terms of energy use in other sectors of society, in particular housing and transport, is quite different (Box 7).

In summary, we may conclude that, whereas in the former planned economies productive activities were major contributors to environmental pollution, in the market economies consumption patterns in fields such as housing and transport are important causes of environmental damage, with energy use providing a good indicator. Whereas environmental problems in the planned economies were often

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Energy use in OECD countries and Central and Eastern Europe

Energy use and production

Between 1970 and 1990, the average annual growth in energy use was 1.3% in the Western OECD countries and 2.4% in the former states of the Eastern bloc. The main cause of this difference between the market and planned economies lies in the development of industrial production. Between 1970 and 1988, industrial energy use in OECD countries fluctuated around a stable level, whereas it rose sharply in the USSR and other Eastern European countries.

In the OECD countries, the share of manufacturing in total final energy use declined from 36% to 27% between 1973 and 1988. In the USSR, the share of final energy use accounted for by manufacturing industry was still 55% in 1985.

Energy use and consumption

Despite the cold climate in Eastern Europe, there is no great difference between OECD countries and the former Soviet Union in terms of the share accounted for by the residential sector in energy use: in both cases, it is approximately 20%. In the former Eastern bloc countries, the efficiency of energy use, in relation to both space heating and water heating as well as to consumption by electric appliances, was traditionally low and, unlike the OECD countries, it remained low in the 1970s and 1980s. However, people in Eastern Europe have far less energy-consuming residential space and fewer appliances at their disposal and this limits household energy use.

The share of passenger travel in energy use in OECD countries increased from 19% to 22% between 1973 and 1988, whilst in the USSR it was not more than 5% of final energy use, even in 1985. In personal traffic, energy intensity is lower in the East than in the West, because of the larger share of railway traffic and the smaller share of motor cars. Compared with Western Europe, the level of per capita travel is also low, even in the former Soviet Union with its large distances.

Source: Schipper and Meyers (1992), pp.73, 78, 79 and 130.

caused by the over-exploitation of natural resources and excessive quantities of pollution per unit of GDP, the environmental problems in the market economies are much more a factor of the continuing growth of consumption. In other words, the resource-constrained, planned economies of the East in fact generate environmental problems by their excessive use of natural resources per unit of GDP, whilst the demand-constrained economies of the West cause environmental problems by their ever-growing consumption.

The transformation of the former communist states

The communist regimes did not, it should be said, completely ignore all environmental problems. Some forms of environmental degradation were discussed in the scientific press and sometimes even in the popular press. One example is the pollution of Lake Baikal, which has been the object of regular criticism in the Soviet press ever since the 1960s. Indeed, the Soviet Union was one of the first countries to formulate environmental quality standards, which were in fact stricter than those later formulated in the United States. Environmental legislation and environmental inspections were developed. Natural areas were protected by awarding them the status of nature reserve. Progress was made in some areas, in particular in the reduction of surface water pollution (see Box 8).

Progress in environmental policies did not prevent excessive forms of environmental destruction, though. In official publications, environmental pollution was referred to as a form of *wastage*. Even before Gorbachev came to power, there had already been criticism of the excessive use of materials and energy in Soviet manufacturing industry as compared with the West. As early as 3 June 1981, a decision was taken by the Central Committee of the communist party and the Council of Ministers of the Soviet Union to step up efforts to save and make rational use of raw materials, energy and other material resources. This decision was later confirmed in other public statements and

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Water management in the Soviet Union

There is evidence that the authorities began to pay serious attention to the Soviet Union's mounting water pollution problem during the 1970s and 1980s. The purification and re-use of water became common practice in industry. By 1990, 72.5% of the country's industrial water needs were met from this source, compared with a 56.9% recycling rate in 1976. Whilst only 63% of sewage and industrial waste water was purified in 1979, that figure had risen to 77% by 1990. Despite such progress, the lag in constructing new facilities and the introduction of more stringent water quality requirements meant that only 30% of the water treated in 1990 actually met the government standards set at the time. Indeed, there were definite signs of regression during the late 1980s. There was again an increase in polluted discharges into natural hydrosystems and a considerable reduction in the rate of construction of treatment facilities.

Source: Golitsyn (1992).

decisions (Tellegen, 1989, p.148). Economic stagnation and environmental damage were considered to be caused by the same factor: wastage.

As a consequence of the policy of *glasnost* in the Soviet Union and comparable developments in other Eastern European states, environmental issues were not only discussed more openly than before but were also presented in a different context. Instead of being regarded as symptoms of wastage, they were now considered as symptoms of *exploitation* by the central authorities, in particular the central government in Moscow.

Environmental pressure groups were very successful in the Soviet Union after 1985. An extremely important success was the cancellation of the project which had been designed to alter the direction of flow in a number of rivers (see 3.3: Communism and the exploitation of Nature). Various forms of action aimed at industrial enterprises also proved to be highly effective. Many polluting factories had to stop production for a period of time and in some cases there were lengthy shutdowns. The planning and construction of many nuclear power plants was halted after the Chernobyl accident.

