DEVELOPMENT OF CLEANER PRODUCTION STRATEGIES FOR THE KYRGYZ REPUBLIC

by

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Abstract

Cleaner production is essentially aimed at increasing production efficiency, while at the same time eliminating or minimizing wastes and emissions at their source, rather than treating them after they have been generated. The concept is especially important to developing countries, where natural resources are scarce, and the pace of environmental degradation is continuously increasing.

Since, Cleaner Production started to implement in Kyrgyzstan , this research attempts to examine the current industrial practices that have been and are being used in the Kyrgyz Republic, and current national institutional capacity to implement of Cleaner Production in Kyrgyzstan.

Transition of Kyrgyz economy from planned economy toward market-based economy has had impact on Kyrgyz industries. Many of industries are relaying on 'end-of-pipe' solutions in solving environmental problems, management of industries is not committed to implement CP options at enterprises.

The research also addresses the possibility of funding from Multilateral Environmental Agreements (MEAs) for cleaner production projects in Kyrgyzstan, and the challenges faced in that regard. Most of the studied MEAs have relevant provisions to Cleaner Production in their objectives and implementing mechanisms. Moreover, they have mutual benefits: MEAs could be funding sources for implementation Cleaner Production projects; Cleaner Production could be an effective instrument in global environmental protection efforts and improve the effectiveness of MEAs.

The strategies the industry has to take to achieving cleaner production goals are proposed, as well as the different policy instruments that the Kyrgyz government should implement to encourage cleaner production implementation.

Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

ADB	Asian Development Bank
APO	Asian Productivity Organization
BAT	Best Available Techniques
BEP	Best Environmental Practices
BISNIS	Business Information Service for Newly Independent States
BMZ	The German Ministry for Economic Cooperation and Development
BOD	Biochemical Oxygen Demand
CAT	Central Asian Tourism Corporation
CBD	Convention on Biological Diversity
CDM	Cleaner Development Mechanism
CEIT	Countries with economies in transition
CIS	Commonwealth of Independent Countries
CLIND	Clean Industry Development Project
CO	Carbon monoxide
COD	Chemical Oxygen Demand
COP	Conference of the Parties
CPCs	Cleaner Production Centers
CP	Cleaner Production
CT	Clean Technology
DDT	Dichlorodiphenyltrichloroethane
DNA	Designated National Authorities
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EIT	Economies in Transition
EMC	Environmental Management Centre
ESM	Environmentally Sound Management
EU	European Union
FSU	Former Soviet Union
GEF	Global Environmental Facility
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GTZ	German Technical Cooperation
HFCs	Hydrofluorocarbons
JV	Joint - Venture
ICETT	International Center for Environmental Technology Transfer
IDCP	International Declaration Cleaner Production
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
IWG	Implementation Working Group
KRSU	Kyrgyz Russian Slavic University
KS UCTA	Kyrgyz State University of Construction Transportation and Architecture
KTU	Kyrgyz Technical University
LDC	Least Developed Countries
LWG	Legal Working Group
MAEs	Maximum Authorized Emissions
MBI	Market Based Instruments
MEA	Multilateral Environmental Agreements

MOE	Ministry of Environment
MOP	Meetings of Parties
NAPA	National adaptation programs of action
NORAD	Norwegian Agency for Development
NCPC	National Cleaner Production Center
NIP	National Implementation Plans
NIS	New Independent States
NO2	Nitrogen dioxide
ODS	Ozone Depleting Substances
OECD	Organization of Economic Cooperation and Development
OEWG	Open-ended Working Group
PCB	Polychlorinated biphenyl
PFCs	Perfluorocarbons
PIC	Prior Informed Consent
POPs	Persistent Organic Pollutants
PREGA	The Netherlands Cooperation Fund on Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement
REF	Regional Environmental Fund
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SEF	State Environmental Fund
SMEs	Small and medium scale enterprises
SO2	Sulfur dioxide
SU	Soviet Union
TWG	Technical Working Group
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNECE SPECA	United Nations Economic Council for Europe Special Project for Economics of Central Asia
UNEP	United Nations Environment Program
UNEP GRIDA	UNEP Global Resources Information Database at Arendal (Norway)
UNEP TIE	United Nations Environment Program, Trade, Industry and Economic Division
UNFCCC	UN Framework Convention on Climate Change
WBCSD	World Business Council on Sustainable Development
WWTU	Waste water treatment units

Chapter 1

Introduction

1.1 Background

Environmental problems are amongst the most severe problems mankind has to face in the 21 century. There is no single place anymore on the planet earth that has not been affected by environmental pollution, caused by activities of mankind. Although at local level the effects seems to be limited, there can be a contribution to the impacts of global environmental problems such as the depletion of the ozone layer, greenhouse effects, and desertification, as well as the pollution of water sources by pollutants. (F. van den Akker, 2002)

Kyrgyz economy: As an independent state, the Kyrgyz Republic (which is situated in the Central part of the Asian continent, with neighbors in West, Uzbekistan and in the North, North-West, Kazakhstan and South, China, South-West, Tajikistan) was created as a result of the collapse of the former Soviet Union. The Kyrgyz Republic is a country in transition from central planned to market based economy. This has created a strong pressure for restructurisation of industry. In addition to the overall recession, the economy of Kyrgyzstan has undergone considerable structural change – in the first place the growth in the share of the extraction industry compared to the share of the processing industry. Thus, the economy changed from industrial - agricultural into extraction – agricultural (Ministry of Environment, 2003). Comparing to other countries of the Former Soviet Union (FSU), Kyrgyzstan is less industrialized country with small number of industries such as, Energy, light industry, metallurgy, manufacturing and food processing industry (Ministry of Environment, 2001). Most of the industrial enterprises still active are using out-of-date technologies and processing equipment, which in addition has been or is poorly maintained due to a lack of funds (UNECE, 2001).

Impact on the environment: Kyrgyz Republic's environmental problems are diverse. Water pollution is one of the country's most serious problems. Surface waters are polluted by biogenic substances (nitrogen, phosphorous) and untreated wastewater discharges from industries. The most polluting industries are cement, electroplating and textile industries together with foundries, tanneries and slaughterhouses (UNECE, 2001). Kyrgyz Republic's surface waters are slightly polluted with heavy metals, oil products and others. The Report on the State of the Environment in Kyrgyz Republic published in 1998 (UNEP-GRIDA, 2003) states that annually 900 to 1,150 million-meter cubes of waste water is discharged into natural receiving bodies. Only 300 to 635 million meter cubes undergo wastewater treatment, be it mechanical, biological or physico-chemical. 1.42 to 0.75 million-meter cubes of toxic or dangerous wastewater is discharged without any treatment.

Air pollution: Levels of air pollution have dropped in recent years because of a drop in industrial production and in consumption of fuel in the energy and transport sector. The main source of pollution in Kyrgyz Republic is transportation (cars), which produces 73% of the overall amount of pollutants. Environmental pollution from industries and energy is 22% and 12%, respectively (Ministry of Environment, 2001).

Industrial hazardous waste: There are no noticeable efforts to introduce cleaner technologies, or to recover at least some of the reusable components from wastes. In many

cases, industrial waste is deposited in municipal waste dumps or even in uncontrolled sites. There are no special treatment facilities to decontaminate or break down toxic compounds, nor are there controlled repositories for hazardous waste. Enterprises avoided the proper treatment and storage of the wastes produced.

Traditional approach – "end-of-pipe": The degree and long-term consequences of the impact of industrial emissions have finally been recognized in last years and government has tried to control the wastes and reduce the impacts through regulation. Moreover, the regulatory approach generally taken has assumed that industrial pollution would continue to be generated and must therefore be treated and disposed. This type of solution is called *end of pipe* treatment, as Gaynutdinova (2001), said that the end-of-pipe strategies do not eliminate pollution, but merely transfer it from one media to another; require expensive pollution treatment equipment; discourage technological innovation toward achieving environmental benefits beyond compliance; and hinder stakeholders dialogue. However, it has become progressively clearer that "end of pipe" strategies alone cannot resolve complex environmental problems. They do not eliminate pollution, but often transfer it from one media to another; require expensive pollution treatment equipment; discourage technological innovation toward achieving environmental benefits beyond compliance; and hinder stakeholders' dialogue.

Need for Cleaner Production: One of the ways of rational using of natural resources and energy is Cleaner Production (CP). By implementing CP options in production process it will help not only save resources and energy, but it will also help to save funds spending on end of pipe treatment. To implement CP options in a country scale it is required to establish Cleaner Production Centers, for coordination of projects, capacity building of Industries, international co-operation and financing of CP activities. There have been 24 National Cleaner Production Centers (NCPC) were established in all over the World since 1994 (UNEP DTIE, 2003). Nevertheless, CP activities are needed financial support.

MEAs as a source of funding: One of the options financing of CP activities is an implementation of international environmental conventions or Multilateral Environmental Agreements (MEA) in CP activities. As a most environmental problems causing by industries have a transboundary nature and often a global scope, and they can only be addressed effectively through international co-operation. A Multilateral Environmental Agreement (MEA) is an agreement by several parties to take certain steps to increase protection of the world's natural resources or promote environmental quality. According to (John Hilborn, 2003), a recent UNEP study identified 500 multilateral agreements related to environment, of which 41 were considered of global importance. Cleaner Production can play a role here, yet the potential for improving MEAs' effectiveness remains largely untapped.

1.2 Problem Statement

To what extent the CP activities can be adapted in implementation of MEAs, Cleaner Production can be applied in the Kyrgyz Republic and effectiveness of existing environmental regulations. Therefore, this study focuses mainly on the use of MEAs for the financing CP activities, identification of inter – linkages between MEAs and CP, development of Strategy for Cleaner Production Promotion particularly in Kyrgyzstan.

1.3 Objectives of the study:

The objectives of this study are as follows:

1. To review the existing Multilateral Environmental Agreements (MEA), to identify links to Cleaner Production Promotion

2. To review the current status of industrial activities and the associated pollution issues in the Kyrgyz Republic

3. To review the on-going CP Projects, identifying the promoters and the barriers

4. To review national institutional and capacity building aspects to promote CP

5. To develop a CP strategies by incorporating existing MEAs in Kyrgyz Republic

1.4 Scope of the study

This study is related only to The Kyrgyz Republic, focusing on reviewing of existing Multilateral Environmental Agreements of the chemical and atmosphere clusters, to identify links for Cleaner Production Promotion, reviewing of industrial compliance to existing environmental regulations, reviewing of ongoing CP projects in Kyrgyzstan with identification of promoters and barriers. Based on results of this study, appropriate Cleaner Production promotion strategies are identified.

Chapter 2

Literature Review

2.1 Country background information: The Kyrgyz Republic

The Kyrgyz Republic is one of the New Independent States (NIS), created after the collapse of Soviet Union (SU) in 1991. The Kyrgyz Republic is located in the centre of the Asian continent, in the north-east of Central Asia. The Republic borders on Kazakhstan in the north, on China in the south-east and east, on Tajikistan in the south-east, and on Uzbekistan in the west. The length of the Kyrgyzstan's borders is 4,508 kilometers; its total area is 199,900 square kilometers. The highest point of the Republic is the Pobeda Peak (7,439 m.) and the lowest is 350 meters above the sea level. The average height of the Republic above the sea level is 2,750 meters. About 94% of the territory is located above 1,000 meters, 90% – above 1,500 meters, and 40% – above 3,000 meters above sea level (Bokonbaev K.D. *et al, 2003*). All natural features of Kyrgyzstan are determined by these high mountains – the climate, landscapes, soils, water resources, flora and fauna, as well as social and economic conditions of life.

Figure 2.1: Map of the Kyrgyz Republic

Source: UNEP-GRIDA, 2003

Climate

The Kyrgyz Republic is a typical high mountain country with an arid continental climate and large temperature range. Along with this, separate parts of its territory differ dramatically from one another due to a wide range of natural factors, thus causing a mix of natural conditions, resulting in considerable interregional differences. Four climatic zones are clearly distinguished: North and Northwest Kyrgyzstan, Southwest Kyrgyzstan, the Issyk-Kul basin, and the Internal Tien - Shan. A significant climate forming factor is high ranges, predominantly of sub-latitude location, separated by deep valleys and basins. In the

lowlands the temperature ranges between -4°/-6°C in January to 16-24°C in July. In the highlands the temperatures range from -14°/-20°C in January to 8-12°C in July. There are heavy snowfalls during winter (UNEP-GRIDA, 2003).

Population

The permanent population in the Kyrgyz Republic at the end of 2000 was 4.9 million people (Bokonbaev K.D. *et al.*, 2003). The average population growth rate for the last 10 years is about 1.0% per year. This represents a population density of approximately 23 people per km2. Overall, 34% of the population lives in urban centers, while the remaining 66% lives in rural areas. For administrative purposes, the country is divided into a series of regions, or oblasts (Ministry of Environment, 2003). Country's largest city is a capital city Bishkek with population around 800 000 people, other big cities: Osh (300 000), Jalal-Abad (100 000), Karakol (70 000) and etc. Kyrgyzstan is a unique country with its multicultural diversity; each nationality has its own tradition, custom and language. Kyrgyzstan is home for 23 nationalities, a majority are Kyrgyzs (63%), following by Russians (16%), Uzbeks (12%), and other nationalities: Kazakhs, Ukrainians, Byelorussians, Koreans, Germans and etc.

Overview of Kyrgyz Industry

According to Bokonbaev et al. (2003), for the last 10 years the economy of Kyrgyzstan has undergone changes common for all CIS countries in many respects. After the period of gradual growth and relative welfare until 1991, the economic recession followed till 1996. The Kyrgyz economy largely collapsed in the early 1990s after the break-up of the Soviet Union. The industrial sector in the country continues to shrink (UN ECE, 2001). The transition to a market economy was painful, as industry was state-owned and heavily subsidized.

Since 1996 economic conditions have somewhat stabilized. In addition to the overall recession, the economy of Kyrgyzstan has undergone considerable structural change – in the first place the growth in the share of the extraction industry compared to the share of the processing industry. Thus, the economy changed from industrial - agricultural into extraction - agricultural. Light industries and processing industries have almost entirely been reoriented to the domestic market. The basic exporting industries are mineral resource industry and power engineering (Ministry of Environment, 2003). Kyrgyzstan's economy is predominantly agricultural, mostly based on agricultural products, and main agricultural crops are: cotton, tobacco, fruit and berries, grains, meat and wool.

The GDP increase, marked since 1996, has been de facto based on the launching of the gold - mining industry "Kumtor", which provides about 16% of GDP. Figure 2.2 shows GDP volume by sectors compared to 1990 in percent (Bokonbaev et al, 2003).

Kyrgyzstan has different kinds of industrial production: mining industry (gold, zinc, and coal), machinery and metalworking, tobacco and food processing, textiles and tanning. In particular, sectors of the manufacturing industry are the following: machinery and equipment, metalworking and spare parts, and electrical devices and equipment (State Investment Agency, 2004).

Major Industries:

- Agriculture and food processing (35.2% of GDP) (Dairy, canning and packaging)
- Manufacturing (21.4%) (Auto parts, electro-technical parts)
- Mining (20%) (Gold mining)
- Hydro energy (electricity)
- Tourism (eco and adventure)
- Textiles
- Construction

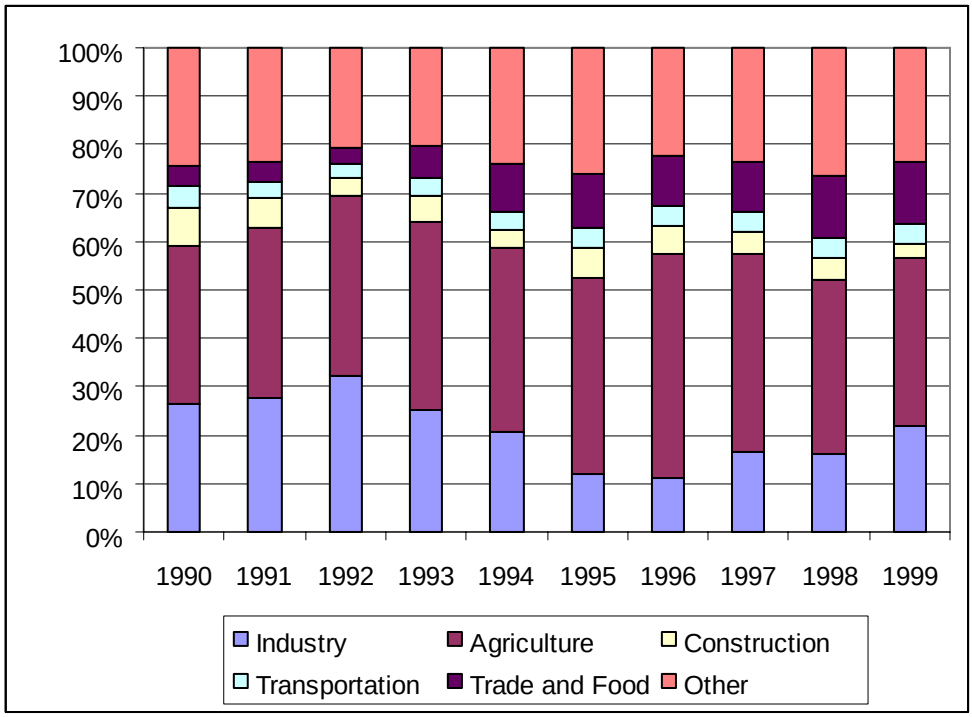


Figure 2.2: GDP volume by sectors compared to 1990

Source: Ministry of Environment, 2003

Manufacturing:

Kyrgyzstan's manufacturing plants are concentrated in Bishkek, many working at less than full capacity due to curtailment of traditional heavy industrial exports to the CIS countries and the import costs of raw materials (formerly supplied by other areas of the Soviet Union).

Manufacturing sector of the Industry has the following sub-sectors:

- *Metal working and spare parts:* parts for equipment and automobiles

- *Machines and equipment:* production lines for the food processing industry, and for medical equipment and machinery firms, food processing equipment such as pasta lines, refrigerators, and commercial equipment for kitchens and shops.

- *Manufacturing of home appliances, electrical devices and components:* home appliances, electrical devices and components.

Light Industry:

Light Industry includes textile, clothing and leather-shoe branches. The structure of sector includes all technological stages from processing raw materials to manufacturing final products and even scraps reprocessing (State Investment Agency, 2004). With the collapse of the Soviet Union, light industry in the Kyrgyz Republic began to decline. The country could not finance the massive state-owned, capital-intensive enterprises. As a result, they could not afford to purchase raw materials and machinery. Currently, light industry makes up about 3.5% of the country's GDP (BISNIS, 2002).

Companies in Kyrgyzstan's light industrial sector are engaged in the following activities:

- Cotton ginning
- Wool processing and production of yarn
- Animal skin processing and production of leather
- Knitting: clothing and socks
- Textiles
- Clothing manufacturing
- Handicrafts

Food Processing Industry:

Currently, the food-processing industry makes up about 20% of all manufacturing in the Kyrgyz Republic. It supplies the local market and produces some foodstuffs for export.
According to the Ministry of Agriculture of the Kyrgyz Republic, there are currently 342 firms operating in the food-processing sector. According to an industry consultant, about 100 of those are the most active companies, with the remainder being largely defunct (BISNIS, 2002). Among of those enterprises, 40 firms are representing fruits and vegetables canning sector, and only six of them have high production capacity (Djoodatov, 2003).

A number of obstacles hold back further development of the food-processing sector. Most companies have outdated processing and packaging lines. The equipment is not energy efficient and packaging does not meet modern standards (BISNIS, 2002).

2.2 Overview of Multilateral Environmental Agreements (MEA)

2.2.1: Multilateral Environmental Agreements

Most environmental problems have a transboundary nature and often a global scope and they can only be addressed effectively through international co-operation. For this reason, International Community is trying to promote measures at international level to deal with regional or worldwide environmental problems, setting up Multilateral Environmental Agreements (European Union (EU), 2003).

A Multilateral Environmental Agreement (MEA) is an agreement by several parties to take certain steps to increase protection of the world's natural resources or promote environmental quality, (European Union, 2003). MEAs include international and regional conventions and protocols; where a convention provides a general framework for action, protocols outline steps to address specific problems.

Based on definition for a term "treaty" from UN Treaty Collection - Multilateral environmental agreements is the main instrument of international environmental protection. In the present context, the MEAs refer to international legal instruments concluded between a large number of states or international organizations as parties in written form, and governed by international law, whether embodied in a single instrument or in two or more related instruments, with the goal of environmental protection. (UNEP DTIE, 2003).

As a response to the global environmental change, a large number of environmental agreements have been created. The first multilateral treaty on an environmental issue was agreed in 1868 (Convention on the Rhine). UNEP has estimated that since then "the number has risen to at least 502 international treaties (other reputable authorities consider there are even greater number than this {International Council for International Law}) and other agreements relating to the environment, of which 323 are regional". Over 60 percents of the agreements have been agreed since UNEP was founded in 1972, 70percents are regional in scope (Dodds, 2001).

Earlier MEAs were usually dealing with one or another single issue of environmental protection, primarily addressing allocation and exploitation of natural resources. The modern generation of environmental agreements is more holistic, system oriented and trans-sectoral (UNEPDTIE, 2003). This new generation of MEAs was spurred by the UN Stockholm Conference (1972), when the people realized that industrialization and economic development were posing an ever-increasing threat to the global environment, and that solving complex environmental problems have to address multiple aspects of interaction of society and environment. The United Nations Conference on Environment and Development (UNCED) in Rio (1992) was another important landmark for the new generation of MEAs.

All of the core MEAs are legally binding instruments. MEAs can be either self-contained conventions (working through annexes or appendixes) or operate as the framework conventions that can develop protocols for addressing specific subjects requiring more detailed and specialized negotiations.

MEAs have varied priorities and objectives, but they all share a common goal of sustainable development: "The objectives and priorities of MEAs vary significantly from one agreement to another, even within a cluster.

The institutional elements of MEAs adopted after 1972 include the following elements: Conference of Parties, a secretariat, a number of executive and subsidiary bodies, a clearinghouse mechanism, and a financial mechanism (see Table 2.1).

Most MEAs are not self-executing and are implemented via national legislation and regulatory measures. It is important to appreciate the meaning and difference of three key concepts pertaining to MEAs: implementation, compliance and effectiveness. Domestic implementation of MEAs is “a long term process of converting international commitments and behavioral change of target groups, i.e. those actors causing the problem in question”.

Often, however, it is understood more narrowly as a process of converting MEA's requirements into national legislation. Compliance with treaties goes beyond implementation in its narrow sense and refers to whether the countries in fact adhere to the agreements provisions, and to the measures that countries have undertaken, including procedural measures (e.g. national reporting) and substantive measures (e.g. actual elimination of persistent organic pollutants - POPs).

There is a clear distinction between compliance with an MEA and compliance with national measures put in place to meet MEA requirements. Finally, effectiveness of an agreement, in its broad sense, means whether a MEA has been able to resolve the problem that caused its creation (UNEP TIE/InWEnt, 2003).

The important cross-cutting implementation mechanisms of modern MEAs include inter-alia:

- Technical and financial assistance to Parties or member states to meet their responsibilities under MEAs;
- Assessment and management of pollution;
- Education and awareness;
- Information exchange;
- Strengthened participation of all stakeholders in the decision-making;
- International partnership.

It is recognised that modern MEAs also face several common challenges. Those challenges include: the need to, inter alia, improve synergies among MEAs; ensure adequate implementation and co-ordination of MEAs at national level; develop adequate mechanisms for compliance and enforcement and environmental and performance indicators to measure the effectiveness; and ensure that adequate financial and human resources are available for implementation.

MEAs are important tools for fostering global commitment to resolve global environmental issues. However, the overall effectiveness of MEAs that have been in effect for quite some time, in attacking crosscutting and cross-boundary environmental problems remains rather low. One of the reasons is that implementation of many MEAs over-relies on conventional end-of-pipe approaches based on controlling the impacts of pollution after the pollution has been generated. Cleaner Production can help to find ways to meet those challenges and explore new opportunities via preventive strategies.

Table 2.1 Main institutional elements of Multilateral Environmental Agreements.

Conference of Parties (COP)	It is the ultimate decision-making body on the overall implementation and development of their respective MEAs, including the work program, budget, and adoption of protocols and annexes
Secretariat	The Secretariats perform a number of varied functions depending on the mandate of a MEAs. There are two types of the Secretariats: those that prepare and service the meetings of COPs and co-ordinate with other international organizations. (e.g. The Montreal Protocol, Convention on Biodiversity, The Stockholm Convention, the Rotterdam Convention); and the Secretariats that, in addition to, the functions of the first type, perform scientific research, and/or are also involved in implementing programs or projects at the regional and country levels (e.g. The Basel Convention, the Global Program of Actions on Land-Based Sources of Pollution);
Executive and subsidiary bodies	Some MEAs established standing committees or hold inter-sessional meetings that represent their COP/MOP, to review and advise their Secretariats on implementation. Subsidiary bodies, which are generally advisory in nature, report to COPs/MOPs on scientific, technical, or financial matters or on progress in implementation. They may be internal or external, and be standing bodies or ad hoc, with a limited mandate.
Clearinghouse mechanisms	Clearinghouse mechanisms are generally operated by secretariats to facilitate exchange of scientific, technical, legal and environmental information. A few conventions have established regional centers for training and technology transfer, or to assist in implementation.
Financial mechanisms	Most MEAs are funded via voluntary contributions. Financial mechanisms include: - Regime Budgets. MEAs can establish one or more trust funds, administered by the international organizations that provide the Secretariats. Budgets are proposed by Parties and approved by the COPs. - Development Assistance. Funds can be provided via foundations (e.g. UN Foundation), bilateral arrangements, private sector donors and NGOs. - Other multilateral financing mechanisms (e.g. the Global Environment Facility, The Kyoto Protocol climate related mechanisms, the World Bank).
Implementation bodies	Implementation bodies on the national level, depending on mandate and design of an MEA, can include designated national authorities, focal points, training and other centers with specific functions.

Source: UNEP DTIE / InWEnt, 2003.

2.2.2 Web links to MEAs:

Chemicals and Hazardous waste cluster:

- PIC Rotterdam Convention on Prior Informed Consent (1998)
- URL: http://www.pic.int
- Stockholm Convention on Persistent Organic Pollutants (POPs) (2001)
- URL: http://www.pops.int
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)
- URL: http://www.basel.int

Climate change and Ozone depletion:

- UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997)
- URL: http://unfccc.int

Table 2.2: Summary Table of Multilateral Environmental Agreements

#	Title	Date	Objectives	Possible Funding sources	Ratified countries
1.	Convention on the Prior Informed Consent Procedure (The PIC Rotterdam Convention), Rotterdam	10.9.1998	To promote shared responsibility and cooperative efforts in the international trade of certain hazardous chemicals to contribute to the environmentally sound use of those hazardous chemicals	• Technical Assistance	73 signatories, 30 parties (2002).
2.	Convention on Persistent Organic Pollutants (The POP Stockholm Convention), Stockholm	22.5.2001	To protect human health and the environment from persistent organic pollutants.	• The Global Environment Facility (GEF). • Technical Assistance from the Convention's Secretariat	151 Signatories, 42 Parties, (2003).
3.	Protocol to the Convention for the Protection of the Ozone Layer (Montreal Protocol), Montreal	16.9.1987	To prescribe precautionary measures in order to equitably control and eventually eliminate total global emissions of ozone depleting substances (ODS).	• The Multilateral Fund, to assist developing country parties.	175 parties (2003).
4.	Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), Basel	22.3.1989	To control the transboundary movement of hazardous wastes and hazardous recyclable materials, and to promote their environmentally-sound management	• Technical cooperation fund to assist developing countries •	82 Parties (2003).
5.	The UN Framework Convention on Climate Change and The Kyoto Protocol	1992, 1997	To stabilize greenhouse gas concentrations at levels that would prevent dangerous anthropogenic interference with the climate system.	• The GEF currently channels funds to developing countries on a grant or loan basis.	UNFCCC has 166 signatures, 188 ratifications. Kyoto Protocol has 84 signatures, 120 ratifications

2.3 Cleaner Production

Definition of cleaner production given by United Nations Environment Program (UNEP), (2003): Cleaner Production is a continuous application of an integrated preventive environmental strategy applied to processes, products, and services to increase overall efficiency and reduce risks to humans and the environment. **For Production Processes**, cleaner production includes conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes. **For Products**, the strategy focuses on reducing negative impacts along the life cycle of a product, from raw materials extraction to its ultimate disposal. **For Services**, it incorporates environmental concerns into designing and delivering services (Sanchez San Francisco, 2002).

Stevenson (2002) found that, the term CP is sometimes used as a narrower concept, in which it is: similar to pollution prevention and waste minimization; focused on the efficiency of the technology selected and fine-tuning of the production process; more appropriate to industrial applications

By contrast, in its true definition, CP: includes concepts of pollution prevention, waste minimization, eco-efficiency, and cleaner technology; considers impacts of resource extraction, all stages of production, distribution, use, disposal, and other aspects of life cycle analysis and design for the environment; strives to reduce the use of natural resources or materials throughput per unit of product; includes management issues; has much in common with a comprehensive environmental management system, industrial ecology, and general concepts of sustainable development

Cleaner production is a broad term that encompasses what some countries/institutions call *eco-efficiency, waste minimization, pollution prevention,* or *green productivity*, but it also includes something extra. (UNEP, 2003)

Eco-efficiency: was devised by the World Business Council for Sustainable Development (WBCSD,), (WBCSD, 2003) in 1992 and defined as the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the Earth's estimated carrying capacity.

Pollution Prevention: the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and waste, and that reduce the overall risk to human health or the environment (Environment Canada, 2003). Pollution prevention and cleaner production both focus on strategy of continuously reducing pollution and environmental impacts through reduction at source.

Green Productivity: a strategy for enhancing productivity and environmental performance with a view to overall socio-economic development, involving the use of appropriate techniques, technologies and environmentally compatible goods and services. Green productivity can be applied to manufacturing, services agriculture and the community (Asian Productivity Organization (APO), 2003).

2.4 Benefits of Cleaner Production

Unlike to *"end – of – pipe"* solution, Cleaner production brings tangible economic savings and financial benefits by improving the overall efficiency of production, health benefits for labor and creating new markets.

The result of all these processes, according to Maged M. and Yehia El Mahgary (2002), is economic benefit, whereas the result of decreasing the risk to human and environment is environmental and health benefit, which again could be transferred into economic benefit. These are the two important pillars of Cleaner Production (CP) economic benefit and environmental benefit. Hence, CP is a win-win solution.

The UNEP Working Group for Cleaner Production in the Food Industry (2003) described the major benefits from a Cleaner Production program as following:

Saving Money: Cleaner Production can help to save money through better use of valuable resources. For example, savings can be achieved in the areas of: wasted raw materials; water and energy consumption; waste treatment and disposal;

Cleaner Production, on the other hand, focuses on improving business. Companies can often perform better than their environmental requirements as an outcome of running a profitable and efficient business. Many strategies, such as *housekeeping* and *process improvements*, can be implemented at a low cost and can have *immediate benefits*.

Preventing Pollution: Businesses are encouraged to review work practices and processes throughout the entire operation to identify ways to reduce waste at the source rather than trying to control the pollution at the 'end-of-the-pipe'. This will reduce the risk of causing environmental harm or nuisance.

Complying With Environmental Legislation: Cleaner Production may assist in maintaining or improving compliance with environmental legislation. This can bring a number of benefits such as reduced regulatory intervention, possible reduced license fees and charges.

Decreasing of risk on human health: By implementing CP approaches in Industries, one can provide healthy work places for labor by good housekeeping, further achieving economic benefits from it.

2.5 Cleaner Production Initiatives Worldwide: National Cleaner Production Centers Network

A global network for promoting Cleaner Production world-wide has been created by efforts of UNEP and UNIDO. Starting from 1994, joint UNIDO/UNEP National Cleaner Production Centre program has been facilitating establishment of the National Cleaner Production Centers (NCPCs) as mechanisms for delivery of Cleaner Production at national level. To date, 24 NCPCs have been established under the UNIDO/UNEP program (UNIDO, 2003). In addition, a number of Cleaner Production Centers have been set up under different bilateral/local initiatives.

NCPCs have become national centers of excellence for Cleaner Production in developing countries and economies in transition. Acting as focal points for Cleaner Production, NCPCs extend the global network to partners in their countries - like productivity councils,

non-governmental organizations, chambers of industry, universities, etc. This extensive network with its wealth of information and expertise allows the NCPCs to provide much better services to companies. NCPCs draw on a global pool of institutions that specialize in Cleaner Production. The unique feature of such a set-up is its ability to deliver Cleaner Production solutions tailored to local conditions (UNEP TIE/InWEnt, 2003).

Many international donors, including The International Labor Organization, NORAD, the World Bank, and the Global Environment Facility (GEF) have identified NCPCs as high competent partners for delivering their programs and projects on the national level (UNEP DTIE, 2003). Jukka Uosukainen (2002) said that NCPCs are one of the best tools available for promoting MEAs. The win-win aspects of MEAs have to be communicated, and "the role of industry can not be overemphasized. It is industry that has the skills and resources to innovate."

The key advantages of the NCPCs are:

- Their excellent rapport with local industries, governments and academia and other stakeholders;
- Their ability to adjust and adopt environmental strategies to suit the local conditions, the culture and manufacturing practices of their country; and
- The support of national and inter-NCPCs networks of qualified professionals.

The core activities of the NCPCs are:

- Awareness rising;
- Technical assistance;
- Training and demonstration projects;
- Information dissemination;
- Policy advice;

These core activities of the NCPCs match the implementation mechanisms of the MEAs. Their strategy of advising and enabling industries to find the best solutions for their specific problems rather than delivering ready-made solutions also goes well with the objectives of MEAs and the desire of most countries to determine themselves the best solutions for their individual circumstances (UNEP/InWEnt, 2003).

2.5.1 Structure of the NCPC in Asia

According to UNEP DTIE (2002), for guidance of the NCPCs activities and policy, every NCPC has a national Advisory Board consisting of representatives from the industrial, governmental, academic, and financial and NGO sectors. Its function is to provide advice and various stakeholder perspectives to the Centre. It is neither a decision-making or consensus-building body. The Advisory Board should be constituted of members who are in influential positions or who are well-known experts. The Advisory Board should be composed of a cross-section of stakeholders (government, industry and other important communities), although membership should not be so large that it becomes difficult to manage. Advisory Committees may be established by the Executive Board to provide advice to the executive body. Like most NCPCs, the India Center's Advisory Board consists of a broad range of influential members from the Ministry of Industry (Joint Secretary), Ministry of Environment (Senior Advisor) UNIDO (Country Director); Central

Pollution Control Board (Chairman); Confederation of Indian Industries (Head of Environmental Management Division) National Productivity Council – the host institution (Director General) (UNEP DTIE, 2002).

According to UNEP TIE (2002) guideline's, very important part of NCPC is its staff; Centre staff is directly involved in awareness-raising and demonstration projects, training, dissemination of generic Cleaner Production information and policy dialogue activities. Staff is also involved in technical assistance to individual enterprises, helped by external experts in the beginning, or even later on in industry sectors in which the Centre has not yet acquired industry-specific experience. The Centers create a national network of experts which help in carrying out Cleaner Production work, thereby considerably reducing the Centers overhead.

2.5.2 National Policy Requirement to promote Cleaner Production

According to Chinese NCPC (2003), on June 29, 2002, the National People's Congress of China approved new and comprehensive cleaner production legislation, the Cleaner Production Promotion Law. This new law is the most significant of a number of initiatives the Chinese government has taken to establish Cleaner Production nationwide as one of China's key strategies for sustainable development. It is unprecedented, being the first national law in the world to establish Cleaner Production as a national policy, and to lay out a strategy for its promotion and implementation. This law became effective in January 1, 2003.

Some remarkable progress has been made towards promotion of the Cleaner Production in China. For example,

- In the laws and regulations, including the Law on Air Pollution Control, the Law on Water Pollution Control, the Law on Solid Waste Control, and the Regulations on Water Pollution Control in Huaihe River Basin, etc., CP was emphasized, and it has been proposed as the sole strategy for industrial pollution control.

- In the Ninth Five-year Plan formulated by the industrial administration agencies, CP promotion and industrial pollution prevention were both emphasized.

Cleaner production (CP) began to be promoted in the Czech Republic in 1992. Government has played an important role since the very beginning, and they are now preparing policies and programs for promoting CP. Environmental regulation was enforced by the government, as a result new environmental legislation was enacted in the Czech Republic in 1991/92. This was done mainly by the Ministry of Environment. As a part of the entire CP program, they have been committed to establishing a special purpose fund for CP within the State Environmental Fund (EM Centre, 2004).

According to ICETT (2004), in Thailand, under the 7th National Economic and Social Development Plan, the Thai Government has given high priority to environmental issues including industrial pollution control. The Cleaner Technology (CT) has been highlighted as an important means of environmental management in the 8th National Economic and Social Development Plan. Moreover, CP concept has been integrated in existing policies which emphasize on industrial development. These policies are the Five-year Industrial Restructuring plan (1998-2002), the Draft Master Plan for SMEs and the Energy Conservation Program enacted by the Energy and Conservation and Promotion Act (1992).

2.5.3 Funding of the Cleaner Production Centers

An adequate level and duration of funding is needed to help the Centre get started, develop a favorable market, and reach a self-sustaining threshold of activity. Different countries have different development stages and therefore different support needs, but on average, five years of funding is needed to enable a Centre to become financially sustainable. After the first year of funding, some Centers are able to earn some income from certain services to help cover its expenditures.

Financing their activities from various sources such as:

- **Domestic funding:** National or local government grants or contracts;
- **Operational income:** Cleaner Production assessments, training programs, consultancy fees, membership fees, publication sales;
- **International funding**: Other multilateral/bilateral agencies – World Bank projects, bilateral assistance. For example, UNIDO in co-operation with NCPCs conducted several projects worldwide: technical assistance to cement factory in Egypt, waste minimizations demonstration projects in India and capacity building of national institutions in Sri Lanka (Luken, 1996)

2.6 Obstacles to Achieving Cleaner Production

According to Stevenson (2002) many barriers have become apparent to the achievement of CP, even when technical information and financing are readily available. Some barriers are institutional and others are cultural, and the specific issues will vary from country to country. Most countries, however, encounter aspects of all the following:

- *Lack of Clear Goals***:** national policymakers have failed to articulate clear goals and carry out policies for the achievement of CP
- *Limited Corporate Awareness:* there is limited general awareness at the corporate management or other decision-making level of the principles of CP and its inherent advantages over strategies based solely on pollution control
- *Limited Public Awareness:* there is only limited pressure from the public for cleaner industry.
- *Insufficient Trained Personnel:* there is insufficient human capital to evaluate, assimilate, adapt, improve, and diffuse information on CTs and CP practices
- *Incorrect Resource Pricing:* Basic resources such as water, wood, and minerals continue to be regarded as free or almost free goods
- *Poor Monitoring and Enforcement:* There is poor compliance monitoring and weak enforcement of environmental regulations in many developing countries.

2.7 Obstacles in implementing of CP in economies in transition

In early 1990s Central and Eastern European countries started transition of their economies from centrally planned to market economy, as a result of political changes. First activities in the field of Cleaner Production in Central and Eastern Europe countries were initiated and managed from abroad in 1992, mainly from Western European countries, like: Norway, Denmark, Sweden, the Netherlands and etc.

Andrzej Doniec (1995) identified that, the most serious obstacle in getting industrial plants interested in CP in Poland is a complete lack of interest and certain resistance to argumentation. Lack of interest is a result of the following factors: poor financial conditions of plants fighting for survival; accustoming to functioning in the "command" system; neglecting the relation of pollution reduction and economic efficiency; schematic thinking – apprehension "end-of-pipe" problems only; believing that only way to improve the state of the environment in the plant is to allocate significant funds; underestimation of organizational solutions; discrediting of the idea of technical improvement (rationalization) in the period of planned national economy.