Environmental issues played a major role in the fall of communist regimes outside the Soviet Union and the struggle for independence of the Soviet republics. In Poland, the Polish Ecological Club was founded together with the Solidarnoz trade union in 1980. In Hungary, the protest against the canalisation of the Danube, led by an action group called the Danube Circle, played a key role in the process of political change. In Bulgaria, the Ecoglasnost pressure group was one of the driving forces behind the takeover of power from the communists. In Estonia, the campaign for national independence began with protests against a new phosphorus mining project, which was considered to be of no interest to Estonia, actually damaging to its natural features and leading to changes in the groundwater level in a large part of the republic. In Armenia, protests against pollution caused by chemical plants marked the beginning of the struggle for independence. This revolutionary period is now undoubtedly a thing of the past.

3.4 Co-operation and common problem solving: conflicts of interest

Environmental problems, particularly international environmental problems, can only be solved through co-operation between the parties involved. However, the kind of co-operation needed depends on the problem at hand. There is thus a vast difference between co-operation needed to solve problems which are caused and felt in both Eastern and Western Europe and that required to solve problems which are caused in one part of Europe but which have an impact in another part of the continent. Also, co-operation may misleadingly suggest the existence of only common interests. We will see there are also conflicts of interest, particularly where one part of Europe has to be protected against another. This applies not only to Eastern and Western Europe in general but also to individual countries within Eastern and Western Europe which are involved in East–West environmental contacts.

I shall now discuss three types of environmental co-operation between Eastern and Western Europe: solving common problems, protecting the East against the West and, finally, protecting the West against the East.

Air pollution: a common interest of East and West

Some transboundary environmental problems are caused in both Eastern and Western Europe and felt in both Eastern and Western Europe. Air pollution and water pollution, for example, do not stop at the border between Eastern and Western Europe, they migrate in either direction. Because of their uniformity they require common problem solving, that is, they can only be solved when both parties take action. By way of an example, I shall discuss some forms of air pollution.

Polluted air is transported hundreds and sometimes thousands of kilometres by the wind, crossing many national borders. There are, however, great differences between countries in the extent of their contribution to and suffering from transboundary air pollution (see Box 9).

The reduction of air pollution has long been recognised as a common interest of Eastern and Western European countries, even though some countries suffer more from transboundary air pollution than others. Both natural conditions (in particular prevailing wind directions) and economic activities in neighbouring countries (such as energy production and other industrial activities) may contribute to these differences. Among the European countries, Russia is a net importer of air pollution, most of which originates from other members of the former Eastern bloc.

In 1979, negotiations within the framework of the *Economic Commission for Europe* (ECE) of the United Nations led to the adoption of the *Convention on Long Range Transboundary Air Pollution* (LRTAP). This convention was ratified by 32 countries in Eastern and Western Europe and Northern America (the United States and Canada). Even before 1979, the ECE had already initiated the development of a programme for monitoring and measuring transboundary air pollution, called EMEP. Under the umbrella of EMEP, Monitoring Synthesising Centres were founded near Moscow (known as MSC East) and Oslo (known as MSC West). Scientific research was concentrated in IIASA in Laxemburg (near Vienna), where the RAINS model was developed (see Box 10).

Within the framework of the LRTAP convention, various protocols were signed on different air pollutants. In 1985, 18 countries signed the Helsinki Protocol and thereby committed themselves to reducing SO_2 emissions by 30% by 1993, as compared with the level of emissions in 1980. Under the 1988 Sofia Protocol, the signatories are committed to stabilising NO_x emissions to 1987 levels by the year 1994. A third protocol, signed in Geneva in 1991, aims to limit emissions of volatile organic compounds (VOCs) in 1999 to a level 30% below that applying in 1988 (Hordijk, 1991; OECD, 1993, pp.179–81). All the Western countries and most of the Eastern European countries had reached the 30% reduction target in 1993. Many Western countries achieved a much larger reduction in SO_2 emissions.

In 1993, the member states of the LRTAP agreed upon a new SO_2 reduction plan. The new plan is not *emission orientated* but *effect orientated*. In other words, the aim is no longer to achieve equal reductions in emissions in all member states, but to reduce local depositions as far as is necessary not to surpass *critical loads*. The concept of a critical load has been defined as 'a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified elements of the environment do not occur according to present knowledge' (Amann *et al.*, 1992,

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Transboundary air pollution in Europe

The long-range transport of sulphur dioxide in Europe has been well documented since the 1970s. It has more recently been ascertained that other contaminants, such as nitrogen oxides, ammonia and heavy metals, are also transported over long distances. The pattern of prevailing westerly winds in Europe implies that the main transport of pollutants is typically in an easterly direction. However, two other important factors influence the net flux of pollutants. First, the density of emissions per unit area is much greater in most of Eastern Europe than in Western Europe. Second, stagnant or easterly wind conditions sometimes occur; at these times, pollutants gather over Central and Eastern Europe and may be transported westward. For example, in the well-documented case of SO_2 smog in January 1985, pollutants accumulated in a stagnant air mass over Central Europe and were then transported to Western Europe by moderate winds blowing from the East. Owing to these factors, there is a flux of pollutants both eastward and westward (as well as northward and southward) in Europe. Various computer models have been used to estimate the atmospheric flux of different substances between European countries. Results from the EMEP (European Monitoring and Evaluation Program) model indicate a net westward flux (backflow) of atmospheric sulphur. In 1985, for example, the eastward flow of atmospheric sulphur was estimated at 463 kt (kilotonnes or millions of kilos) and the westward flow at 870 kt. This implies that there is a net flow from East to West: the high density of the emissions in the East surpasses the effect of the prevailing westerly direction of the winds.