Vladimir Dobes (1995) summarized several negative barriers for the implementation of Cleaner Production in Czech Industry, such as: resistance to changes in the approach towards production on the level of enterprise and government as well. Usual approach is end- of- pipe solution; old management system in enterprises; unclear ownership, unclear responsibility, lack of enterprise strategy; lack of information on Cleaner Production. Especially on waste minimization method and its technical and organizational possibilities

According to Miroslav Chodak (1995) Slovak Industry met more than 50 barriers to implementation of cleaner technologies; identified barriers can be summarized under six key areas: present situation; human resources; governments; economy transformation process; policy instruments; and enterprises.

2.8 Approaches to Promote Cleaner Production

This section aims to review of the possible strategies for promoting of Cleaner Production through the use of different environmental policy tools, such as regulatory, economic, information based and voluntary program instruments. Therefore, only short explanation of each option will be discussed.

In its full definition, concepts of CP are readily and productively applied in areas beyond industrial processes, and the development of a national strategy is essential for its achievement (UNEP DTIE, 2003). According to UNEP (2003), Pollution and environmental management in the preventive approach get internalized and integrated into the developmental process. A number of countries have made progress, albeit to varying extent, in applying a mix of instruments for promoting CP. (EM Centre, 2002). Cleaner Production strategies would thereby be integrated in various policies such as:

- Environmental policies
- Industrial policies
- Resource pricing policies
- Trade policies
- Fiscal policies
- Educational policies
- Technology development policies

Stevenson (2002) suggested wide range of policy instruments that governments can use to stimulate the achievement of CP. A number of different typologies may be used to classify environmental policy instruments, but one of the most commonly used distinctions divides instruments, according to the basic nature of the mechanism, into four categories: Luken, Sedic (2002), however suggest, that Government Policies can be categorized into the three

categories that Organization of Economic Cooperation and Development (OECD) has proposed for output oriented (pollution reduction) environmental policies:

- **Regulatory-based instruments** (Stevenson, 2002) **or Command and Control instruments** (Luken, Sedic, 2002), that regulate behavior affecting the environment by law require specific behavior;
- **MBIs** (Stevenson, 2002) **or Economic instruments** (Luken, Sedic, 2002), that offer financial incentives for particular activities; such as charges, taxes and fines to improve environmental performance.
- **Information-based instruments** that seek to change behavior by providing information to decision makers; and
- **Voluntary programs** that the private sector may undertake with the encouragement and cooperation of government, or in direct collaboration with government, to change behavior.
- **Other instruments** that are non-mandatory efforts aimed at improving environmental performance. These include planning, environmental impact assessment, voluntary agreements, information disclosure and environmental management systems.

2.9 Regulatory-based instruments

Since the inception of environmental policy, the predominant strategy for pollution reduction has been through the use of regulatory instruments, in which public authority sets standards and then inspects, monitors and enforces compliance to these standards, punishing violations with formal legal sanction (Stevenson, 2002). At the core the command and control system of policies is set of direct regulations aimed at directly modifying behavior. These instruments include quotas, direct limitations behavior, prescribed regulations and standards, etc. established, controlled and enforced by the government (Luken, Sedic, 2002). According to Sanchez San Francisco (2002), command and control can reduce the cost to society if the regulator adapts the abatement cost to each company, so that no polluter is asked to reduce emissions if another can do so at lower costs. Traditional Command and Control system is shown in Figure 2.3

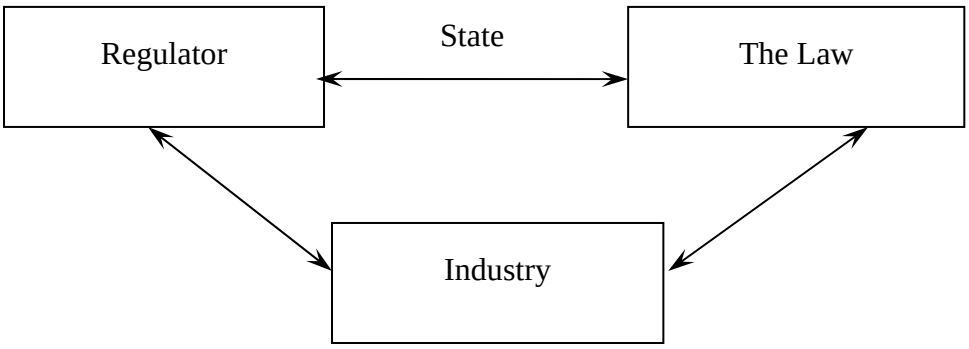


Figure 2.3: Traditional Command and Control System
Source: Tiong, (1998).

According to Stevenson (2002), there are certain situations where regulatory instruments may be seen as the most appropriate and effective means of achieving a desired

environmental outcome, a pertinent example being the control of hazardous materials through specified restrictions and banning.

But generally and specially in situations with many various polluters, a large informal sector, and weak public administration, command and control policies will not work so well (Sanchez San Francisco, 2002). Moreover, the regulated community tends to become alienated and united in its opposition to the rule makers, and the approach has tended to encourage the use of end-of-pipe, media-specific technologies in order to respond to the regulatory requirement in a direct and visible manner. Regulatory instruments can be classified to the following types (Stevenson, 2002):

- *Discharge standards*, in which the producer is limited in the amount of waste that can be discharged into the land, water, or atmosphere, are the most common type of regulatory approach.

- *Product controls*, aims for environmental improvements throughout the life cycle of the product systems by obliging manufacturer responsible for its product.

2.10 Economic instruments or MBIs

Economic instruments used in environmental policy compromise those policy instruments, that may influence environmental outcomes by changing the costs and benefits of alternative actions open to economic agents (Luken, Sedic, 2002). Economic instruments, however, according to Bakken, (2001) are normally better at stimulating reduction processes than at meeting specific emission targets, when they are rarely effective. The importance of economic instruments has put an important focus on the costs of reductions, and on allowing industry to meet general or specific goals more flexibly.

But market- based incentives, allows each polluter to decide whether to pay, for example a tax; or to assume additional abatement, with the result that low-cost abatement is selected since each source will abate only if the marginal costs of abatement do not exceed the tax rate (Sanchez San Francisco, 2002). Government may stimulate CP measures by providing grants, subsidies, and favorable tax regimes to relevant industrial enterprises.

The case of taxes: taxes can be used to promote CP practices by raising the costs of unwanted outputs, or by providing incentives to promote more efficient use of natural resources (Stevenson, 2002).

The case of subsidies: subsidies are a form of monetary aid, which must act as an incentive for polluters to change their behavior or which is given to companies facing problems in complying with imposed standards (Sanchez, 2002). There several types of financial assistance (Stevenson, 2002 and Sanchez San Francisco, 2002):

- Grants are non-reimbursable forms of financial assistance, provided if certain measures are taken by polluters to reduce their future levels of pollution
- Soft loans are loans provided to polluters, particularly small and medium enterprises (SMEs), to undertake certain anti-pollution measures that can contribute to CP

- Tax allowances help actors by means of allowing accelerated depreciation or other forms of tax or charge exemptions or rebates if certain anti-pollution measures are taken.

2.10 Information-based instruments

In addition to creating to creating an appropriate regulatory and financial framework for CP, a government may stimulate the adoption of CP practices through the use of informational measures. Examples of information based-based strategies that may be introduced by government include the following (Sanchez San Francisco, 2002 and Stevenson, 2002):

Product labeling includes initiating and supporting measures that address consumption, such as eco-labeling schemes and environmental product declarations).

Information dissemination on best industry practices provides enterprises useful information that they can adopt in their own practices.

Training facilities, establishment of the training facilities will accelerate creating of the skilled human resources needed to carry out CP strategies at firms.

2.11 Other Instruments

These instruments compromise a number of different kinds of tools, many of which have been introduced into environmental regulatory systems fairly recently. They may be grouped into three major sub-categories (Luken, Sedic, 2002):

- Environmental planning and environmental assessment instruments;
- Voluntary programs;
- Information disclosure schemes and environmental management and audit schemes.

Most of these instruments involve improving environmental performance by enlisting the voluntary support of the parties concerned and supplying them with better information, guidance, training, etc

Chapter 3

Methodology

3.1 Methodology

The Methodology adopted in this study is divided into the following stages:

- *Pre-Data collection;*
- *Field Data collection;*
- *Data analysis;*
- *Production of the final report that* includes conclusion and recommendation

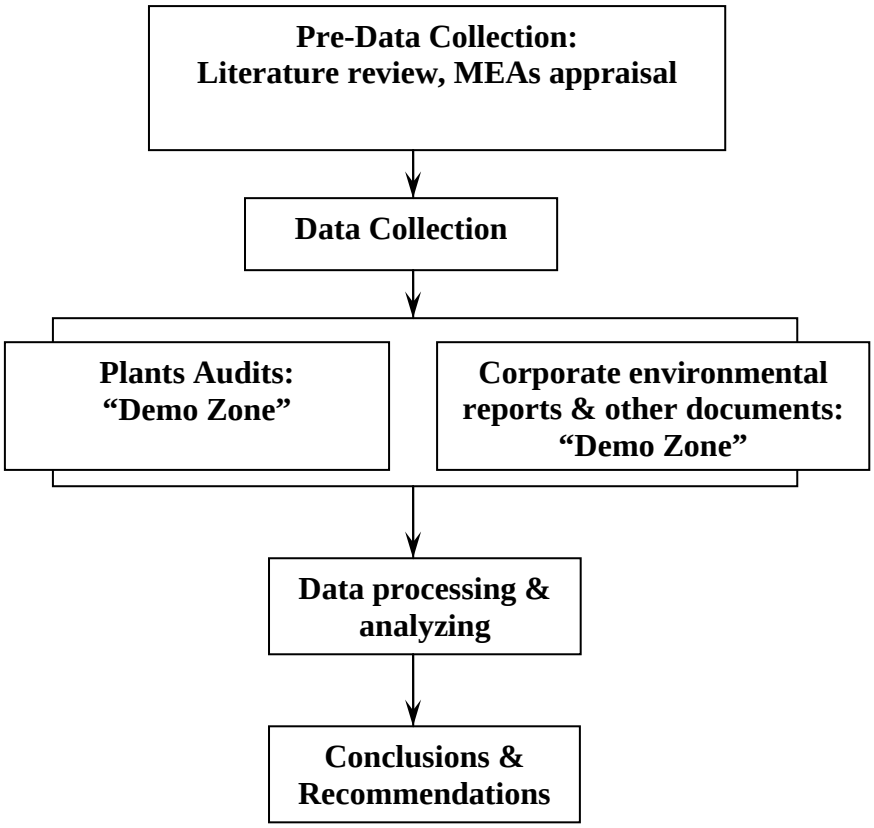


Figure 3.1: General Methodology Outline

3.2 Pre-Data Collection

As a main goal of the study is development of strategy of CP Promotion, and one of the possible ways to promote CP and the sources of Financing CP activities are MEAs. Pre-Data collection was based on the review of the certain existing MEAs, and the following MEAs were examined in this study:

- PIC Rotterdam Convention on Prior Informed Consent (1998)
- Stockholm Convention on Persistent Organic Pollutants (POPs) (2001)
- UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997)
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)

Since the MEAs are covering a broad range of environmental problems, this study was focused on MEAs, which could be applicable to Kyrgyzstan.

The scheme of inter- linkages is shown in the Figure 3.2.

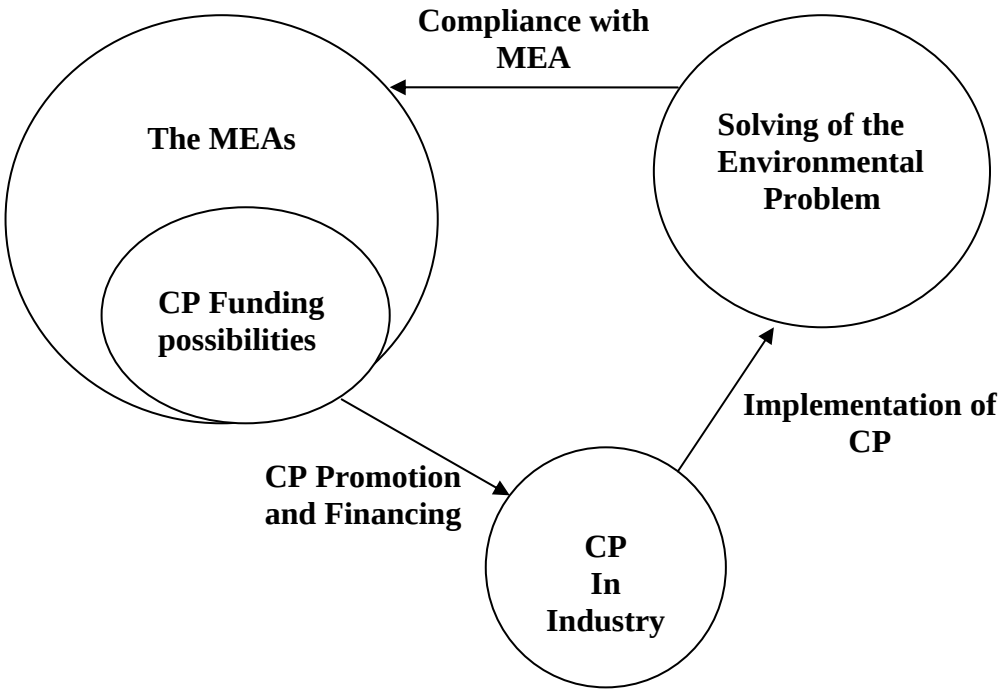


Figure 3.2: Inter – linkage between MEAs and CP

3.3 Field Data Collection

Field data collection was based in host organization “Demo Zone”, (Bishkek City, Kyrgyzstan), and conduction of the study was supervised by local Cleaner Production specialist.

For the development of the CP promotion strategies, background information on Present Situation in the Industry, Government and Policy Instruments and critical review is needed.

Field Data collection was based on three stages or areas:

1. Present Situation: it is a key area, provides a milieu for other areas.

   This area determines the total potential of country for CP.

2. Government, Policy Instruments:
   - Role of the Government in Environmental Regulation;
   - Existing environmental regulatory instruments;
3. Enterprises:
   - Existence of Environmental Management System (EMS);
   - Compliance with Environmental Regulations;
   - Barriers and promoters for implementation of CP;

3.3.1 Method of Data Collection

All the related study Data is gathered by:

(1) Visiting government agencies and relevant enterprises;
(2) Review of Publications;

By Visiting Government Agencies and Relevant Enterprises

Data was collected by visiting Government Agencies: State Energy Agency, Environmental Protection Department, a department within the Ministry of Environmental Protection and Emergency, National Statistic Committee, located in Bishkek, Kyrgyzstan.

Following enterprises were visited during study period of time:

(i) “Kyrgyzmebel” JS Company (Furniture): - a company produces a wide range of furniture.

(ii) “Coca Cola Bishkek Bottlers” JS Company (Beverages): - one of the largest beverages producing companies in the Kyrgyz Republic.

(iii) “Bulgaary” JV Company (Tannery): - one of the country’s medium sized tanneries, producing a wide range leather products.

Review of Publications

Reviewing of publications focused on current state of Industrial Pollution, Environmental Legislation to identify promoters and barriers of successful implementation of CP in Kyrgyz Industry.

Data were mainly collected from organizations, like UN Library, "Capitals Market" journal, State Technical Library, universities Kyrgyz – Russian University, KS UCTA.

Personal communications were also done with persons with knowledge in this area, who gave their opinion and suggestions about the actual environmental and economic problems of industry in Kyrgyzstan.

3.4 Data Analysis

Analysis of the field collected data for Identification of possibilities of Funding of Cleaner Production. Data or information will be evaluated by following steps:

Step - 1

First of all, this study was started by reviewing of the MEAs to finding out inter – linkages with CP, for further financing of CP actions; reviewing the present state of environment in Kyrgyzstan. As a major goal of this study is Development of Strategy of CP Promotion, and implementation of CP, the following issues examined:

(i) Linkage between MEAs & CP for CP Promotion.

(ii) Current state of the Environment; Industrial Pollution.

(iii) Industrial compliance with Environmental regulations and promoters and barriers of implementation of CP.

Step - 2

Based on the previous step, a proposed strategy of CP promotion developed and recommendations are made.

This study has the following outputs:

- Current environmental problems of the Industry determined, and analyzed;
- Strategy of Cleaner Production Promotion in The Kyrgyz Republic was developed;
- Potential donor organizations was determined for financing of Cleaner Production Projects based on Multilateral Environmental Agreements: Kyoto Protocol, Basel Convention, etc;

Chapter 4

Overview of the Current Industrial Trends and Environmental Impact of these Activities

4.1 Industrial sector in Kyrgyzstan

In this section of the study, the industrial sector is reviewed in depth, focusing on industry characteristics; the current economic trends and the resulting changes to the sector; and finally, environmental problems which is associated with industrial pollution in Kyrgyzstan.

4.1.1 Industries Characteristics

Comparing with other republics of the Former Soviet Union, Kyrgyzstan was less industrialized with only few industries. Before the collapse of the Soviet Union in 1991, industry was one of the main components of the national economy, which made up almost half of the national GDP. Since 1991, it started to decline after total breakdown of links between the former Soviet Union economies. And in 1996 it contributed only 11% of the GDP (Soros - Kyrgyzstan Foundation, 2001). During the next years it has had a tension to rise, reaching 26.2% in 2002 (World Bank, 2004), as it can be seen in Table 4.1. Industrial activities are decreased since 1992 by 26.2% in 2002; the main reason is the collapse of Soviet Union, and the following breakdown of the economic and trade relations with other Former Soviet Republics which lead to decrease of industrial activities.

Table 4.1: GDP by economic activity 1992 -2002 (%)

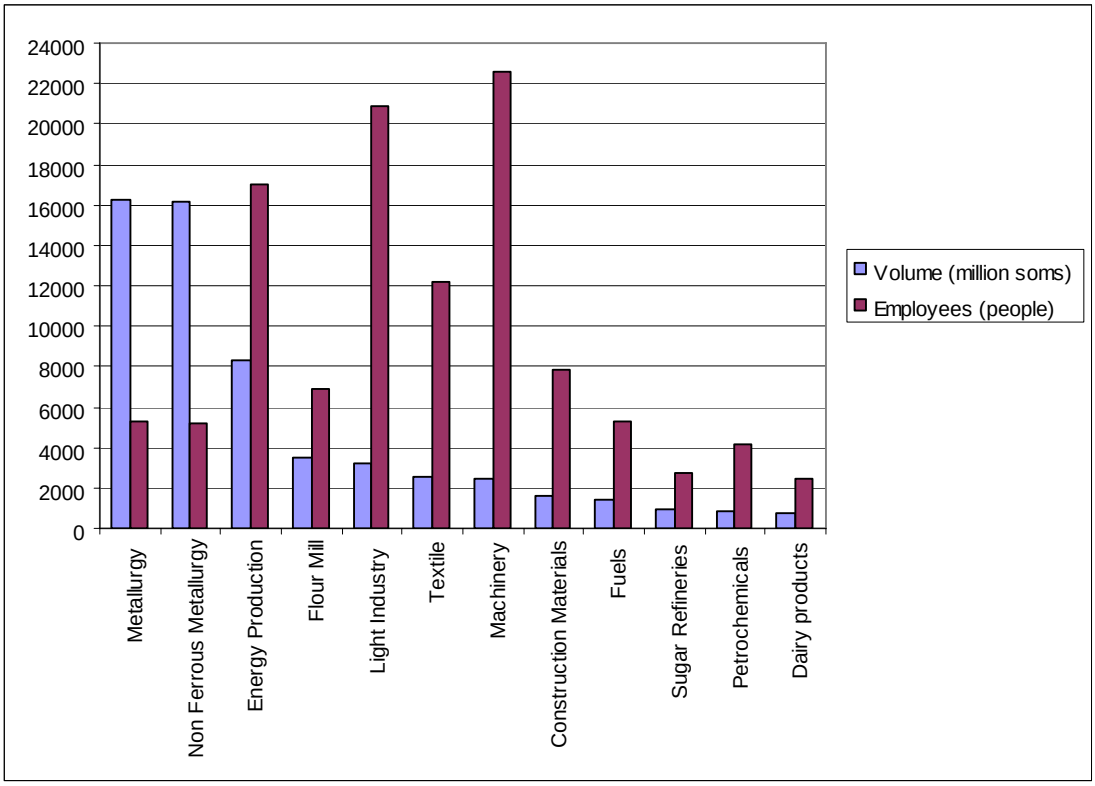
Economic Activities	1992	2001	2002
Agriculture	39	37.3	38.6
Industry	37.8	28.3	26.2
Services	23.2	34.4	35.2

Source: World Bank, 2004

Information on industrial activity has been obtained information from the National Statistics Committee. The Committee did not provide information on industrial output and employment on the plant-level. However, it can provide information on industrial activity at both the sectoral and regional levels.

According to National Statistic Committee (2003), in 1998 2,365 enterprises were in operation, and in 2002 the number of existed enterprises reduced till 1,892. Total industrial production in Kyrgyzstan fell by approximately 10.9% in 2002 comparing to the production level in 2001, despite this fact some industries has shown increasing production output, like food processing (10.8%); textile industry (15.7%) sawmills and furniture industries by 20%. While employment rate in 2001 was 130.5 thousand people, and fell to 124.8 thousand people in 2002. The sectors heavily affected are the metallurgy and machinery industries, the flour mills. In 2002, the largest industrial sector in terms of value

of production was Metallurgy and in terms of employment was Machinery (Figure 4.1). The eight largest industrial sectors in Kyrgyzstan contributed to approximately 93% of the total value of industrial production in the country.



Note: The Som – The National Currency of Kyrgyzstan, Exchange rate 100 soms – 42.53 USD

Figure 4.1 Value of Industrial Production and Employment: Largest Sectors 2002
Source: National Statistic Committee, 2003

There are 4 distinct industrial regions in Kyrgyzstan (Figure 4.2). Chui Region accounts for approximately 31% of the total value of industrial production in the country. Second largest industrial center is the capital city Bishkek with 20.2%, and rest of the regions are Jalal - Abad Region (17.1%), and Issyk – Kul Region with 19.0%. These 4 regions all together accounts for more than 70% of the total value of industrial production in Kyrgyzstan.

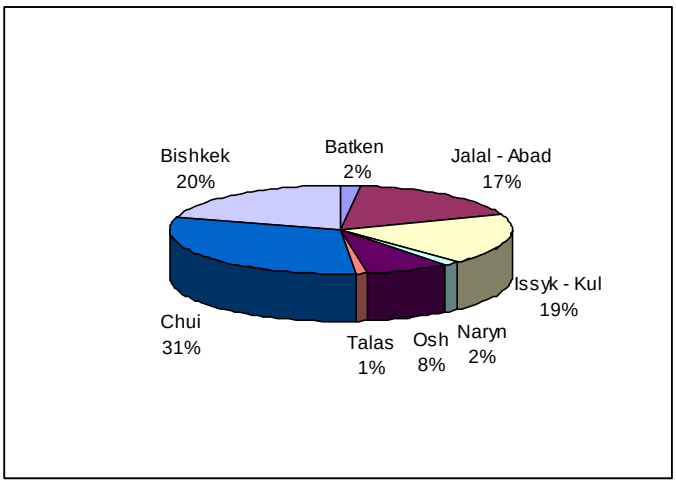


Figure 4.2: Distribution of Production Value across Regions 2002
Source: National Statistic Committee, 2003

While industrial activity is geographically concentrated in a small number of regions, the composition of this activity differs considerably across these four regions. While no single industry dominates industrial activity in Chui region (the largest industry, Metallurgy, Machinery and Food Processing). In Jalal - Abad, and Issyk – Kul regions are heavily dependent on the behavior of a small number of industries: Electrical Energy production, Metallurgy in Jalal - Abad, and Metallurgy in Issyk-Kul.

4.1.2 Size of enterprises

As a result of Privatization in the early nineties, more privately owned firms have emerged as well. In 2002, the private sector, including joint ventures (JVs), created 89.4% of jobs out of the total jobs in the industrial sector (National Statistic Committee, 2003). The Table 4.2, below shows the breakdown of Production Value and employment by enterprise type:

Table 4.2: Production Value and Employment by Enterprise Type 2002 (%)

Industries	**Number of enterprises**	**Production Value**	**Employment**
State (including municipal enterprises)	10.6	4.5	10.6
Private:	89.4	95.5	89.4
- individual	18.6	12.1	5.6
- joint stocks	66.1	79.6	80.8
- Foreign Invested companies (JVs)	4.7	3.8	3.0
Total:	**100**	**100**	**100**

Source: National Statistic Committee, 2003

4.1.3 Current Trends

Despite the instability in the growth of the small and medium enterprises (SMEs), they provided a fragile but still important livelihood in a time of high unemployment and very

low income. In 2000, SMEs produced 33% of the total food products, and 35% of the total production of light manufacturing: shoes, clothes. Moreover, some sectors of industries produced reached high production level, for example, production of knitted fabrics reached 85.7% of the total production; textiles – 94.1%; and shoes manufacturing and ethyl spirit production reached all 100%, (Soros – Kyrgyzstan Foundation, 2001).

At the same time SMEs are trying to implement innovative technologies in product and production process improvement, but according to Statistic Committee (2003), for the last three years only 9% out of 492 enterprises has implemented innovative technologies: food products and tobacco industries used to implement one third of innovations, and manufacturers electronic, electrical and optic equipments implemented one fourth of innovations. Most industrialized centers of Kyrgyzstan - Bishkek city and Chui Region were active in the process of technological innovation. Most of the innovated companies highlighted improvements in working conditions, development of the production, and high energy efficiency of the process and decreasing of the impact on the environment.

However, most of the enterprises still using out dated technologies and equipments, which has an enormous impact on the quality of the producing product and on the environment as well, lack of capital at the enterprises has caused these problems. The negative environmental effects of industry in Kyrgyzstan can typically be broken down into a number of categories, including:

1. Water-related environmental impacts
2. Air pollution-related environmental impacts
3. Solid Waste related environmental impacts
4. Workplace health and safety problems

4.2 Overview of the State of Environment in Kyrgyzstan

State of the Environment is an indicator of the environmental management system in the industries of Kyrgyzstan, and the study gives some idea of the current environmental situation. Since the meaning of environment cover a broad range, the overview of state of Environment covers the following issues:

(a) Water pollution;
(b) Air pollution;
(c) Solid Waste Management;
(d) Hazardous Waste Management;

4.2.1 Water Pollution

In 2000, 746.3 million cubic meters of waste water is discharged into natural receiving bodies. Only 137.7 million cubic meters undergo waste-water treatment, be it mechanical, biological or physico-chemical. 1.42 to 0.75 million cubic meters of toxic or dangerous waste water is discharged without any treatment. It is related to improper treatment of the wastewater from the cities and meat and milk, food processing industries as well.

Based on the situation in 1990s, waste-water treatment units (WWTU) represent a capacity of 300 million cubic meters per year. Industrial waste water is generally treated in municipal waste-water facilities, possibly after a detoxifying or primary treatment. The

monitoring of municipal waste-water treatment plant outflow is the responsibility of the State enterprise operating the plant.

Most of the cattle breeding enterprises have no wastewater collection, storage and utilization. There is no quantified information on the pollution discharge by agriculture, be it point pollution (manure from cattle breeding) or diffuse (fertilizers and pesticides impacting river water quality). But untreated manure containing sewage and livestock wastes is perceived as one of the most dangerous sources of water pollution at present.

According to the data from Ministry of Environment (2001), toxic pollution has increased since 1995. Due to the recession, the preliminary treatment facilities at industrial plants are rarely operated. In the Bishkek region, they function at 5 to 10 per cent of their capacities, if at all. In general, they are outdated, obsolete and require overhauling.

Surface waters pollution monitoring: Water monitoring is spread over different State agencies/institutions:

- The State Agency for Meteorology (Hydromet) of the Ministry of Environmental Protection monitors surface water quantity and quality.
- The State Committee for Geology and Mineral Resources of the Ministry of Environmental Protection monitors groundwater quality and quantity.
- The Environmental Monitoring Department of the Ministry of Environmental Protection monitors the purification performances of municipal waste-water treatment plants and of the major industrial enterprises.

In 2000, Hydromet had a routine monitoring network of about 180 stations located on rivers, lakes and reservoirs. There, the global basic parameters of water quality, plus a few specific elements as heavy metals and some organic pollutants (oils, pesticides, phenols, etc.), were determined.

Chui River, located in Chui valley is the most polluted river in Kyrgyzstan, because of industrial activities in this region. The quality of the river is remained stable, for the last decade impact from the industry reduced because of economic reconstruction. Dissolved oxygen in Chui River is 7.84 – 11.6 milligram per liter. The range of BOD in the river was from 0.29 to 1.36 milligram per liter. Upper stream of Chui River is less polluted, because the main sources of pollution are located in the middle and down streams. Insufficiently treated wastewater from WWTP is discharged into the river; leading to the increase of the concentration of nitrites is 0.034 milligram per liter, copper compounds is 0.002 – 0.005 milligram per liter, nitrates 0.22 milligram per liter, and concentration of phosphorus 0.230 milligram per liter.

4.2.2 Air pollution

Air pollution is local phenomenon. Despite substantial decreases in controlled emissions in 1990 compared to 1998 (according to stationary sources from 640,000 to 218.1 000 tons annually) environmental conditions in the cities are worsening systematically. The basic reasons are the lower quality of raw materials being used; especially fuel (high ash, high-sulfur, and low-caloric), the reduced efficiency of treatment facilities, the weakening of environmental protection measures taken by enterprises, and the aging vehicles, which alone are responsible for 80% of emissions.

Monitoring network and stations: Air quality monitoring is the responsibility of Hydromet of the Ministry of Environmental Protection. The national network has 13 monitoring stations Dust (by gravimetry), SO2, CO and NO2 are measured at all stations. Air quality monitoring is conducted by Hydromet in four cities: Bishkek, Kara - Balta, Tokmok and Cholpon – Ata (Table 4.3).

Table 4.3 Air quality Monitoring stations in the Kyrgyz Republic, 2000

#	City	Number of stations	Number of conducted monitoring
1	Bishkek	7	17 161
2	Kara-Balta	2	1 480
3	Tokmok	2	1 478
4	Cholpon – Ata	2	894
	Total:	13	21 013

Source: Ministry of Environment, 2000

In 1998, the annual average concentration for dust was 0.7 milligram per cubic meter or 4.7 times the MAC. The average values for the stations taken individually range from 0.2 to 1.1 milligram per meters in the centre of Bishkek. SO_2 average concentrations have not exceeded the MAC, individual values ranging from 0.004 to 0.009 milligram cubic meters with an overall average of 0.006 milligram per cubic meters. For NO_2, the standard has been slightly exceeded overall at 1.5 times the MAC, individual average concentrations varying from 0.03 to 0.07 milligram per cubic meters. Pollution by CO was a 5 milligram per cubic meters overall average or 1.7 times the MAC with individual values ranging from 3 to 9 milligram per cubic meters. It is also reported that high levels of BaP exceeding 25 times the MAC have been observed.

Sources of Air Pollution: In general, there two major sources of air pollution, namely:

(i) Mobile sources: vehicles;
(ii) Stationary sources: power stations, industries, and domestic fuel burning;

Mobile sources: Emissions from mobile sources peaked in 1989 with 485,000 tons and reached a record low in 1994 with 109,000. Since then, the values have ranged from 183,000 to 202,000 tons, without showing a significant trend.

Stationary sources: In 2000, emissions of the air pollutants into the atmosphere have depended mostly on the economic activities of the state: energy sector and industrial sector, and the situation in municipal economy. Most of the industrial enterprises still active are using out-of-date technologies and processing equipment, which in addition has been or is poorly maintained due to a lack of funds. Air emissions are correspondingly very high, and probably in many cases above the maximum allowable emissions (MAEs) and up to 65 per cent of environmental protection facilities in enterprises are working unsatisfactorily.

4.2.3 Solid waste management

Municipal Solid Waste (MSW) management is the responsibility of the Municipalities. In other words, they are responsible for the whole chain of MSW management. There are five elements of MSW Management in Kyrgyzstan:

(a) Generation;
(b) Storage;
(c) Collection;
(d) Transfer and transport;
(e) Final Disposal;

There is a decreasing trend in Municipal Solid Waste generation in 1993 – 1997 (Figure 4.3), but it doesn't indicate real figure, due to problems of MSW collection and utilization, the data of the generated MSW is not correct.

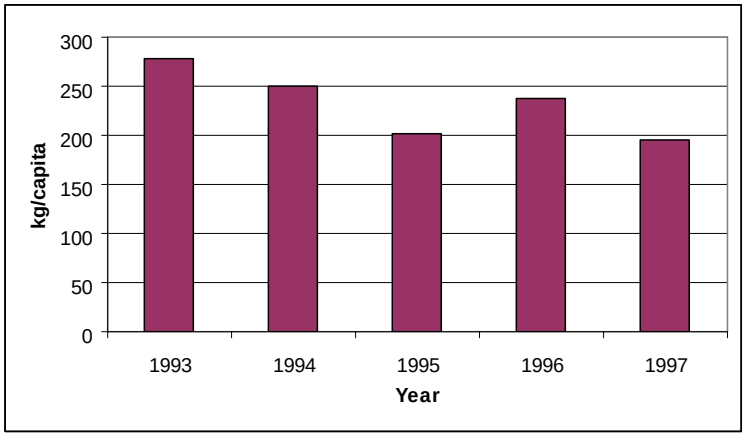


Figure 4.3: Generation of municipal wastes, 1993-1997
Source: National Human Development Report 1999.

The data do not reveal a reduction in waste generation, as waste disposal was largely reduced for the following reasons:

- Decrease in the number of trucks in operation for waste collection and transport
- Increase in waste disposal at non-authorized sites or in the streets
- Exhausted landfill capacities and lack of new sites

There is no separation of waste components for potential further recycling or composting. Previous facilities for the separate collection of waste paper, textiles or glass no longer exist.

4.2.4 Hazardous Waste management

Outdated process technologies are responsible for the relatively high generation of hazardous waste. The storage of toxic industrial wastes has largely been unorganized during the previous decades, and only few enterprises maintained storage sites equipped with measures to prevent the spreading of toxic components and their infiltration into soils and groundwaters.

In the Chui valley approximately 5000 tons of harmful substances suitable for burning, and 10000 tons of inorganic harmful substances are annually thrown out and the generation rate of hazardous waste. Another big problem is registration and utilization of mercury - bearing elements (mercury lamps, thermometers and other devices). At present at the Bishkek machine - building plant 6.4 tons of mercury lamps, thermometers are stored.

There are no noticeable attempts to introduce cleaner technologies, or to recover at least some of the reusable components from wastes. According to the state-of-the-environment report of '97 (1997), there are 53 industrial facilities using very reactive toxic substances, out of which 18 apply chemicals of the highest degree of toxicity. Among those are 3 mining combines, 7 water purification and distribution facilities and 4 meat-processing plants with their respective chemicals, acids, chlorine and ammonia.

In fact, toxic waste, e.g. mercury-containing lamps and thermometers, has been stored in an unprofessional way on industrial sites, such as the Bishkek Engineering Works, the Kyrgyz Truck Assembling Plant, the Osh Machine Building Plant, the Kara-Balta Carpet Factory and others. In many cases, industrial waste is deposited in municipal waste dumps or even in uncontrolled sites. There are no special treatment facilities to decontaminate or break down toxic compounds, nor are there controlled repositories for hazardous waste. Enterprises avoided the proper treatment and storage of the wastes produced.

The enterprises have to store and keep their wastes on their own territories because of lack of special objects for storage and recycling of harmful industrial wastes and grounds for their bury. The harmful industrial wastes, in the majority, are not supervised. Some wastes, for example containing mercury, are thrown out on urban heaps, other remains without observation in different places, and in some cases enterprises temporarily store them on their territory, the generation and disposal of hazardous waste is shown in Figure 4.4.

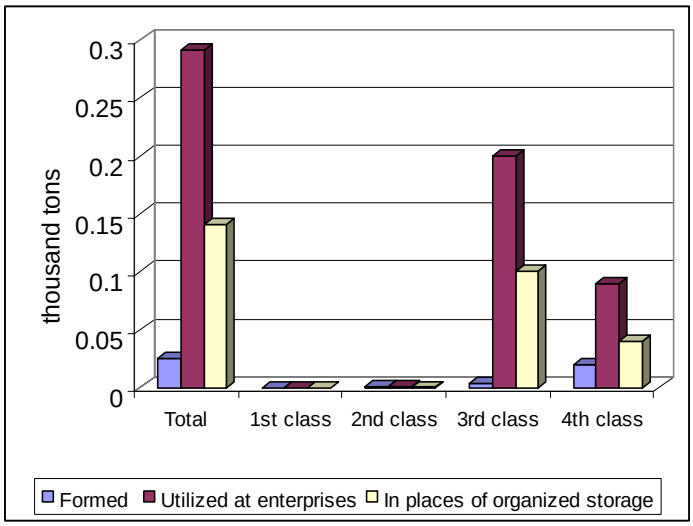


Figure 4.4 Generation and disposal of toxic wastes in 1999, thousand tons
Source: National Environmental Health Action Plan, 2000

In the republic there are no special objects for processing and storage of harmful substances, except for special plant for storage of radioactive sources of radiation. Due to the lack of grounds for utilization of different kinds of wastes, all of them are placed on the enterprise territories on places unsuitable for storage. It leads to ground water

contamination by chrome, mercury, oil-products and other harmful substances. Measures on introduction of waste-less technologies or reutilization and secondary use of wastes are not practically applied.

4.3 Environmental Protection Instruments

Kyrgyzstan has set up different policy instruments, in order to regulate environmental behavior of the Industry. For convenience in considering them, they are grouped according to the mechanism by which they operate, they include:

- Regulatory instruments;
- Economic instruments;
- Financing environmental expenditures;

4.3.1 Regulatory instruments for environmental protection

The Environmental Legislation in Kyrgyzstan has been entirely renewed since its independence in 1991; it is given in Appendix A. The law on Environmental Protection was first adopted in April 1991its currently valid version follows the revision of 1999. The Law defines the procedures for ecological and contains specific articles on licenses for use of natural resources.

Licensing and environmental impact assessment (EIA): The Ministry of Environmental Protection is required to prepare an environmental assessment of contracts and agreements related to the use of natural resources, according to the 1999 Law on Ecological Expertise. It also assesses the materials presented for a license application when the license is to be issued by a State agency (e.g. for prospecting for mineral resources, the withdrawal of water for irrigation). License fees are paid into the State budget. The following activities are required to get license: the prospecting and exploitation of mineral resources, the withdrawal of surface and groundwater for irrigation.

The licensing procedure differs, depending on the size of the investment project. In the case of large-scale investment projects (23 main types of projects are shown in the law), the documentation is submitted to the Department of Ecological Expertise at the Ministry of Environmental Protection. For small investments, the investor normally submits a declaration on pollution, which is subject to ecological expertise at *oblast* level or at regional level.

Permits and related procedures: The system for issuing permits in Kyrgyzstan is not unified. Permits are issued separately by the Ministries of Environmental Protection and Agriculture and Water Resources. Ministry of Environmental Protection is issued permits for all kind of activities, like: emissions from stationary sources; waste generation and management; waste-water discharges; use of natural resources. Only, water abstraction and use is administered by the Ministry of Agriculture and Water Resources.

Generally, a permit is valid for five years. All the conditions related to emissions – locations, emission thresholds and duration – are specified in each permit. The permit conditions are monitored and enforced by inspectors. The limits on the use of natural resources are established by the competent State agency after consultation with the

Ministry of Environmental Protection. For example, limits on mining are defined by the State Agency for Geology and Mineral Resources.