Besides the long-range transport of air pollutants in Europe, there is also the problem of transboundary air pollution within Central and Eastern Europe itself. The net direction of the atmospheric flux of sulphur again follows the prevailing winds eastward. This is because substantial amounts of sulphur are emitted nearly everywhere in Eastern Europe and hence there is no substantial backflow of pollutants within Eastern Europe as there is from Eastern to Western Europe. Poland, for example, receives a much greater amount of sulphur across its Western border (for instance from the lignite-fired power plants in Eastern Germany) than it sends across this border. In the same way, Poland passes on considerably more sulphur to its Eastern neighbours than it receives from them. This flux, of course, is a function of the size of the receptor country; a small country will receive fewer kilotonnes of sulphur on its territory than a large country, all other factors being equal.

The annual flux of nitrogen (as the sum of nitrogen oxides and ammonia) also shows a general trend toward the East. However, the total mass of nitrogen is not as great as the mass of sulphur. In addition to the acidifying pollutants of sulphur and nitrogen, relatively large quantities of other more toxic pollutants, such as heavy metals, are also emitted to the atmosphere in Central and Eastern Europe. These substances are emitted as gases or small particles from power plants, metallurgical smelters, vehicles and other sources. Computer models show that there is a substantial transboundary flow of these substances. A fairly even exchange of arsenic and cadmium takes place between Poland and Eastern Germany, but the flow is much less balanced between other countries.

Source: taken from Alcamo (1992), pp. 88–101.

The RAINS model

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The RAINS model focuses on the acidification of Europe's natural environment and on the deposition of sulphur and nitrogen compounds that lead to acidification. The model consists of a set of submodels that cover the cause–effect chain: pollutant generation (energy scenarios, emission abatement option, costs of control), atmospheric transport and deposition and environmental effects (forest soil, Scandinavian lakes and groundwater). The model covers the whole of Europe, including the European part of the former USSR, using a resolution of 150 × 150 km for emission and atmospheric processes and a grid system of 0.5° latitude × 1.0° longitude for environmental impacts. The pollutants included are SO_2, NO_x and NH_3.

The RAINS model can be used for the following purposes:

1 Given a certain financial budget, to maximise the number of kilotonnes of SO_2 that can be reduced in Europe as a whole.
2 Given a specific deposition target, to minimise the amount of emission reduction needed to reach the target. A different target can be set for each cell of the RAINS grid (150 × 150 km).
3 Given a specific deposition target, to minimise the costs of emission reduction needed to reach the target.

Sources: Amann *et al.* (1992), p.1187 and Hordijk (1991), p.599.

p.1186). This new policy is based on maps of critical loads for different parts of Europe (Hettelingh *et al.*, 1991). There are great differences in the critical loads applying to different areas, based, for example, on the different types of soils in these areas.

It is clear that this new policy makes international co-operation much more complicated. Local emissions are often highly dependent on emissions in other countries (Box 9) and the necessary level of reduction may therefore differ among member states because of the different effects in other member states. A logical consequence of the effect-oriented approach would be the creation of a common European fund from which investments in pollution reduction would be paid in order to reduce the most extreme deviations from the critical loads, wherever this is in Europe. The RAINS models could be used for this purpose.

As early as in 1985, the Austrian Minister of Environmental Protection, Kurt Steyer, suggested creating a common fund for SO_2 emission abatement in the framework of the LRTAP treaty. At the time, opponents of this idea argued that Eastern European countries should not be granted subsidies for taking environmental measures as long as a large part of their state budget was still devoted to military spending. However, even though the Cold War has now come to an end, such a common fund has still not been created. At the same time, Western financial institutions offer financial aid to individual countries to reduce local and transboundary air pollution. Co-operation within the LRTAP Convention remains limited to joint studies of the scale and effects of air pollution and the definition and evaluation of policy targets.

Hazardous waste: protecting the East against the West

Some environmental problems are caused mainly in the West, while their effects are transmitted at least partially to the East. For instance, there is a social 'law' that hazardous waste moves to places with weak environmental regulations and a high level of interest in foreign sources of income. Accordingly, waste is shipped both legally and illegally from Western to Eastern Europe.

The problem with the concept of co-operation here is that it suggests too much close harmony. In reality, environmental co-operation often means two or more bodies working together to fight the environmentally damaging activities undertaken by other bodies.

Various international agreements regulate the transport of hazardous waste and other dangerous substances. Among these agreements is the Basel Convention, which was signed by many Eastern and Western European countries and has now entered into force in a number of them (see Box 11).