Data of the limits related to emission of air pollution, waste generation and wastewater discharges are recorded in one single document, so called “ecological passport”. According to the data in ecological passport, violation of the methods or the volume of use of natural resources, or exceeding the emission limits could be identified. Exceeding the emission limits leads to fines by the State Environment Inspectorate.

Environmental inspection: The national environmental inspectorate inspects enterprises one to three times a year, depending on the degree of hazard associated with the inspected activity. The aim of the controlling is the conformity of the activity with the granted permit, as well as the emission or discharge information provided by the enterprise. In case of infringement or non-compliance, penalties can be applied to the company manager, or to the company.

4.3.2 Economic instruments for environmental protection

The structure of economic instruments for environmental protection in Kyrgyzstan was inherited from the previous Soviet system and has not been significantly modified since then. The present structure includes:

- User charges applied to water supply, (domestic) sewerage, sewage treatment and water management;
- Emission charges for air pollution, waste-water generation and waste disposal;
- Product charges applied to transport and the use of natural resources;
- Penalties for excessive pollution or for unlicensed activities (illegal tree felling, fish catch, hunting, or extraction of mineral resources);

User charges: User charges are applied for sewage and waste-water treatment as well as for waste management (domestic waste). The system of fees used for water management aims at a rational use of water and the preservation of its quality. Where the necessary infrastructure exists, additional fees are collected for waste– water sewerage and the treatment of waste water in treatment plants.

Charges for water and wastewater: municipalities control the system of fees for water, the discharge of sewage and the treatment of waste water. Municipal enterprises handle waste, treat and supply water. “Vodokanal”, the municipal water service companies manage water works, sewerage and waste-water treatment.

Usually, the municipal service fees are very low comparatively to countries in Central and Eastern Europe. This forces municipal companies to operate on cost-recovery basis; those collected charges hardly cover some expenditure, like salaries and urgent repairs of the water supply and wastewater treatment units. Fees for municipal water services in Bishkek are shown in Table 4.5.

Table 4.5 Water-supply and wastewater treatment charges in Bishkek city, by type of user, som/m^3

Charges	Domestic users	State enterprises and organizations	Commercial users
Water supply	0.60	0.60	0.60
Wastewater treatment	0.27	0.27	0.27

Source: Vodokanal, Bishkek, 1999

Note: the national currency, the som, the exchange rate was 100 soms = US$ 4.2

Charges for waste disposal: Municipal utility companies handle waste collection and disposal. The way charges are levied depends on the type of user of the service. For domestic users living in apartment buildings, the manager of the building pays a monthly rate to the waste - Collection Company.

For commercial organizations, charges are levied per cubic meter of waste produced (approximately 12.5 soms per cubic meter). The quantity is based on the size of the company premises (in square meters), and the number of staff. The overall waste economy in years 1996-1998 in Bishkek is given in Table 4.6.

Table 4.6 Overall waste economy data for Bishkek, 1996-1998 (thousand soms)

Charges	1996	1997	1998
Charge revenues	9, 033.3	11, 522.0	10, 300.0
Total operation costs	8, 788.2	11, 595.2	12, 030.0
Balance	245.1	- 73.2	- 1, 730.0
Total volume of collected waste, (thousand m^3)	567.2	570.8	498.3

Source: Waste management company, Bishkek

The current charges do not cover all the expenditures of the waste services and, because there are no State budget contributions, the waste-collection company reduces its activities (volume of collected waste). As a result, the suburbs have been transformed into a source of pollution and environmental degradation.

Emission charges: In Kyrgyzstan emissions charges are applied for air emissions and wastewater discharges. In case of air pollution, the charge is levied at the basic rate for pollution not exceeding the threshold and at a reduced rate when the actual emissions are below the threshold. In these cases the charges are paid to the Regional Environmental Funds (REF). The REF will then transfer 25 per cent of the sum to the State Environmental Fund (SEF). The revenues from pollution charges collected by the *oblasts* (regions) during 1998 are given in Figure 4.5.

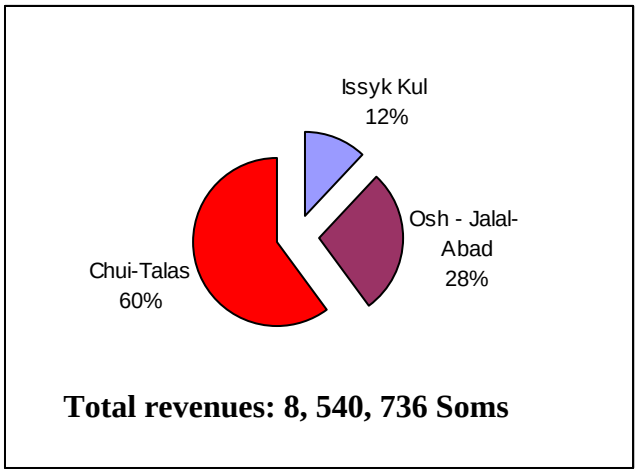


Figure 4.5: Oblast revenues from pollution fees, 1998
Source: Ministry of Environmental Pollution and Emergency Situations, 2001

When emission limits are exceeded, a penalty is applied and the polluter pays an increased rate. According to the Law for Administrative Responsibilities (adopted in October 1998), the entire penalty is paid into the State budget. In the case of penalties, 70 per cent of the fee is to be paid into the State budget and 30 per cent into the State Environmental Fund.

Kyrgyzstan's environmental policy makes quite extensive use of charges on emissions. They should primarily encourage polluters to change their behavior. However, they also help to raise considerable revenue. The revenues from emission charges help the State Environmental Fund to finance environmental activities. The charges are levied on the basis of environmental protection acts.

Polluters discharging their waste water to surface waters pay waste-water discharge fees. Three types of polluters are distinguished: sewage treatment plants, operated by water companies, municipal sewerage systems, and industries. As with air pollution, the charge is levied at the basic, reduced or increased rate according to the degree of deviation from the Maximum Authorized Emissions (MAE) set in the permit. The MAE for water pollution is the maximum permitted amount of pollutants discharged into water per time unit that is compatible with the established maximum allowed concentration 500 meters downstream according to former soviet standards.

Product charges: Three types of product charges are used for environmental protection: charges on the withdrawal of surface and groundwater, charges related to transport, and taxes on natural resources. The State Committee for Water, under the Ministry of Agriculture and Water Resources, collects the withdrawal fees from the municipal water companies and industrial and agricultural enterprises abstracting water. The 1998 fee rates are set out in Table 4.7.

Table 4.7 Fees for freshwater abstraction, 1998

Soms/m^3

Period	In general	In Particular regions
In vegetation period	0.030	0.015
Outside vegetation period	0.015	0.005

Source: Ministry of Agriculture and Water Resources, 1999.

Penalties and fines: Penalties are applied (a) to pollution beyond permitted limits (see above on reporting obligations of enterprises), or (b) to the pursuit of activities without the required license (illegal logging, fishing, hunting, extraction of mineral resources).

Inspectors can impose fines if they find evidence of unreported pollution. According to current practice, the polluter is then fined an amount that is 1 to 10 times the minimum monthly salary (in October 1999, this salary was legally fixed at 100 soms).

Inspectors also impose fines if they find evidence of pollution exceeding the permitted amounts. The procedure can be summarized as follows:

- Inspections are carried out, partly at the request of the regional offices;
- The enterprises' compliance with their permits are checked, visual inspections also take place;
- When a breach of law is detected, a penalty may be imposed;
- Inspectors deliver a written statement to the enterprise, summarizing their observations;
- If the enterprise does not take remedial action, the inspector issues a decision. The decision includes the size of the fine (1 to 50 times the minimum salary) or in some cases the temporary suspension of activities
- The enterprise may appeal against the decision at the Arbitration Court

Penalties for the illegal (unlicensed) use of natural resources are widely applied. The fines are paid into the State budget. Table 4.8 shows the imposed and actually collected "environmental penalties".

Table 4.8: Environmental Penalties imposed and actually paid, 1998

Soms

Affected resources	Imposed penalties	Actually collected	Payment ratio (%)
Water	52, 519	27, 242	51.9
Air	80, 457	68, 713	85.4
Soil	59, 344	33, 613	56.6
Total for excess pollution	192, 320	129, 568	67.4

Source: Ministry of Environmental Protection and Emergency Situations, 1998

4.3.3 Financing environmental expenditures

Environmental expenditures: Environmental expenditures are composed of capital expenditures (investments in equipment and civil constructions) and non-capital expenditures (or current expenditures) that include operational costs, such as personnel, energy, maintenance, chemicals, transport. Table 4.9 gives an overview of investments and current expenditures in the environmental sector in 1994 – 1998 periods.

Table 4.9: Environmental expenditures, 1994 -1998

Million current soms

Category	1994	1995	1996	1997	1998
Investments	27.4	28.8	27.1	32.3	38.3
Current expenditures	60.5	75.6	77.0	119.1	130.3
Total	87.9	104.4	104.1	151.4	168.6

Source: National Statistics Committee, 1998

National source of financing: The State Environmental Fund was established in 1992, by presidential decree as an independent legal entity. The main tasks of the Fund is financing of the environmental protection activities, reproduction of the natural resources. The Fund consists of:

- National Environmental Protection Fund at the central level;
- Regional Environmental Protection Funds at "oblast" level, there are, 8 regional funds countrywide;

The Fund's sources of income are charges on: air pollution, water pollution, waste generation and permits for landfilling. According to the Ministry of Finance, State Environmental Fund's income in 1995 stood at 345,000 soms; in 1996 at 957,200 soms; in 1997 at 1,272,600 soms; in 1998 at 2,072,600 soms.

Environmental expenditures mainly covered by enterprises themselves, also by State Environmental Fund and Regional ones, as well. In 2000, most of capital investments were invested on water resources protection: construction of dams, and river banks strengthening. Since 1998, no capital invested into air protection activities. Total amount of investments on Environmental protection is shown in Table 4.10.

Table 4.10 Investments on Environmental protection

Million soms

Investments	1985	1990	1995	1997	1998	1999	2000
Water resources protection	50.6	56.5	7.4	13.1	9.1	51	7.4
Air Protection	3.7	5.7	3.4	2.3	N/A	N/A	N/A
Land Protection	10.7	22.9	18	16.9	29.3	53.5	55.6
Total:	65	85.1	28.8	32.3	38.4	104.5	63.0

Source: Ministry of Environment Protection, 2001

Table 4.11 gives an overview of the use of investments by sector. During the 1985-2000 periods, most in soil restoration and land protection. While, investments in air protection has been stopped in 1998 till 2000. In total the state's investments have declined in 1995, investing only 28.8 million soms, however, there is a trend toward increase of investments in 1999. This may explain that government investing in end –of- pipe solutions.

Chapter 5

Results and Discussions

5.1 Review of the existing Multilateral Environmental Agreements (MEA) to identify links to Cleaner Production Promotion

In this section, the status and relevance of Cleaner Production in modern MEAs is outlined. The focus is on the core environmental conventions and agreements that deal with hazardous chemicals and wastes anthropogenic impact on a climate. Most of the agreements can be clustered into six areas, these being:

- bio-diversity/species;
- oceans and seas;
- chemicals and hazardous wastes;
- nuclear energy and testing of nuclear weapons;
- energy/climate change/air;
- Freshwater and land related conventions.

A comprehensive analysis of existing MEAs, numbering over 500, is virtually impossible. Instead, examples of MEAs are chosen from each cluster to demonstrate the application of Cleaner Production strategies. Special attention is given to the MEAs from chemical and atmosphere clusters, which incorporate precautionary approach as these can directly benefit from Cleaner Production as a strategy to put precautionary approach into practical actions.

5.1.1 Chemical and Hazardous Waste Cluster

The MEAs in this cluster all deal with management of chemicals and are directly relevant to Cleaner Production. The main treaties of the cluster are the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade, the Stockholm Convention on Persistent Organic Pollutants (POPs).

The Basel Convention has strong focus on Cleaner Production, both in its objectives and in the implementation mechanisms. The fundamental goals of the Basel Convention are the reduction of transboundary movements of hazardous and other wastes subject to the Convention; the prevention and minimization of their generation; the environmentally sound management of such wastes; and the active promotion of the transfer and use of cleaner technologies.

The Stockholm Convention contains direct references to preventive approaches in its preamble and key control provisions. Cleaner Production is of crucial importance for implementing the POPs treaty, particularly in regard to the Convention’s goal of continuing minimization and, where feasible, elimination of the unintentionally produced POPs, since this goal can be most realistically and efficiently achieved through Cleaner Production. All articles of the Convention contain references to one or another component of Cleaner Production, including prevention-oriented policymaking, cleaner technologies, information exchange and training.

Although the Rotterdam Convention does not explicitly mandate preventive strategies, it aims to contribute to environmentally sound use of chemicals. Thus, the convention's requirements on information exchange cover certain aspects of Cleaner Production, such as safer alternatives to hazardous chemicals; cleaner technology, and developing infrastructure to manage chemicals throughout their life cycle.

5.1.2 Atmosphere Cluster

The Kyoto Protocol on Climate Change – one of the agreements, which also strongly encourages Cleaner Production. It sets out the goals of reducing emission of greenhouse gases that, without compromising economic or social needs, can be only achieved via Cleaner Production-based "win-win" strategies.

There are simply no end-of-pipe technologies feasible for eliminating carbon dioxide emissions. The Protocol's Clean Development Mechanism (CDM) will provide credit for financing emissions reducing or emissions-avoiding projects in developing countries, and can become an efficient vehicle for transferring clean technologies and Cleaner Production practices.

5.2 Funding potential of MEAs in implementation of Cleaner Production

For the past decades, as a member of the World community, Kyrgyzstan has signed a number of Multilateral Environmental Agreements (MEAs); it is shown in Appendix B. Since, Kyrgyzstan already signed conventions of chemical and hazardous wastes cluster and atmosphere cluster to find a linkage to Cleaner Production, the following conventions are studied:

1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989);
2. Stockholm Convention on Persistent Organic Pollutants (POP) (1998);
3. Rotterdam Convention on Prior Informed Consent (PIC) for Certain Hazardous Chemicals and Pesticides in International Trade (1998);
4. The Kyoto Protocol (1997);

5.2.1 Potential of the Basel Convention in implementation of CP

The Basel Convention entered into force in May, 1992

Objectives: Among other MEAs, the Basel Convention has a strong focus on prevention of hazardous waste generation, which is pointed in the objectives of the Convention, that, the reduction of transboundary movements of hazardous waste and other wastes, prevention and minimization of their generation, and moreover, environmentally sound management of generated wastes. Transfer and use of clean technologies is actively promoted by the Basel Convention.

The objectives on prevention and minimization of generation of wastes are strongly emphasized in the Basel Declaration on Environmentally Sound Management of Hazardous Waste.

Implementation mechanisms: All processes regarding Information Dissemination and Collection, co-ordination between parties and partners is carried out by the Secretariat of the Convention. It also involved directly in some of the implementing activities at the national level.

The Convention operates through the representatives of each party, i.e. focal points and Competent Authorities. Moreover, one of the key mechanisms in implementation of the Basel Convention is Regional Centers for Training and Technology Transfer around the world. In order to build up capacities of the parties and non-parties, allowing them meet requirements of the Basel Convention, the Regional Centers established.

Capacity Building and Financial Aspects: The Basel Convention has direct link to possible financial assistance, through some mechanisms: the Regional Centers and Technical Cooperation Trust Fund;

Firstly, the Basel Convention's Regional Centers could serve as a source of funding to implement Cleaner Production options at enterprises, through the core activities of the Regional Center, such as:

(a) Developing and conducting trainings, workshops and seminars to public and private industrial sectors in ways of reduction and minimization of generating hazardous wastes;

(b) Promoting public awareness;

(c) Cooperating with parties to mobilize financial and human resources, in order to meet urgent requirements of the parties;

In 1999, Regional Centers entrusted with the implementation of priority measures of the Strategic Plan by COP-6, serving as a main channel for implementing the Strategic Plan with time frame till 2010. Implementation of Cleaner Technologies and Production with involving of Cleaner Production Centers, has clearly pointed out in Strategic Plan's preamble (Basel Convention, 2003).

By COP-6 Decision, Parties or Regional Centers can submit the project proposals within the framework of the environmentally sound management of hazardous wastes or chemical substances and/or their import, export and control to the Open-ended Working Group (OEWG) and donor countries for consideration. As result of OEWG work, 21 projects were approved and financed in total:

- OEWG 1: 15 projects financed totaling US$ 880,000;
- OEWG 2: 6 projects financed totaling US$ 320,000;

For instance, Slovak Republic project proposal "Implementation of waste minimization – cleaner production project" has been approved by OEWG on US$ 30, 687 for trainings conduction (Appendix A). Moreover, OEWG calls for project proposals for next OEWG meeting in year 2004-2005.

5.2.2 Potential of the Stockholm Convention

The Stockholm Convention entered into force since May 17, 2004.

Objective: The objective of the Convention is precautionary approach in using of chemicals in order to protect human health and the environment from persistent organic pollutants. Precautionary approach is applied in practice through preventive strategies; therefore Cleaner Production is integrated into the Convention.

Control Provisions: In its provisions, the Stockholm Convention has direct reference to Cleaner Production, which is required minimization and where it's possible elimination of POPs. All articles of the Convention contain references to components of Cleaner Production, such as Best Available Techniques (BAT), good housekeeping, Best Environmental Practices (BEP), training of labor and policymaking to reduce and eliminate POPs from the production processes of enterprises and from agriculture use as well.

Control provisions contain separate articles on intentionally and unintentionally produced substances, and both pertaining to Cleaner Production. ***Article 3*** of the Convention deals with measures to reduce or eliminate releases from intentional production and use of substances. It requires parties to adopt regulatory approach, which is directly related to Cleaner Production. Measures on unintentional production and use of POPs is mentioned in ***Article 4***, by setting a goals to continuous minimization and where it possible ultimate elimination of the substances (Stockholm Convention, 2003). All paragraphs of the article are relevant to Cleaner Production and its different components, policy, technological aspects.

Implementing mechanisms: Intergovernmental Negotiating Committee (INC) is managing the Convention in the interim period. The Secretariat serves as a clearinghouse for the Convention. The Convention requires parties to develop implementation plan within two years by involving all interested stakeholders, review it and update the plan on a periodic time. Moreover, it is suggested to integrate implementation plan into national sustainable development.

Parties are obliged to facilitate and launch information exchange by the Article 9 of the Convention, in order to reduce or eliminate POPs. All parties are required to set up a national focal point for information exchange.

Financial Assistance: The Stockholm Convention has direct reference to possible financial resources in its provisions. Financial assistance is provided by developed parties, according to Article 13 of the Convention, in order to meet the costs of the implementing measures to fulfill their obligations of the Convention. By the requirement of the Convention, financial mechanism is functioning under the authority, which is accountable to the Convention for the purpose of the Convention.

For instance, Canada POPs Fund has supported projects on capacity building in developing countries and countries with economies in transition (CEITs) in order to reduce or eliminate releases of persistent organic pollutants from these countries the total project budget is CAD $20 million, which is provided by the Government of Canada, and is managed by the World Bank, and implemented by the Bank and UNEP Chemicals (UNEP Chemicals, 2004).

As an example, in 2002 Canada POPs Fund financed the project aimed to improve India's capacity to ratify and implement the Stockholm Convention. As a result, a status report was prepared, outlining India's readiness to implement the Convention. The report consisted of an institutional assessment of legislative, regulatory and organizational frameworks pertaining to POPs; a review of industrial sectors responsible for POPs emissions; a review of monitoring and assessment capacities; and actions to date in the areas of pesticides, PCBs, DDT and unintentionally produced POPs (dioxins, furans and PCBs), (Confederation of Indian Industry, 2004).

Article 12 of the Convention requires technical assistance from developed countries parties to developing and economies in transition countries parties, allowing them to meet requirements of the Convention by transferring technologies to them. For instance, in 2001 UNIDO in close cooperation with GEF implemented a US$ 250,000 POPs project on Non-Combustion Technologies for Destroying POPs in the Philippines and Slovakia has been approved, more details are given in Appendix B (UNIDO, 2004).