The Basel Convention does not explicitly ban the transport of hazardous waste. While there is general agreement on the principle that waste should not be transported but be processed or dumped at the place where it was produced, this principle has not been put into practice to date. The vested interests which are involved in the export of waste are too strong for export to be banned completely. Further discussion of the transport of hazardous waste will be found in Chapter 6.

Nuclear power plants: protecting the West against the East

The relative backwardness of industrial technology and organisation and the weakness of environmental controls in Eastern Europe have resulted in forms of environmental

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The Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 and took effect on 5 May 1992. The main provisions of the convention call for the following action by states:

1 Information exchange with other parties on waste exports and imports, through designated national authorities.
2 The prohibition of waste exports to countries that are not party to the convention or to countries which are party to the convention but which have not expressly authorised waste imports.
3 The licensing and supervision of persons transporting or disposing of waste.
4 The packaging, labelling and transport of waste in accordance with international rules and standards.
5 Co-operation on the environmentally sound management of waste.
6 Mutual information in the event of accidents during the transboundary movement of waste.

Source: Environmental Action Programme for Central and Eastern Europe (1993), pp.VI–21.

pollution which are felt far across the boundaries of the Eastern European states. The spread of radioactivity as a consequence of the catastrophe at Chernobyl in 1986 is the most dramatic example of transboundary pollution generated in Eastern Europe and felt in Western Europe. Since the Chernobyl disaster, both politicians and the general public in the West have been acutely aware of the risks associated with the use of nuclear energy in the Soviet Union and the other former Eastern bloc states. A number of countries are particularly concerned about nuclear power plants which are either in operation or under construction. Finland, for example, is afraid of plants operating in nearby St Petersburg, while Austria fears the future operation of the nuclear power plant in Temelin (Czech Republic).

The disintegration of COMECON (roughly, the Central and Eastern European Economic Co-operation Platform) and the Soviet Union have made the risks associated with the use of nuclear energy in this part of the world even greater than they were in the past. Before the disintegration of the former Eastern bloc, Russia dominated nuclear energy production both within the Soviet Union and in other COMECON countries where nuclear energy had been introduced. Both the other Soviet republics and the various satellite countries were dependent on Russia for the construction and management of nuclear power plants, the supply of fuel and the disposal of waste. The old networks on which the use of nuclear energy was based were destroyed when COMECON and the Soviet Union fell apart. Those nuclear power plants which are still operating suffer from a lack of skilled staff and of facilities for disposing of nuclear waste. Another new risk involving the use of nuclear energy, whether for peaceful or for military purposes, is the outflow to foreign countries of both nuclear materials and nuclear experts.

The quickest short-term solution for reducing the nuclear risk in Central and Eastern Europe would be to shut down the nuclear power plants which are currently in operation. It has been argued by Western experts and politicians that there is a particularly urgent need to shut down the oldest type of VVER reactors as soon as possible so as to avoid new nuclear catastrophes (see Box 12).

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Soviet nuclear reactor types

There are two basic Soviet power reactor designs: the RMBK and the VVER. RBMKs are boiling light-water, graphite-moderated, channel-type reactors which have only been built or operated in the former Soviet Union. The four reactors at the nuclear power plant near Chernobyl in the Ukraine are of this type. Other RMBKs have been built in Lithuania (2) and Russia (4).

VVERs are pressurised water reactors. They have been built in Armenia (4), Bulgaria (4), the Czech Republic (6), Eastern Germany (4), Hungary (4), Russia (31), Slovakia (8) and the Ukraine (15).

In addition, there are a number of other units of a different design that are used for district heating.

Source: UI (1993).

Four VVER plants in Greifswald (in the former GDR) have been shut down. The same has happened with two Armenian power plants of the same type, although it is possible that these may be recommissioned in the near future. Although all the power plants of this type, particularly those in Bulgaria, are considered to constitute a major safety hazard, most are all still in operation.

Another way of containing the risk associated with the use of nuclear power is either to improve both the technology and the management of existing nuclear power plants or to replace them with new, 'safe' nuclear power plants. There is growing resistance in Central and Eastern European countries to the closure of existing power plants. The West also has a strong interest in improving existing nuclear power plants or building new ones instead of closing them down. The Western nuclear industry has suffered from shrinking markets in Western countries for many years now. Nuclear equipment suppliers such as Westinghouse (in the USA) and Siemens (Germany) have strong interests in the continued use of nuclear energy in the former Eastern bloc countries. They are also interested in safety, however, because a second Chernobyl disaster would deal a severe and perhaps decisive blow to the future of nuclear energy all over the world. The provision of aid to improve technology and management may also pave the way for future investments in new nuclear power plants in Central and Eastern Europe (see Box 13).

One special form of Western aid that is designed to limit the nuclear risks resulting from the disintegration of the former Soviet Union is the creation of employment for nuclear specialists in subsidised nuclear research institutes in their home countries, thereby discouraging them from emigrating to countries which may use their expertise for military purposes.

3.5 Environmental policies in the post-communist era

Political independence, economic interest and environmental protection

The disintegration of the former communist states has led to a dramatic fall in local production levels. Reductions of 50% and more have become normal phenomena in the post-communist period. In the short run, this trend has led to a reduction in environmental pollution yet this can hardly be considered to be an environmental success story. The closure of factories or the drastic reduction of their output alone does not contribute to a long-term solution to environmental problems. Sooner or later, governments and firms will begin attempting to restore production levels to their former states. If a long-term reduction in environmental damage caused by productive activities is to be achieved, existing facilities will need to be modernised and particular economic activities will have to be replaced by others.

A lack of state control, however, hinders the development of environmental control. In that vein, the former Soviet Minister of the Environment, Vorontsov, has already warned against the environmental 'chaos' which would be the outcome of the collapse of all-Union institutions. Referring to both the political circumstances and the environmental situation in the Baltic region, he queried: 'Is it possible to declare the "independence"

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Western involvement in Eastern nuclear power

A Friends of the Earth report distinguishes three types of involvement of Western firms in the nuclear industry in Central and Eastern Europe: selling technology or expertise; investing directly in the concerns which manage operations within the nuclear fuel chain; and buying electricity from the utilities which operate nuclear power plants.

The state of the nuclear industry in Central and Eastern Europe is an issue of global concern. However, despite all the political talk and corporate hype since the collapse of communist regimes in the region, little has been done so far to change the situation. Moreover, the limited level of finance and support which has been offered has tended to perpetuate the expansion of nuclear power programmes in Central and Eastern Europe, rather than address immediate safety concerns relating to existing nuclear reactors and develop more environmentally acceptable and economically efficient energy systems.

The key findings of this study are as follows:

- More than twice as much government-backed money has been directed at completing partially-built nuclear power plants in Central and Eastern Europe than has been spent on making existing reactors any safer.
- When all public and private Western financial involvement is considered, nearly three times as much finance is going towards expanding nuclear power generation in the region as towards making existing reactors safer.
- Western electricity utilities are providing incentives to countries in Central and Eastern Europe to complete partially-built nuclear plants and to patch up existing ones by signing long-term contracts to buy the electricity output of the plants.
- Western financial assistance programmes have ignored the need to target decommissioning.

Investments are made by buying shares in newly privatised concerns. Thus, Siemens owns 67% of the Czech Republic enterprise, Skoda Energy. Electricity companies in Switzerland, Austria, France, Italy and Germany import electricity from nuclear power plants in Central and Eastern Europe.

Source: Roberts (1993), pp.3 and 9.

of the atmosphere?' (quoted in Peterson, 1993, p.44). Although, as we argued, environmental control was already a weak element in the former communist states, many of the previously existing structures and mechanisms have now indeed disappeared without their being replaced by new, effective forms of environmental control. In the former Soviet Union, the concept of *perestroika* not only failed to give rise to an 'eco-perestroika' but, on the contrary, was actually accompanied by a marked increase in the pace of environmental destruction (Wolfson, 1994, p.77). In a number of countries and former Soviet republics, there is a strong tendency towards political decentralisation. Political power has been transferred from national to regional and local authorities. However, the new regional and local authorities often have little or no experience in environmental control. They also lack the financial resources to build up systems of local environmental control. Central funding

has been drastically reduced and local authorities are now entirely dependent on the limited funds that they can raise locally through taxes or other tariffs (Environmental Action Programme for Central and Eastern Europe, 1993, p.IV–7).

The weakening of (internal) environmental protection measures is exacerbated by the splitting up of large firms and the privatisation of state enterprises. In the past, many large enterprises traditionally pre-treated the effluent they discharged into municipal waste water systems. Today, as firms are split up and privatised, the cost of industrial pre-treatment is felt to be too high and there is a risk that increasing amounts of industrial discharges will flow directly into municipal sewers, which are not equipped to handle them. On the positive side, the change in water pricing systems and the collapse and restructuring of the industry often diminish the earlier overloading of existing facilities (Environmental Action Programme for Central and Eastern Europe, 1993, p.II–13).

The important role which environmental protest movements played in the fall of communist regimes has already been mentioned. In the Soviet Union, polluting firms came under attack as being evidence of the exploitation of the country by the central authorities in Moscow. For the new, independent republics, the products of these very same companies have become a matter of economic survival and at times national pride. So it was that, in the 1980s, the Ignalina atomic power plant in Lithuania was the subject of criticism from both local environmentalists and nationalists. Yet as soon as Lithuania became an independent nation, the protests faded away. Vytautas Statulevicius, the founder of the Lithuanian Green movement, is quoted as having said about Ignalina: 'When Lithuania was in the Soviet Union, it was one thing. But now it belongs to us' (Peterson, 1993, p.243). Basically, the situation is no different in Armenia, where the protests against Nairit, a highly polluting chemical plant, marked the beginning of the struggle for national independence. The factory was closed at the beginning of 1990, but reopened in 1991 after Armenia became an independent nation (Peterson, 1993, pp.244–6). Contrary to earlier decisions, reactors 1 and 3 of the Chernobyl nuclear power plant have been kept open because of the shortage of electricity in the Ukraine.