These are potential sources of financing Cleaner Production activities, which will be useful in Kyrgyzstan for both Capacity building and technology transfer activities.

5.2.3. Potential of the Rotterdam Convention

The Convention entered into force on 24 February 2004.

The convention's mandate has not strong focus on the preventive strategies, set out by the references to some Cleaner Production components in the objectives. The preamble of the Convention recognizes "contribution to the environmentally sound use of hazardous chemicals, by facilitating information exchange about their characteristics," and "providing national decision making process to Parties".

Objective: Promotion of shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm is the objective of the Convention. As a precautionary approach is implemented into practice through preventive strategies, therefore, Cleaner Production is somehow embodied into the Convention's mandate.

Control provisions: Control provisions include articles for the environmentally sound use of chemicals, pertaining to Cleaner Production. However, articles do not contain direct link to Cleaner Production components and techniques.

By Article 10 each party is required to implement appropriate legislative or administrative measures to ensure timely decisions with respect to import of chemicals listed in Annex III of the Convention.

Implementation mechanisms: The administrative functions required by the Convention are performed by the Designated National Authorities (DNA), designed by the parties. Parties adopted final regulatory action, and are required to notify the secretariat in writing of such action.

A Secretariat is arranged meetings of the Parties and assists to the Parties on request, in the implementation of this Convention. Also the Secretariat coordinates cooperative activities

with other international bodies. In order to implement the Convention, parties are required to facilitate the exchange and provision of information about chemicals within the Convention, among parties and to public.

According to Article 15 of the Convention, for the effective implementation of the Convention, all the parties are obliged to take measures to establish and strengthen its national infrastructures and institutions, by establishing of national registers, databases, including safety information for chemicals. Moreover, industries shall be encouraged for their initiatives to promote chemical safety.

Financial and Technical Assistance: As the Rotterdam Convention does not clearly mandate preventive strategies, and therefore, Convention does not have direct linkage to financing CP options. However, provision of the technical assistance is given in Article 16 of the Convention. Developed Parties shall, shall understand the needs of developing countries and countries with economies in transition and cooperate in promoting technical assistance for the development of the infrastructure and the capacity necessary to manage chemicals to enable implementation of this Convention.

Parties with more advanced programs for regulating chemicals should provide technical assistance, including training, to other Parties in developing their infrastructure and capacity to manage chemicals throughout their life-cycle.

According to Article 11, each exporting Party shall advise and assist importing Parties, by obtaining further information to help them to take action and strengthen their capacities and capabilities to manage chemicals safely during their life-cycle.

As an example, in 1999 two pilot projects of the Rotterdam Convention were implemented in Argentina and Thailand, in order to follow the requirements of the Articles 11 and 16 of the Convention. The projects were funded by the European Commission (EC) and the German Ministry for Economic Cooperation and Development (BMZ) with coordination by German Technical Cooperation (GTZ). The main goals of the projects were capacity building, informational network facilities and risk assessment and management (The Rotterdam Convention, 2003). Details of these projects are given in Appendix C.

5.2.4 Potential of the Kyoto Protocol

Objectives: The Protocol is legally obliged 38 industrialized countries, including 11 countries in Central and Eastern Europe, to return their emissions of GHGs to an average of approximately 5.2 percent below their 1990 levels as an average over the period 2008-2012. The Kyoto Protocol has not entered into force, and it is expected to come into force, following Russia's expected ratification.

The Kyoto protocol is supplementary instrument to the UN Framework Convention on Climate Change (UNFCCC), in a way to strengthen the Convention. A principle of operation of the Kyoto Protocol is same, as the Convention, by sharing common objective. Annex groups are remained as in the Convention, grouping into Annex I, Annex II and non - Annex I. Parties (see Appendix D). Conference of the Parties will serve as "Meeting of the Parties" to the Protocol. The Intergovernmental Panel on Climate Change (IPCC) will support the Protocol on scientific, technical and methodological matters as it does the

Convention the advice provided by the Subsidiary Body for Scientific and Technological Advice..

The Kyoto Protocol focuses on:

- Commitments, including legally binding emissions targets and general commitments;
- Implementation, including domestic steps and three novel implementing mechanisms;
- Minimizing impacts on developing countries;
- Compliance, including a compliance Committee to assess and deal with problem cases;

Financial Assistance

The Kyoto Protocol on Climate Change also strongly encourages Cleaner Production, as one of the agreements on environment and sustainable development affecting all sectors of the society. Objectives of the Kyoto Protocol lead to reduction of greenhouse gases (GHG) emissions can be achieved through Cleaner Production-based "win-win" strategies.

In terms of financing Cleaner Production projects, the Protocol's Clean Development Mechanism (CDM), as it mentioned before, provides credit for financing emissions reducing or emissions avoiding projects in developing countries, which is potential source of attracting funding for Cleaner Production purposes.

Another financing mechanism of the Kyoto Protocol is the Global Environment Facility, which operates as the Convention's financial mechanism is the main funding channel for developing countries to implement GHG emissions reducing technologies.

The result of the COP-7 in Marrakesh, (Morocco), is the Marrakech Accords. The Marrakesh Accords established two new funds under the Convention. These will be managed by the GEF, as the operating entity of the Convention and Protocol's financial mechanism, in addition to its climate change focal area:

• A ***special climate change fund*** will finance projects relating to: capacity building; adaptation; technology transfer; climate change mitigation; and economic diversification for countries highly dependent on income from fossil fuels; and

• A ***least developed countries fund*** will support a special work program to assist Least Developed Countries (LDCs) to them adapt to climate change and prepare of national adaptation programs of action (NAPAs).

In addition, the Marrakesh Accords established an Adaptation Fund under the Kyoto Protocol, which will be managed by the GEF and funded not only by the adaptation levy on CDM projects, but also by additional contributions from Annex I Parties.

The Adaptation Fund will finance practical adaptation projects and programs in developing countries, and also support capacity-building activities. Parties to the Protocol have to report yearly on their contributions to the fund and the COP/MOP will review these reports.

5.2.5 Case Study: Costa Rican experience

Costa Rica, a small Latin American country with territory 51,100 square kilometers and 4,000,000 people population. Recently, National Cleaner Production Center has conducted Cleaner production projects with financing from Conventions (UNEP DTIE / InWEnt, 2003).

Potential of the Kyoto Protocol to finance Cleaner Production

Clean Development Mechanism: Costa Rican NCPC conducted pilot project during 2000 (Quick Scans) in 4 sectors: Cement; Food; Textile and Transport. All conducted projects had potential for actions on good housekeeping; technology modification.

For example, Energy Efficiency project was conducted at "Dos Pinos" dairy company, which is a producer of cheese and dehydrated milk. After the implementing of the energy saving measures, the company reduced its fuel consumption and results are given below:

- 7.5% reduction in Fuel Oil consumption for boilers
- 43 872 Liters/year
- US $9 730 / year
- 127.93 Tons CO2
- Estimated Investment US$5 000
- Return of Investment: 0,51 years

Cleaner Production possibilities of Basel and Stockholm Conventions

Interacting with Basel and Stockholm Conventions, Costa Rican NCPC conducted a number of capacity building projects, they are:

- Joint Course and Regional Lead Project and support on local study (2002)
- PCB Training workshop for Power, Transmission and Distribution Utilities (March 2004)
- Hazardous Material Regional Workshop (July 2004)
- Activities included as part of the CP - IPA

As an outcome of the capacity building projects, a demonstration project on material substitution was conducted this is related to both above mentioned conventions. Project conducted at "Equipos El Prado" metal processing company. Before CP project, company used Cr VI as material for metal processing, which is water pollutant, highly toxic and carcinogenic. After conduction of environmental audit, Cr VI was substituted by Cr III. As a result, certain benefits were gained:

- They eliminate the use of the only carcinogenic substance of the process
- Reduction in water treatment costs
- Increase in production costs of only 7%.
- Product quality is the same and is accepted by the companies

This case study serves as a clear example, of how effectively Cleaner Production Center could use funding opportunities of the conventions. For the Kyrgyzstan following of this example, will be useful in implementing Cleaner Production.

5.2 Review of the current status of industrial activities and the associated pollution issues;

5.2.1 Textile Industry

Industry overview: Textiles sector is stressing for the last 10 years, as a result of break down trade links with Former Soviet Union (FSU) countries, and consumers potential is limited in Kyrgyzstan due to economic crisis appeared in the country. The largest enterprises are concentrated in the textile branch and are mostly cotton processing plants. Currently there are approximately 14 cotton processing plants in the Republic. Currently, companies produce a wide range of products, they include: rope and cloth for manufacturing of burlap sacks, blankets, towels, cotton fabrics, wool blankets. Production trends for recent years is shown in Table 5.1

Table 5.1 Textile industry production

Products	Unit	1998	1999	2000	2001	2002
Cotton fabrics	,000 m^2	12, 304.9	11, 270.8	6, 119.2	5, 398.1	3, 630.4
Silk fabrics	,000 m^2	460.8	486.1	135.9	323.7	431.6
Jute fabrics	,000 m^2	834.0	511.0	864.0	1, 062.0	1, 086.0
Woolen fabrics	,000 m^2	1, 481.0	700.0	750.0	477.0	373.7

Source: National Statistic Committee, 2003

Environmental concerns: From the environmental point of view, companies have high potential to implement Cleaner Production solutions in plant, such as changing the process of technology; good housekeeping; training of the staff and reduction of energy consumption; generation of wastewater, air pollutants and hazardous waste.

During the visit of KKCK (Cloth Combine - produces wool blankets and fabrics), it was found that, the company has reduced output of its products during the last 10 years, as a result of having lost market access to neighboring Central Asian countries and the Russian Far East. Company has large facility with certain environmental problems like: high energy consumption, high generation of wastewater, hazardous waste. This company has refused from taking part at the First CP & EE program in Kyrgyzstan, due to changes of the company's management.

5.2.2 Leather and Wool Processing

Industry overview: Being one of the agriculture satellites of the Soviet economy, Kyrgyzstan has had high percentage of cattle breeding in total agriculture, supplying raw materials to tanneries, production of rugs and garment, for production of leather products: hides, footwear, jackets, and shoes. The leather-shoe producing is consist 3,4% of the Light Industry sector is represented by 5 enterprises, including: JSC "OKKO", JV "Bulgaary", JSC "Ak-Maral", and JSC "B-Style". Production rate of this sector of industry is shown below in Table 5.2.

Table 5.2 Leather industry production

Products	Unit	1998	1999	2000	2001	2002
Cow hides	,000 dm^2	261.0	n/a	869.6	1,091.8	1,019.3
Sheep hides	,000 dm^2	5,657.6	6,361.1	6,332.0	4,625.8	1,932.6
Furs	,000 dm^2	14,936.6	7,012.6	9,964.6	9,341.7	7,285.7
Shoes	,000 pares	196.4	88.0	136.9	188.7	171.0

Source: National Statistic Committee, 2003

Like in other sectors of Light Industry, tanneries are in transition period trying to resize of their huge facilities with compact ones, in order to be flexible to meet demand of the market. Demand for leather products like, jackets, fur coats, shoes is high at the local market, allowing companies to make some profit. However, excluding local market, companies supply leather and hides to the international market: South Korea, Italy, India, and Pakistan.

Environmental concerns: Despite these successes in the marketing, companies suffer from old outdated equipments and technology, which consume much more energy, generate a lot of industrial waste, high consumption of chemicals like: chrome, sulfide, nitrogen, and liquid wastes comprise the vast majority of pollution from tanneries. Generally, these wastes have high concentration of Biological Oxygen Demand (BOD), high concentration of suspended solids, dissolved solids, oils and grease. As the wastewater treatment units of most of the companies are outdated, and the treated water do not meet the discharge standards, most of companies prefer to pay fines in order to introduce wastewater treatment plants.

Management of the companies has not much concern on environmental issues at their companies, having one person responsible for environmental issues, who mostly serves as a watchdog, monitoring generated emissions and discharges.

5.2.2 Food Processing Industry

Industry overview: Kyrgyzstan has transformed to agro-industrial country during the last decade, and with high concentration of agro industries such as: sugar refineries, vegetable processing and canning industries, meat and milk processing industries, cotton processing plants. Food processing constitutes about 22% of the total value of industrial output of the country.

Dairy industry is one of the leading sectors of the Food Processing Industry, having 45 plants and 116 small scale milk processing enterprises. Being one of the main exporters of milk products at Russian and Kazakh markets currently competes with competitors from Russia and Kazakhstan, the quality of the products declined for last decades, due to out dated technology and inflexible supply of milk. Companies are operating on 5-30 % of their total capacity.

Another major player in production of food is Fruit and Vegetables Processing industry with 35 companies, countrywide. Most of canning companies felt into bankruptcy due to financial problems caused by massive inefficient production line, which needs to be replaced by compact equipments, low quality products. Production rate of food industry is shown in Table 5.3.

Table 5.3 Food processing industry production

Products	Unit	1998	1999	2000	2001	2002
Milk products	tons	12, 879.8	11, 023.2	11, 449.6	16, 779.7	20, 912.1
Meat products	tons	2, 133.0	2, 755.6	1, 759.6	1, 208.4	2, 573.1
Sugar products	tons	88, 280.1	70, 324.4	58, 010.9	30, 536.3	51, 192.0
Tobacco	tons	39, 598.4	37, 798.2	31, 257.5	26, 910.5	20, 718.8

Source: National Statistic Committee, 2003

Environmental concerns: Environmental problems in all companies in food industry are quite similar, with high concentration of organic pollutants in discharged wastewater like BOD, suspended solids, and dissolved solids. Few of enterprises make pretreatment of generated wastewater prior discharging it into municipal sewerage or discharge directly without any treatment. Most of companies use 'end of pipe' solutions, in order to comply with Environmental Legislation.

5.2.3 Manufacturing Industry

Industry overview: Generally speaking, Kyrgyzstan has small machinery, due to agriculture oriented economy. Manufacturing Industry is represented by the following sectors: Metal working and spare parts; Machines and equipment; manufacturing of home appliances, electrical devices and components.

Most of enterprises are export oriented, because of low demand in the domestic market; demand for certain types of manufactured goods in NIS countries have increased after Russian economic crisis in 1998. Examples of successful exported goods are: car batteries, light bulbs, equipment for manufacturing lighting, metalworking, and automobile electrical parts.

However, most of the companies are facing problems with finance, out dated technology and equipments, high taxation rate for manufacturing companies and skilled workforce. As requirements of the planned system of economy were high, the size of all manufacturing plants was huge, with a number of workshops in each plant. Now it is a burden to companies, with certain expenditures on high energy consumption, less productive capacity of old equipments.

Environmental concerns: Despite the reduced production rate, impact of the manufacturing on environment slightly decreased. Most of enterprises discharge their effluent into municipal sewerage with pretreatment or without any treatment. Since most of WWTUs at enterprises are in a worse condition, so efficiency of treatment is not high, it is burden to budget of surviving enterprises.

Another issue is accumulated hazardous wastes and chemicals at enterprises territories, since, there is no Hazardous waste storing landfill in Kyrgyzstan and the burial of hazardous waste at Municipal waste is prohibited by the Law on Wastes of Production and Consumption (2001). Only "Avtomash Ecol", a producer of car batteries, utilizes used car batteries to recycle them. Nevertheless, it can not solve this problem on country level.

5.3 Review national institutional and capacity building aspects to promote CP

5.3.2 Potential Stakeholders

As a Promotion of the Cleaner Production requires well established institutions, representing various government agencies to implement Cleaner production in multi-sectoral level, in this section, potential Kyrgyz institutions and their capacities are examined, they include:

- Ministry of Environment and Emergencies;
- Ministry of Agriculture, Water Resources and Processing Industry;
- Ministry of Foreign Trade and Industry;
- Ministry of Finance;

Ministry of Environment and Emergencies (MOEE)

By Government Resolution No. 44 of 26 September 1996 the State Committee on Nature Protection was converted into the *Ministry of Environmental Protection*. In February 28, 2000, by the President's Decree No UP-45 of the Ministry of Environment and Ministry of Emergencies merged, establishing the Ministry of Environment and Emergencies.

The Ministry is the key institution in charge of environmental policy and nature protection regulations. It coordinates the system of environmental management within all sectors of the economy, developing and enforcing all environmental standards and regulations. It also assists the Government in designing and implementing policies and investment programs for environmental protection.

Environmental data collection, pollution control, the granting of permits for the use of natural resources, the management of protected areas and environmental impact assessment (EIA) are its main operational responsibilities.

The Ministry consists of a central office and seven local branches in every oblast. Organizational structure of the MOEE is shown in Appendix G. The Ministry has highly qualified personal, with solid knowledge gained from Soviet period. However, personnel are still following old out dated manuals, preferring 'end of pipe' solutions to 'pollution prevention' and there is a need to build up capacity of the staff at Ministry.

Focal Point of the MEAs: As it already known, Kyrgyzstan signed certain numbers of MEAs in chemicals and hazardous wastes cluster, and in order to coordinate activities of these conventions the MOEE set up Ozone Center. Ozone Center under The MOEE is a focal point for certain number of MEAs in Kyrgyzstan such as, Montreal Protocol on Ozone Depleting Substances (ODS), Basel Convention and Rotterdam Convention. Ozone Center was organized to carry out project on Institutional strengthening to implement Montreal Protocol in Kyrgyzstan.

Ozone Center is responsible for conduction of the Informational campaign to inform local population, enterprises about ODS; collection and processing of information on importing and consuming ODS by enterprises; and information dissemination about new technologies in country.

The Ministry of Agriculture, Water Resources and Processing Industry (MAWRPI)

The MAWRPI is responsible for water allocation, water accounting and for regulating and issuing permits for water use and for the development of the processing industry.

The MAWRPI coordinates development and realization of the State policy in agriculture, water resources management, fisheries, processing industry and small and medium agricultural enterprises.

Structure of the Ministry is too complex, with number of departments, which is shown in Appendix H. Food Processing Industries Department of the Ministry is a responsible for the processing industry, by coordinating food and processing enterprises. A major aim of the department for Food and Processing Industry is assisting to sustainable development of the industry by replacing old technologies with state of the art ones; strengthening export potential of the sector;

The Ministry of Foreign Trade and Industry (MOFTI)

According to the Decree of the President of the Kyrgyz Republic of March 16, 1999, # 72, The MOFTI is responsible for the development and implementation of the external economic, trade and industry policy of Kyrgyzstan. All kinds of licenses, quotas for import and export of goods are issued by the ministry.

The Ministry is divided into the certain departments regarding each industrial sector, and there are two independent departments under the Ministry: The Department of Small and Medium Entrepreneurship and The Center of International Trade and Marketing, it is shown in Appendix I. The MOFTI coordinates activities of the state companies, helping them to define their foreign trade and industrial policies, and monitoring of industrial activities and financial situation at enterprises.

With the aim of supporting and development of industrial techniques, technologies and new kinds of products, the Ministry jointly with the self-financing entities has established the sectoral fund for science and technologies.

The Ministry of Finance (MOF)

According to the Ordinance of the Government of the Kyrgyz Republic of March 3, 2001, # 75, the Ministry of Finance is central state management body responsible for executive and administrative functions within its frame. Briefly saying The Ministry of Finance is responsible for:

1. Designing and development of common state macroeconomic, budgetary-finance, taxation and customs policy;
2. Jointly with other state agencies determine socio-economic development strategy of Kyrgyzstan;

The MOF is divided into four departments: budgetary, revenue, investment policy and economic and structural development departments. Moreover, the State Economy Development Fund is functioning under the MOF, which offers loans, grants to enterprises

on a competitive basis, disseminate information among regional enterprises in country scale.