In the meantime, the environmentalists have seen their position considerably weakened. Where there had previously been a common enemy, i.e. 'the System', environmental activists now face numerous regional and local systems which are no less dangerous. The environmentalists are being forced to divide their forces. Without having achieved any tangible changes and forced now to fight for their own survival, many of those who sympathised with and helped the movement have left it. Within the movement itself, conflicts have increased over the issue of whether groups should be political in character or concerned exclusively with protecting the natural heritage. Perhaps the most disturbing development is the division of a once united movement, operating within the framework of the USSR, into numerous isolated ethnic groups and movements. Politics today is undoubtedly stronger than ecology (Yanitsky, 1993, pp.100–1).

Environmental conflicts between states

As a result of the breaking of the old bonds between communist states and between Soviet republics, new tensions have developed or have at least come to the surface, as

a consequence of transboundary environmental damage and risks. This section discusses two examples of environmental conflicts between states: the Gabcikovo-Nagymaros dam dispute and the Aral Sea conflict.

As far back as the 1950s, plans were made to canalise the Danube between Bratislava (in Slovakia) and Györ (Hungary). The main purpose of the proposed project at the time was to connect the two countries with the planned trans-European Danube-Main-Rhine waterway, which was to create a direct water link between the Black Sea and the North Sea. After the oil crisis in 1973, the original plans were changed and electricity production became the main aim of the project. In 1977, the Czechoslovak and Hungarian governments agreed upon a common project: the Gabcikovo-Nagymaros dam system (see Box 14)

At first, the project was delayed by economic difficulties in both countries, but it later met with growing opposition, especially in Hungary. Among the damaging environmental effects which it was claimed the project would cause were the extensive destruction of the Danube landscape, the degradation of groundwater quality and the loss of agricultural land, flood plain forests and fish stocks. In addition, it was feared that there was a risk of flooding further downstream, as well as a potential for disastrous flooding in the event of a dam burst.

The opposition in Hungary to the whole project became so great that the Hungarian government decided to stop work on the Hungarian part of the project in 1989 and in 1992 unilaterally withdrew from the 1977 treaty. The new, independent Slovak government, which assumed power on 1 January 1993, decided to persist with the project. Measures were taken to complete work on the project with the exception of those parts which were located on Hungarian territory. Conflicts between Hungary and Slovakia about the project continued after Hungary's withdrawal. Slovakia reproached Hungary for withdrawing unilaterally from the project. Hungary, in turn, tried to stop the project in Slovakia, because of its damaging effects on the population, flora and

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The Gabcikovo-Nagymaros dam system

In 1977 the Austrian, Czechoslovak and Hungarian governments agreed to divert the Danube through a huge concrete tunnel in order that the river would generate electricity and provide a safe passage to barge traffic. Under the plan, upstream, close to the Hungarian village of Dunakiliti, a dam was to be constructed in order to create an artificial lake 25 km long with a surface area of 60 km^2. This lake is connected to a hydro-power plant in Gabcikovo by a canal which is 18 km long and up to 730 metres wide and which, at some points, is raised some 18 metres above the surrounding area. From the Gabcikovo power plant, the water flows through 8 km of canal before reaching the Danube, which is deepened over a distance of 20 kilometres downstream of the end of the canal. The construction of a second dam, in Nagymaros (Hungary), prevents wide fluctuations in the level of the Danube downstream as a consequence of the operation of the Gabcikovo power plant twice a day during peak periods of electricity consumption. Between 90% and 97.5% of the Danube water passes through the artificial lake and canals and only 2.5–10% follows the old bed of the river.

Plate 3.2 Construction work on the Gabcikovo-Nagymaros dam. Photo: Jacques Langevin/ ABC Press

fauna in Hungary. Both the Commission of the European Community and the International Court of Justice became involved in the conflict (see also Kamminga, 1995).

One of the main reasons for the continuing struggle between the two countries is the fact that the majority of those people in Slovakia who are likely to suffer most from the effects of the project are members of the Hungarian minority. The environmental conflict is therefore also an ethnic conflict. For the Slovaks, finishing the Gabcikovo project has become a matter of national prestige and a means of strengthening nationalist sentiments by blaming Hungarians both outside and within Slovak territory. Hungary is fighting not only for its environmental interests, but also for the interests of Hungarians on both sides of the Hungarian–Slovak border. Strong nationalist feelings are involved on both sides.

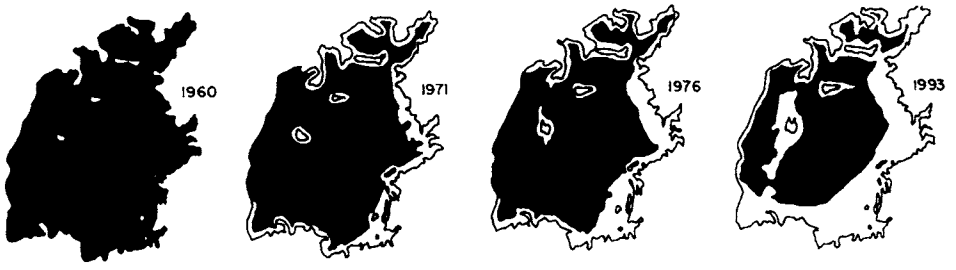
Political tensions, not only between the former communist states but also between former Soviet republics, are hampering the prevention or solution of other transboundary environmental problems. This is the case with the conflict surrounding the Aral Sea (see Box 15).