Institutions Potential to promote Cleaner Production in Kyrgyzstan

Based on the above mentioned information and by using the mapping tool we can see the current situation of institutions power and potential to implement Cleaner Production in Kyrgyz industry, it is shown in Figure 5.1

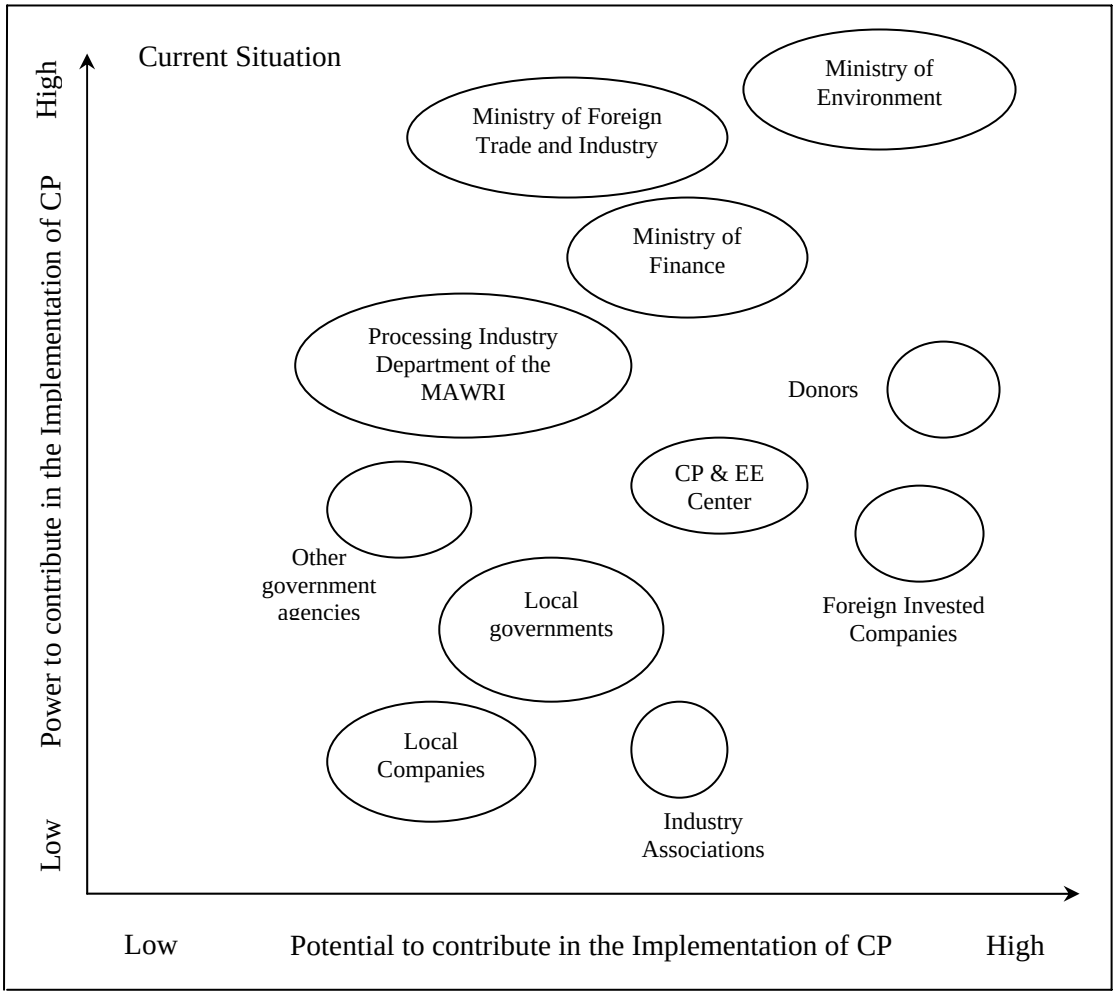


Figure 5.1: Current situation of the institutions to implement CP in Kyrgyzstan

From the figure we can see, that Ministry of Environment has, high capacity and power in dealing with environmental problems and key player in development and implementation of State's environmental policy and strategies. However, the weakness of the Ministry of Environment is unskilled staff, because of lack of knowledge in implementing CP projects in all stages.

Regarding, international organizations or donors, only Norwegian government assisted to kick off first demonstration project in Kyrgyzstan, at same time other donors have not involved. Donors have high potential, with sufficient amount of funding and experience of implementing CP projects in other countries. Industry associations and Ministry of Industry are unaware of CP, however, since they work closely with industries.

The CP & EE Center has just started its operation, and it is not well known in country scale, among government agencies. However Center could play an important role in initiating and coordinating promotion of CP as well as involving other CP stakeholders into this process.

After promoting the implementation of Cleaner Production measures the current situation of the power and potential of appropriate institutions could change as it is shown in Figure 5.2, with possible improvements of the key players in developing and implementing stage.

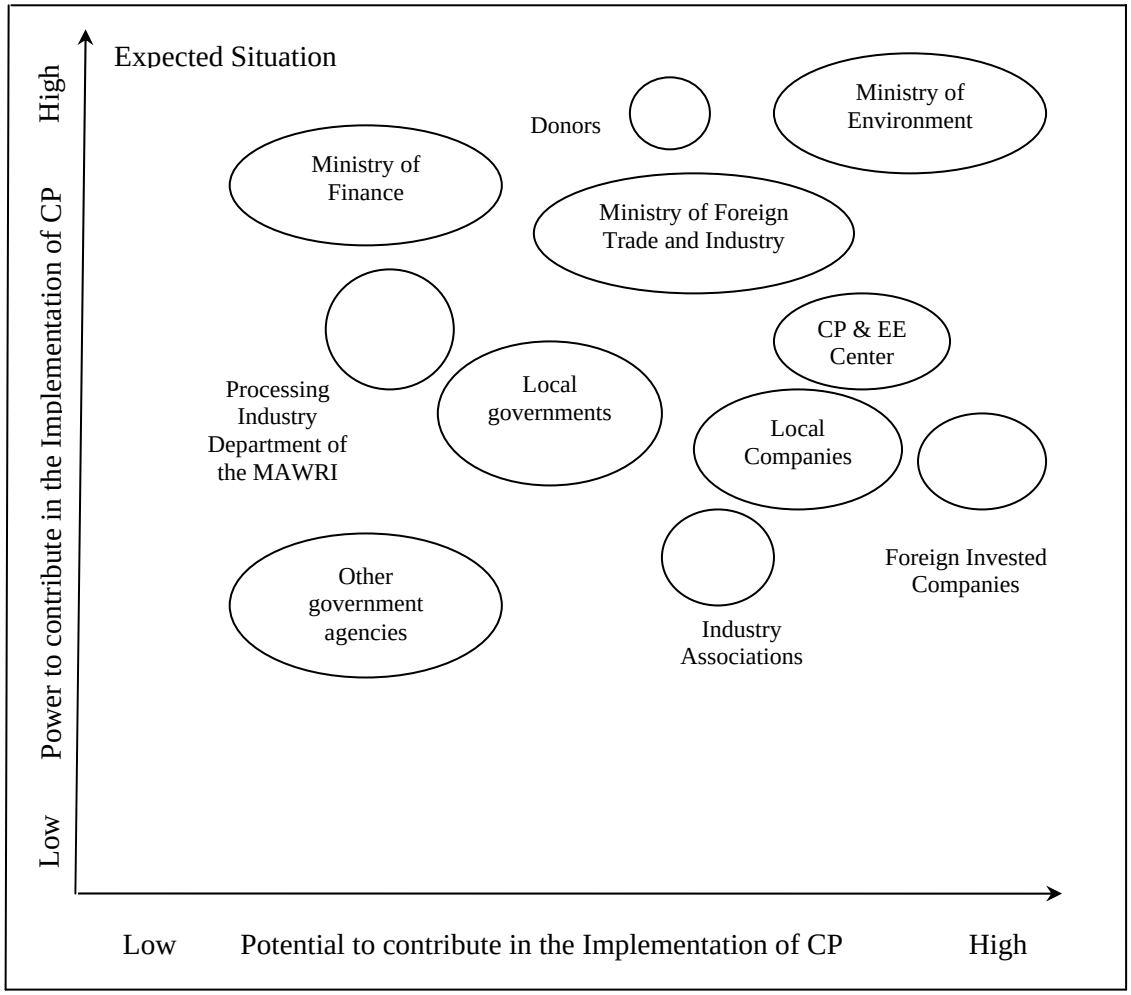


Figure 5.2: Expected situation of the institutions to implement CP in Kyrgyzstan

Source: Field survey by researcher, 2004

5.4 Review of the on-going Cleaner Production Projects in Kyrgyzstan: the promoters and barriers

Since the first CP & EE program has just started in Kyrgyzstan, a term 'Cleaner Production' is still new for Kyrgyz enterprises. In this chapter all aspects of the current status of Cleaner Production are examined, they include:

- Cleaner Production Center: structure, training program,
- On going CP Projects;
- Financing of the identified CP options;
- Obstacles of the CP implementation.

Finally, appropriate CP promotion strategies are identified for successful implementation CP in Kyrgyz Industrial companies.

5.4.1 Cleaner Production and Energy Efficiency in Kyrgyzstan

First Cleaner Production activities have started in the Kyrgyz Republic since autumn 2002 with assistance from the outside, within the framework of the Kyrgyz-Norwegian long-term collaboration program on Cleaner Production & Energy Efficiency (CP & EE) in the industrial sector of the Kyrgyz economy.

"Demonstration zone of energy and water efficiency" (Demo-Zone) has been chosen as a focal point to carry out CP & EE project in Kyrgyzstan. The Demo Zone is an organization initiated in 2000 by the UN ECE SPECA project.

Staff of Cleaner Production Center

The Demo Zone has seven full time employees of which three are new as a result of the Norwegian program. Despite this fact, the Demo Zone has only one Cleaner Production engineer. Organizational chart is given below in Figure 5.3. Technical staff of the Demo Zone is well educated and has a broad experience in field of energy savings.

However, as the concept of CP is new, so staff of the Demo Zone still lack of capacity to carry out CP projects in a required level, mostly relying on assistance from Norwegian counterpart ENSI.

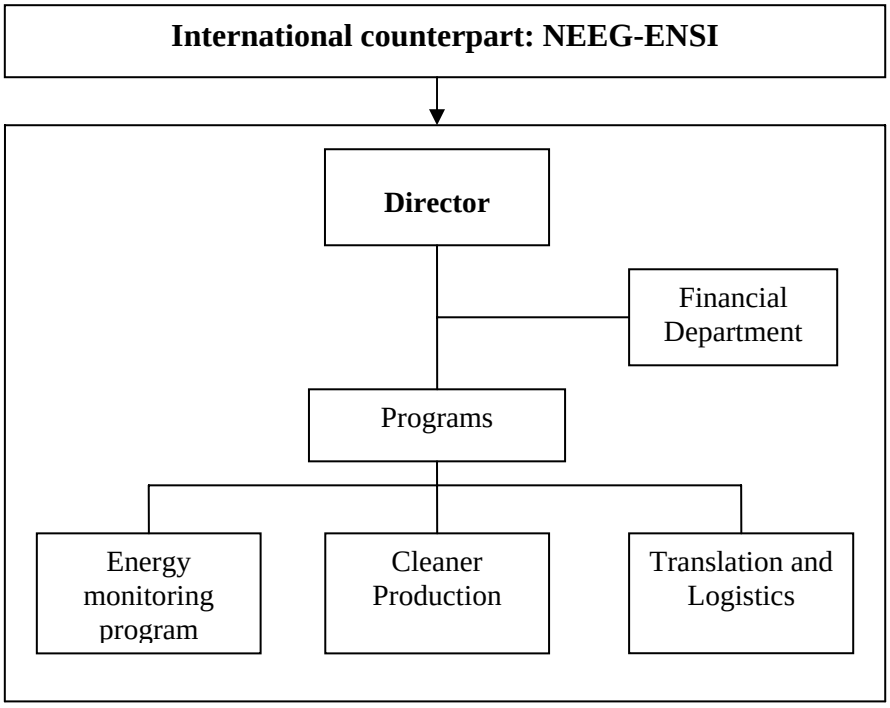


Figure: 5.3: Organizational set-up chart of the Center.
Source: Field survey by researcher, 2004

5.4.2 Ongoing Cleaner Production Projects

The first Demonstration Projects started in September 2003, run by the Demo Zone, and coordinated by Norwegian company ENSI, emphasizes on the training of the staff of the Demo Zone and engineers and managers from the enterprises to identify and implement Cleaner Production and Energy Efficiency projects within their companies, which would give concrete environmental and economical results and disseminating know-how to local experts who can promote and implement future CP&EE.

Starting point of the CP & EE program was Information dissemination seminar, and where the concept of CP and EE was presented for the top-managers of Kyrgyz companies and local authorities. As a result, the following companies submitted their request to the Demo-Zone to take part in the program:

1. JSC “Kyrgyzmebel” – furniture
2. JSC “Tattuu” – confectionary plant
3. JSC “Coca-Cola Bishkek Bottlers” – beverages
4. JSC “Kyrgyz Worsted Cloth Combine” - textile

Nevertheless, Textile Company has rejected from the participation in CP & EE program due to changes of the management of the company, which was found during the company visit.

Since the beginning of the CP & EE program, a number of important measures have been undertaken at participating enterprises, those environmental performance improved significantly. As a result of the program, CP&EE measures were identified: 16 – measures of category A, but also 5 - measures of category B.

The measures are evaluated both technically and economically, and are categorized in A, B and C measures:

A. Housekeeping measures/actions requiring no or very small investments. These measures should be implemented as soon as possible, financed from the operating budget of the companies.

B. Short term investments with a payback less than 1 year, to be financed using the operating budget or small loans.

C. Larger investments with a payback longer than 1 year, normally requiring external loans. If extended financing is needed, these measures require further development, including development of a detailed Business Plan.

However, several of the measures, especially of category B and C that are not implemented during the CP & EE program planned to be further developed and are likely to be implemented in the near future. Although many of these measures required only small investments, several of them are not implemented because of the lack of equity or availability of loans on suitable conditions.

The main results of the program are presented below, in Table 5.4, identified potential as well as already achieved results.

Table 5.4: Results of CP & EE Program in Kyrgyzstan

Savings	Identified Potential	Achieved Results (February, 2004)	Unit
Electricity	740 938	372 353	kWh/year
Water	49,673	39,561	t/year
Heat	302 308	302 308	kWh/year
Raw materials	0,924	N/A	t/year
Economical effect	**31 159**	**21 533**	**USD/year**

Source: Combined data from CP Audit Reports at enterprises, 2004

As can be seen from the table, the participation in the program brought noticeable benefits to the companies, not only to the environment , but also economical benefits to the enterprises measures giving savings of 31 159 USD/year realized by the end of February.

5.6 Assessment of the obstacles to successful CP implementation in industry

Despite the first implemented CP projects and the economic benefits associated with its implementation, CP remains hard to implement in Kyrgyz industry. There are a number of reasons for this response, which In Kyrgyzstan specifically, according to personal interviews with companies representatives, the following factors are most significant obstacles of the successful implementation of CP in Kyrgyz industry:

- Poor enforcement of environmental regulations;
- Lack of incentives for companies;
- Lack of awareness of CP concepts generally among company officials; and,
- Lack of capital to finance new CP projects and to acquire new technologies.

5.6.1 Examining Root Causes

Many of the obstacles associated with successful CP implementation in Kyrgyzstan, are in fact part of systemic problems of incorporating pollution prevention concepts into industry. A number of 'root causes' that produce, both directly and indirectly, the obstacles have been identified. '*Root causes*' analysis - process of identifying causal factors. In the following sections outlined root causes that led to obstacles for CP adoption

5.6.2 Root Cause Number One: The Policy Environment in Kyrgyzstan

One of the main obstacles to CP implementation in Kyrgyz industry is said to be the poor enforcement of environmental regulations. This is often attributed to a lack of funds as well as to a lack of trained personnel in environmental agencies to carry out policy objectives. While this is true, the lack of effective regulations appears to also stem from the policy environment in Kyrgyzstan.

After the independence since 1991, Kyrgyzstan was the first Central Asian country to formulate its National Environmental Action Plan (NEAP) of 1995. While the national will and commitment to environmental protection may be strong, there is a lack of national funding for environmental protection measures due to serious financial constraints inherent to the ongoing adjustments during the transition process. The national plan enabled a number of policy and legal instruments to be put into effect, including the *Law on Environmental Protection* (1999), with subsequent air, soil and water standards enacted in 1999.

However, despite the multitude of national environmental plans that have been drafted in the past few years, many of the recommendations of these plans have not been implemented and numerous environmental regulations have effectively been ignored. The Kyrgyzstan Capacity 21 Project (UNDP, 1997) conducted an analysis of the national environmental plans in Kyrgyzstan, and summarized that:

> Besides, the institutional capacity of the relevant governmental structures and institutions remain weak to effectively manage country's natural resources. There is no coordination and inter-ministerial dialogue in issues concerning environmental, economic and social problems. There has been no consistent follow-up to implement the NEAP.

Additionally, in 2000, National Corporate Development Framework (CDF) of The Kyrgyz Republic has been worked out and approved by the Government, with a time frame till

2010. The major goal or result of CDF implementation should be the improvement of life standards of the public caused by the achievement of the all components of the sustainable development: economic growth, social stability and clean environment, with further poverty reduction. By implementing of the CDF, the Government should achieve the following environmental results: reduction of emissions and effluents of polluting and contaminating substances; minimization of water loss; reduction of lands degradation.

The CDF is reflected in Strategy and Policy – 2010 of the Ministry of Environmental Protection and Emergency Situations (Appendix G). Environmental policy needs to be incorporated along with economic policy at the national or local level. Therefore, it is clearly outlined in the goals of the CDF, but currently it is limited in the practice by the endless administration procedures and also by the insufficient level of cooperation in planning between government offices and ministries. These gaps were identified in the Capacity 21 Project (UNDP, 1997).

5.6.3 Root Cause Number Two: Unskilled Government

The governments at all levels are seen as the only actor among all the key areas which is to generate conditions for the countrywide implementation of Cleaner Production on a sustainable basis.

During the study time some very serious obstacles were found, which will have to be overcome, in order to successfully implement CP in Kyrgyz industrial companies, they include:

(a) ***Political and economic instability*:** The attempts of the State Government to achieve new developments caused continuous political and economic changes, which is an important obstacle not just for the implementation of Cleaner Production, but generally to the whole restructuring of the Kyrgyz economy.

(b) ***Unskilled Government:*** there is lack of skilled and creative politicians in the Kyrgyz Government. The endless personnel changes in government are impeding the transformation process and increasing chances for major mistakes in governing the country. Recently, there were changes among heads of the ministries and state agencies.

(c) ***Bureaucracy and Administration:*** It seems that Kyrgyzstan's government is highly bureaucratic, with endless administration procedures and as it already mentioned above there is no coordination and inter-ministerial dialogue in issues concerning environmental, economic and social problems. Moreover, Ministries and state agencies duplicate same functions in Environmental Protection issues.

(d) ***Corruption:*** This problem has increasing trend, despite the Government's actions to eliminate it. The level of corruption in Kyrgyzstan increased over the past two years, which is increased from 2.4% in 1999 till 3.8% in 2002. This is, one of the main obstacles not only on investing on CP, but in Kyrgyz economy as well.

(e) ***State budget deficit:*** For the last years, Kyrgyzstan has suffered from the severe budget shortages, which had a negative impact on the allocation of the sufficient amount of financial resources on environmental protection activities. This will

become the major obstacle to impede the establishment of financial support for Cleaner Production, if the Cleaner Production policy will be implemented.

(f) ***Incorrect Resource Pricing:*** most of the resources like water, mineral materials, energy are relatively free, with the low price for it. For instance, the price for fresh water supply is very low, (0.60 soms per cubic meter of water, Note: The Som - the national currency, the exchange rate is 100 soms = US$ 4.2), comparing to neighbor country Kazakhstan (3 soms per cubic meter of water). However, due to economic recession most of companies even can not cover expenditures for water use.

5.6.4 Root Cause Number Two: Traditional Culture at the Enterprises

As it is known, enterprises are a key area to implement all potential CP activities. Therefore, the identification of the obstacles at the enterprises is extremely crucial. Resisting factors of the successful implementation of CP in Kyrgyz enterprises were found from the reports of the first CP & EE program and from the interviews with company managers these include:

(a) ***Outdated technology:*** Most of the enterprises are still using old technology which produces more waste and its energy consumption is high as well. On the other hand, outdated technology offers numerous opportunities for source reduction.