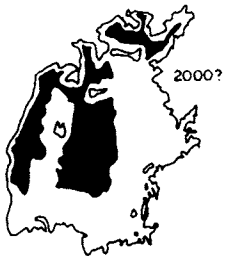
The divergent interests of the various republics surrounding the Aral Sea hamper the introduction of effective policy measures. The principal adverse environmental effects of the shrinking of the Aral Sea are:

1 the disappearance of important shipping routes, in particular between Aralsk in the North and Muynak in the South;
2 the end of the fishing of sturgeon and many other species of fish. Annual catches of fish used to range from 45,000 to 50,000 tonnes. The local fish factory, the Muynak Cannery Combie, now has to import its fish from the Atlantic;

15 The shrinking of the Aral Sea

Until 1960, the Aral sea , with a surface area of 66,000 km^2, was the fourth largest lake in the world, after the Caspian Sea (371,000 km^2), Lake Superior (83,000 km^2) and Lake Victoria (69,000 km^2). For many centuries, the boundaries of the Aral Sea remained essentially unchanged and the water level fluctuated between approximately 50 and 53 metres above sea level. In the short period between 1960 and 1991, the average level of the Aral Sea went down from 53 to 38 metres above sea level and it was divided into a large and a small lake. The total surface area of the lake was reduced to half of its original size, decreasing from 66,000 km^2 to 33,000 km^2. Even more spectacular was the shrinking of the average volume of the lake from 1090 km^3 to 290 km^3. This process has not yet come to an end.





Year	Average level (m)	Average area (km^2)	Average volume (km^3)	Average salinity (g/l)
1960	53.41	66 900	1090	10
1971	51.05	60 200	925	11
1976	48.28	55 700	763	14
1993 (1 January)		33 642	300	
large sea	36.89	30 953	279	~37
small sea	39.91	2 689	21	~30
2000 (1 January)		24 154	175	
large sea	32.38	21 003	159	65–70
small sea	40.97	3 152	24	~25

In the past, the loss of water by evaporation was compensated for by the inflow of water from two rivers: the Syr(darya) and the Amu(darya). Between 1930 and 1960, the average inflows from the Syr and Amu in the Aral Sea amounted to 50 km^3. In 1970, the inflows were reduced to 35.2 km^3. They further decreased to 10 km^3 (1980) and between 1 and 5 km^3 in the 1980s. This reduction in the scale of these inflows was a consequence of the use of water for the irrigation of agricultural land. Yet irrigation as such is not the cause. For several millennia, water from the two rivers had been used for irrigation purposes without this substantially reducing the inflows into the Aral Sea. Traditionally, irrigation has been based on small farms and small irrigated fields.

In the 1920s, however, new irrigation techniques were introduced by the communist regime. New, powerful equipment became available and newly constructed, huge canals enabled land located hundreds of kilometres away from the rivers to be irrigated. The

collectivisation of agriculture in the 1930s led to the development of large, state-managed agricultural collectives with irrigated sectors 7–10 times larger than before. In the 1950s, irrigation was further mechanised and the irrigated sectors of farms further expanded. The development of cotton production as a monoculture in Uzbekistan in particular required large-scale irrigation. The area of irrigated agricultural land in Central Asia and Kazakhstan grew from less than 3 million hectares in 1950 to more than 7 million today.

Modern, large-scale irrigation is a highly inefficient system of supplying water. It is estimated that 60–80% of the water is lost during transport. Excessive irrigation and excessive wastage of irrigation water during transport are encouraged by the free supply of irrigation water. The free availability of this natural resource was justified in the recent past by the communist ideology, according to which Nature has no price and should be freely available to everybody.

Source: Precoda (1991), pp.109–12; Micklin (1992), p.270.

3 a sharp reduction in the size of forests and reed banks along the borders of the lake. In the past, reeds were used by the local Kryl-Ordinsk cellulose and cotton combine; now they have to be brought in from Siberia;
4 the lowering of groundwater levels by 3–8 metres;
5 climate change. The vapour rising from the surface of the Aral Sea once formed a barrier against cold winds from the North. Dry winds and dust storms are now damaging agricultural land at large distances from the Aral Sea. They transport salts from the dry bed of the former sea, damaging not only crops but also electric power lines and concrete structures;
6 salination. Both wind and irrigation contribute to salination. Water losses during transport and excessive water use in irrigation cause groundwater to rise to the surface, carrying salt with it;
7 health damage. The health situation in the Asian republics surrounding the Aral Sea is extremely bad, even compared with other parts of the former Soviet Union. The excessive use of chemicals in the production of cotton has been cited as the main cause of exceptionally high rates of infant mortality, cancer incidence and other indicators of poor health conditions. The transport of chemicals by irrigation water contributes to the poor health conditions in the area;
8 the declining production of cotton. Although large-scale irrigation was primarily developed to enlarge the production of cotton, even the production of cotton itself is suffering from the modern methods of irrigation and the climatic effects of the shrinking of the Aral Sea. Soils used for the cultivation of cotton are salinated by excessive irrigation. This contributes to soil degradation and hence to the need for taking new land into production. As a result, there has been a decline in the production of cotton and the area of land that has had to be taken out of production has increased since the 1980s. The production of cotton nearly doubled between 1960 and 1980, but has declined since then. In 1989, a Soviet publication estimated the annual decrease in output at 4.9 million tonnes (Fesbach and Friendly, 1992, pp.73–88; Khazanov, 1990, p.20; Kotlyakov, 1992, pp.288–9; Micklin, 1992; Precoda, 1991, p.111).

Plate 3.3 Ship cemetery near Muinak City, Aral Sea. Formerly located on the seashore, the town is now more than 50 km away from the sea. Photo:Victoria Ivleva/Lineair

There were already certain conflicts of interest even when the republics were still part of the Soviet Union. On the issue of water distribution, for example, relations between Uzbekistan and Tadzhikistan have been strained for many years. Tadzhikistan and Kirgizia, which are located relatively close to the sources of the Amu(darya) and the Syr(darya), are able to use the water without having to spend additional funds on treatment facilities, while Turkmenistan, and especially Uzbekistan which is the largest consumer of water, are at a geographical disadvantage. The disappearance of the central authority in Moscow and of economic interdependencies between the different republics has only strengthened this type of tension.

Within less than a decade, the political context of environmentalism in Central and Eastern Europe has completely changed. In the 1980s, environmentalist action was closely linked with resistance to the central authorities in Moscow and was stimulated by the struggle for local and regional autonomy. In the 1990s, environmental issues are playing a role in conflicts between former Soviet republics and former communist states. Conflicts of interest between these independent political entities are hampering the solution of transboundary environmental problems. Where nationalism and environmentalism were allies in the 1990s, they have now become enemies in the 1990s.

New problems and new policies

The adoption of Western lifestyles in Central and Eastern European countries will lead to new forms of environmental damage deriving from Western patterns of behaviour.

Many Central and Eastern European countries have public transport systems which lack comfort, but which are superior to those in Western Europe in terms of the density of the network and the frequency of service. There is now a tendency to follow the Western example, however, and hence for transport to become increasingly a private rather than a public provision, even though people are broadly aware of the damaging environmental effects of such a development. In Central and Eastern Europe, systems of recycling household waste, for example by means of the use of returnable bottles, are now losing ground, while the use of non-returnable, disposable packaging as advertised by Western firms is gaining more and more of a foothold. Strange though it may sound, the culture of militarism and secrecy had certain beneficial effects on the state of the countryside in former communist states. Large tracts of land along borders (not only along the 'Iron Curtain', but also between the communist states themselves) and coasts were closed off and guarded against all forms of human influence. Now these nature reserves which developed secretly, as it were, during the communist period may be disturbed by a wide variety of human activity.

Although the environment is not in general a top priority in post-communist Central and Eastern Europe, a large number of government officials in these countries, sometimes working together with representatives from environmental groups, are now engaged in developing new and more effective environmental policies at national, regional and local levels. High priority has been given to the development of systems for monitoring environmental pollution. Forms of environmental impact assessment have also been introduced to incorporate environmental criteria in decision making on industrial activities and infrastructural works with major environmental effects. In general, much is expected of the use of financial instruments, which have indeed been given a prominent place in new environmental policies. In the past, the scales of fees and fines were too low and their payment was often not enforced. This means that fee and fine levels will have to be raised and enforcement procedures introduced. In Poland, for example, the level of pollution charges has been raised by a factor of about ten since 1990. What has now happened, however, is that these charges have been temporarily reduced by 90% to enable industries to adjust. The economic crisis and growing rates of unemployment have put both the level and the maintenance of pollution payments under great pressure.

3.6 Conclusion

The specific characteristics of the environmental problems in Central and Eastern Europe are related in part to the inferiority of the industrial development which has taken place in this region. During the past few decades, the Western industrial states have experienced a transformation in industrial production which is nowadays often referred to as *ecological modernisation*. One of the implications of this process has been a decline in both material inputs and polluting outputs per unit of gross national product. Fewer resources are now used and less pollution is generated per unit of product. Central and Eastern Europe has been left far behind in this process. In fact, the general stagnation in industrial development was one of the driving forces behind the process of societal change that started in the mid-1980s. But relative backwardness is

not the whole story. *Voluntarism* has already been mentioned as one of the elements of the prevailing ideology in this part of the world. The ease of central decision making and the absence of feedback in the form of both scientific criticism and democratic control and public opinion were specific properties of centrally planned economies which created environmental problems of a magnitude that never existed in Western European countries.

Central and Eastern Europe has experienced the failure of central economic planning. As a consequence, political control by the state and its institutions has more or less disappeared. Environmental organisations in Central and Eastern European countries have recently lost much of the strength which they had acquired in the revolutionary period of around 1989. Environmental protection needs strong countervailing power exercised by both public authorities and environmental groups. East-West co-operation between public and non-governmental organisations can support the badly needed development of countervailing power in Central and Eastern Europe. Although inward investment by Western firms may contribute to cleaner and less wasteful production in the East, all new ventures should be critically screened by the public authorities and environmental organisations in order to avoid the transfer of pollution from Western to Eastern Europe.

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