(b) ***Lack of capital:*** One of the main problems in Kyrgyz industry is a general financial situation of the enterprise, which has to strive for existence and can not see any chance in pollution prevention. It is a main constraint to the implementation of other than no-investment CP options. Unfortunately, most of the Kyrgyz industrial companies do not have financial possibilities to allocate investments on investment required CP options. On the other hand, the amount of available is depending on the industry sector and may vary from company to company according to the form of ownership, the share of foreign capital.

(c) ***Company performance:*** As the national economy country in transition stage, most of the companies suffering from the broken trade links with partners of CIS countries, and are unlikely to adopt CP principles.

(d) ***Management system:*** Many company officials are unaware of CP: the inflexible management and the hierarchical structure in companies is an old habit originating from the central planned economy, which has a negative impact on the implementation of new ideas.

(e) ***Incentive system:*** There is no motivation among workers because of low salaries. There is a scare among workers of cut-off extra bonus in the workers' salary for working in risky conditions, for the Cleaner Production.

(f) ***Belief in pollution control:*** Most of environmental departments of the enterprises believe that compliance with environmental regulation is enough. This is a result of schematic thinking, "end of pipe" solution is so strong that it does not admit the fact that "pollution prevention pays". Moreover, most of the environmental

departments in Kyrgyz industrial companies are in position of a watch dog with no rights and many duties.

5.6.5 Root Cause Number Three: Dependence on Outside Assistance

As the concept of CP&EE is new for Kyrgyzstan, so most of the local companies have no experience in CP and EE, and nevertheless, according to Health, Safety and Environment (HSE) managers of some enterprises, Kyrgyzstan used to have CP & EE programs before in Soviet planned system of economy, but as a Government's target was to increase production capacity due to planned economy system, ignoring previously established CP & EE requirements.

The amount of international involvement in Kyrgyzstan is typical of CP demonstration projects and dissemination programs in other CIS countries, which are primarily carried out with the support of external consultants and CP experts. Furthermore, it is characteristic that a considerable part of the program costs are met by outside, or international, funds. However, a major question arises from this trend, namely what happens when foreign financial support leaves? This is a serious issue, since many companies will not implement CP projects unless they are funded by an international organization. This makes economic sense for companies, since demonstration projects often provide free training.

Despite the fact, that the target of the Norwegian CP & EE program is to make Demo Zone sustainable by establishing Revolving Fund to cover future operational costs of the Center and to assist enterprises with potential CP Projects.

Moreover, it planned to help Demo Zone with Fund Raising, with further assistance from GEF/UNDP, and other possible sources. However, in reality, the Demo Zone and enterprises still has not realized about their sustainability in the near future.

The inevitable outcome of this is 'donor-dependence', whereby CP Center and participating firms do not take an active role in changing their management and operational behaviors. They accept the technology and training provided, but is less likely to make changes that would create a climate for sustainable CP implementation within their companies. Therefore, dependence on outside assistance is a root cause for some of the problems associated with awareness and effective implementation of CP concepts.

5.7 Comparative Analysis of companies

During the study period, three companies were visited. In order to see the difference between foreign invested and local companies, comparative analysis is conducted. For the comparative analysis, the three companies were selected: two of them have participated in CP & EE program and one is Tannery Company, which has not participated in the CP & EE program, they include:

- The Bulgaary firm (Tannery);
- The Coca Cola Bishkek Bottlers Company (Beverages);
- The Kyrgyz Mebel (Furniture);

The Bulgaary firm

The Bulgaary firm, is a medium-scale tannery possessing 100 cow hides per day, also manufactures shoes and leather jackets and employs around 70 workers in all. Prior to 1992, the company was part of Ak-Maral Tannery Company, but now operates independently as a Kyrgyz-American-Kazakh joint venture, and characteristics of the company are shown below in Table 5.5.

Table 5.5: Characteristics of Bulgaary firm

#	Characteristics	Unit
1	Production rate	5 million decimetres
2	Production capacity	20 million decimetres
3	Annual Turnover	22 million soms
4	Number of Employees	70

Source: Data from plant visit, 2004

Note: The Som - National currency. Exchange rate: 100 soms – USD 42.50

Current State: Like in other Kyrgyz tanneries, Bulgaary Tannery is outdated, use obsolete technology and depend on old manual skills. Their productivity is below the norm of tanneries in developed countries such as Europe. Despite export orientation of the company, economic performance of the company is getting worse as a result of economic recession of the state, unfavourable state tax system for enterprises, and government's debts to the company for ordered products. As it shown in table, the company is using only one fourth of total production capacities.

Management commitment: As result of the conducted individual interview with the president of the company, it is known, that Management of the company is really keen to implement CP options at plant. However, the company has met some, already familiar to Kyrgyz industry, obstacles to implementation of CP. The company intended to participate in the CP & EE program, but with lack of time and interest of personnel to implement CP options, all these intentions has failed. Another reason is low salary of staff; because of it an outflow of the employees is high, which caused decrease of the qualified labour and instability of the workers.

Main environmental issues: The visit highlighted that there is a vast possibilities to implement CP & EE options in this company. The company has problems in water use, chemicals storage and use, and a high energy demand in the production process, which is caused by outmoded equipments. Causes of this pollution included: process inefficiencies; spillages of chemicals; lack of accurate measuring due to a lack of necessary machinery. Poor quality control, unskilled and untrained work force and lack of water recycling infrastructure were also highlighted. Examples are shown in **Appendix J**.

Water pollution can be considered as expected water pollution was found to be the main problem, with large volumes of waste with high BOD, COD from each unit.

It is also found that a large amount of generated solid waste. The major sources were unhairing, liming mud, fleshings, splitting, shavings, and trimmings. However, all solid waste generated from the tannery has a market value, and the company sends its solid waste to municipal landfill. For example, fleshings can be used in the fertilizer industry.

The Coca Cola Bishkek Bottlers (CCBB) Company

The CCBB established in order to produce and distribute Coca-Cola products in Kyrgyzstan as a part of the Coca Cola world chain. The CCBB began its production in May 1996.

Table 5.6: Characteristics of the CCBB

#	Characteristics	Unit
1	Production rate	39 million liters per year
2	Production capacity	55 million liters per year
3	Annual Turnover	N/A
4	Number of Employees	150

Source: Data from plant visit, 2004

Current State: The plant is equipped with the latest environmentally sound technology. There is no doubt, that company is highly economically performed, being one of the major players in beverage market of Kyrgyzstan.

Management commitment: Management is very keen in efficiency improvements but is not aware if CP brings visible results. Company has the budget for CPEE improvements. The company and is implementing now series of efficiency improvement programmes, as a part of Coca-Cola quality support system such as ISO 9001. However, as it found from individual interview with CP engineer at plant, company is strictly following policy from its head quarters in Turkey, and some technological changes also have to be approved from Turkey.

Main environmental issues: Despite high performance of the company, significant potential of savings still exists: used water at plant simply discharged, instead of recycling it; waste heat recovery from making of plastic bottles, and better insulation of pipes to save energy. Examples are shown in **Appendix J**.

Training of the personnel on preventive measures will be useful in further activities of the company.

Kyrgyz Mebel Company

The company established in May 1997 and produces a wide range of household office furniture, including wooden chairs, sofas, cabinets, beds, mattresses.Wide range of raw materials including wood, metal, polyurethane, fabrics.

Table 5.7: Characteristics of the Kyrgyz Mebel

#	Characteristics	Unit
1	Production rate	39 million liters per year
3	Annual Turnover	682,3 thousand USD
4	Number of Employees	368

Source: Data from plant visit, 2004

Current State: Kyrgyz Mebel is large company with 3 sites currently working at 25% of installed capacity. Built in Soviet time all buildings deteriorated and in very poor condition and level of maintenance with respect to insulation, lighting, utilities. The company has had a difficult financial situation for the past 10 years, but is now improving its economy and can look to make some strategic plans.

Management commitment: One of the main strategies of the company's management is to minimise production costs. Company was therefore very much interested in participating in the CP & EE programme. However, there is no clear interest of engineering staff in CP, as a result of low wages of personnel.

Main environmental issues: Major environmental concerns can be focused in areas of water and energy use, solid waste generation, air pollution and safety measures at plant workshops.

Hot water is used for drying of timber in the drying chambers, without any recycling options. Excessive water use was highlighted as being a problem, due possibly to leaking pipe work. As a result of the CP & EE programme the company has saved a huge amount of water by using simple solutions: identification of leakages.

The amount of generated solid waste (timber, metal, foam) was high, as a company uses outdated technologies, lack of personnel training and responsibility. It is likely that the materials could be used much more efficiently. Examples of waste due to excessive of-cuts are shown in **Appendix J**.

Training of the personnel on preventive measures will be useful in further activities of the company.

Concluding remarks: The above analysis and discussion on implementation of Cleaner Production in Kyrgyzstan indicates that there is a scope for implementation of CP by involving key institutions and overcoming of the above mentioned certain barriers.

Concerning key national institutions, the basic requirement for them is their capability to carry out the National CP implementation program. There is a significant lack of cooperation and understanding between government sectors in developing and implementation of the government's development programs.

For proper implementation, all the stakeholders — state agencies such as Ministries of environment, industry, finance and other key ministries, industrial associations, academic institutions, and relevant to CP groups - must be involved in development and implementation of Cleaner Production promotion strategies. Proposed Cleaner Production promotion strategy scheme is given in Figure 6.1. The institutional arrangement is presented in Key players and their possible actions are listed in Table 6.1.

Chapter 6

Conclusions and Recommendations

6.1 Conclusions

From the overall study, the following conclusions are formulated on the basis of the findings from the literature review and analysis of the collected data.

Most of the studied MEAs have relevant provisions to Cleaner Production in their objectives and implementing mechanisms. Moreover, they have mutual benefits: MEAs could be funding sources for implementation Cleaner Production projects; Cleaner Production could be an effective instrument in global environmental protection efforts and improve the effectiveness of MEAs. Among of those MEAs, the Basel Convention has a high potential of funding for financing Cleaner Production projects in Kyrgyzstan, The Basel Convention's Regional Centers will be keystones in achievement of the goals of the Convention's Strategic Plan-2010.

In general, Cleaner Production is effective strategy in implementation of MEAs and addressing problems of MEAs implementation on local level. Incorporating preventive approaches on a life cycle basis is a way to synergize efforts of different Conventions in pursuing the common goal of sustainable development. It also helps to optimize the response to the requirements of the Conventions.

Costa Rican case study is a clear example, of how effectively Cleaner Production Center could use funding opportunities of the conventions. For Kyrgyzstan it will be useful to follow this example, in implementing Cleaner Production.

Cleaner Production is new in Kyrgyzstan. Kyrgyz Industry does not consider Cleaner Production initiatives as an option for improving productivity parallel to an increased protection of the environment. End-of-pipe solution is commonly applied if environmental demands are to be met by converting pollution from one form to another. Company officials unaware of CP, as a result of lack of knowledge concerning CP and economic benefits they could get from its implementation.

6.2 Recommendations

Since, Cleaner Production is new for Kyrgyzstan; this study recommended strategies to promote it on local level with focus on

(i) Regulatory enforcement:

User charges: Introduction of higher user charge rates for sewerage, sewage treatment and municipal waste management should force enterprises to implement pollution preventing measures in plants. As, the user charges for sewage, sewage treatment and management of municipal wastes are relatively low and do not cover costs.

Polluter pays: More systematic application of the '*polluter-pays'* principle could stimulate enterprises to implement Cleaner Production and Energy efficiency measures.

The existing pollution charge system should be improved with regard to the efficiency of the applied rates, a possible reduction of the charge scheme.

New regulatory development: Adoption and implementation of ISO 14001 series "Environmental Management Standards System", which is important in international trade. Government could promote EMS by linking its adoption with permit requirements.

(ii) Application of economic instruments:

Economic resource pricing: Proper study of economic prices of electricity and water is needed, which will stimulate companies to rational use of resources, as the prices for water and energy are relatively low.

Market economy: Continued transformation towards a market economy will favor CP with cost reduction, market image. Shared responsibility by producers and consumers will be increased by market economy.

Eco-labeling: Introduction of eco-labeling into Kyrgyz industry which insures that the product is manufactured using environmentally friendly methods. Since, eco-labeled products have higher demand for export, eco-labeling offers effective way of covering environmental costs from the potential importers.

(iii) Institutional capacity building:

The CP & EE Center: Since, the problem of capacity-building for environmental management at all levels concerned – national, regional, local, industrial – needs to receive sufficient attention. Government is recommended to support of the Cleaner Production initiatives by:

- Involving the Demo Zone as advisors in industrial policy, environmental policy;
- Recommending the Demo Zone's services to companies;

To strength the capacity of the industry, closer collaboration with industry will be highly effective. In order to achieve targets implementation of CP, Working Group should be established in cooperation with an industrial association, like the Chamber of Commerce and Industry.

Next this paper recommended that the further research can be proceeded to evaluate the potential of other MEA clusters to finance Cleaner Production activities which are not discussed in this study such as following:

(i) Cleaner Production Funding potential of biodiversity and marine cluster MEAs
(ii) Cleaner Production potential of the regional MEAs, such as Bamako Convention in Africa, UNECE Convention on transboundary long distance air pollution.

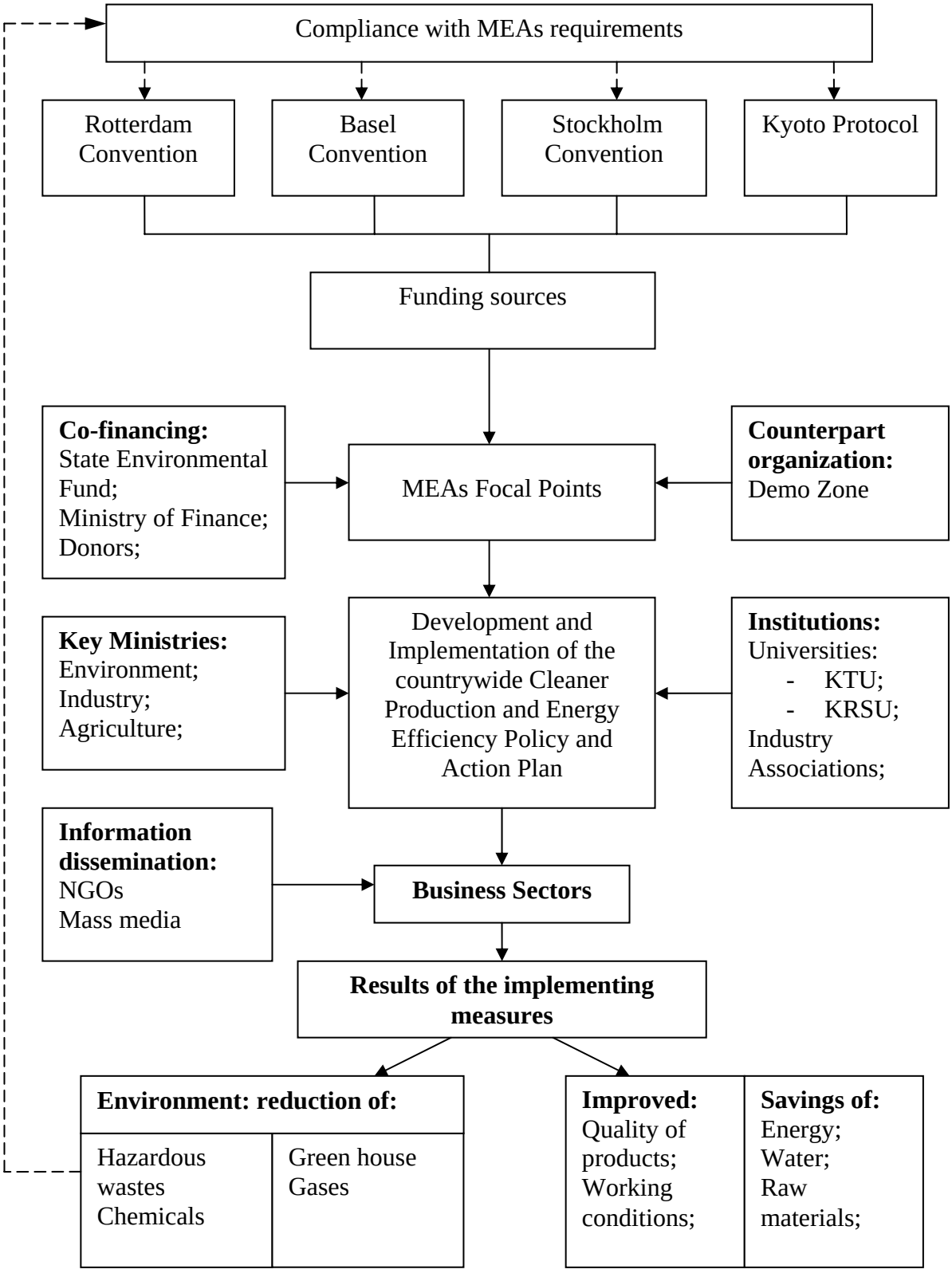


Figure 6.1: Proposed Cleaner Production promotion strategy scheme

Table 6.1: Possible Roles and Responsibilities of Stakeholders in implementing of Cleaner Production

Responsible agency	Actions	
	To upgrade existing industry	**To ensure stability of CP**
Ministry of Environment	Establish environmental objectives; re-design regulations; negotiate sector agreements.	Establish clear framework of long-term environmental objectives and requirements.
Ministry of Foreign Trade and Industry	Mobilize sectors and identify necessary resources.	Identify and promote appropriate technology; support improvements in management.
Ministry of Finance	Review resource pricing and incentives; support discharge fees and similar instruments.	Consider environmental objectives in designing fiscal instruments for industrial promotion.
MEAs Focal Points	Conduct study of the current situation of implementing of each MEA, with further development project proposals to the Conventions Secretariats;	Consider application of long term projects, for better implementation of CP.
The CP & EE Center	Develop in cooperation with MEAs Focal Points and other institutions clear Action plan to achieve long term goals.	Identify and build links with relevant overseas counterpart organizations to exchange with experience with further implementation in Kyrgyzstan
Industry Associations	Accept and promote the concepts of cleaner production; support sector initiatives; encourage involvement of financial institutions; sponsor management improvement.	advise business on suitability of incoming technologies; promote development of local firms to provide services in CP.
Universities: KTU, KRSU	Provide independent advice; conduct research on local problems.	Develop technical and management skills to drive local initiatives in clean technology.
NGOs, Mass media	Transmit local community viewpoints and priorities; assist in monitoring progress; reach firms and groups that are outside the structured industry associations.	Mobilize public support for improvements and new techniques; encourage informed wider debate on issues and options.
Donors: Bilateral organizations, Financial Institutions	Assist in designing and planning schemes; provide technical assistance and access to funding.	Assist in developing industrial policy and promoting transfer of information and technologies; facilitate dialogue between public and private sectors.

References

Andrzej Doniec (1995), Obstacles in application of Cleaner Production in Polish Industry. Cleaner Technologies and Cleaner Products Sustainable Development,
Edited by H.M. Freeman, Z. Puskas, R. Olbina. Proc. of ARW, Budapest (Hungary), 1995, Springer – Verlag, ISBN 3-540-59126-5

BISNIS (2003), Kyrgyzstan: Industry Reports, December 2003
URL:http://www.bisnis.doc.gov/bisnis/country/kyrgyzstan.cfm

Bokonbaev D.K., Rodina E.M., Iliasov S. A., Podrezov O.A., Kasimova V. M., Abayhanova Z. A., Dzhumadilova C. K. (2003), «Климат и Окружающая Среда» (”Climate and Environment”). Bishkek, “Al – Salam” Publishing House, ISBN 9967 –21– 472-4

Confederation of Indian Industry (2004), Capacity Building Project to Develop a Strategic Framework and National Action Plan for the Management of Persistent Organic Pollutants (POPs) in India – completed in June 2002, June 2004, URL: http://www.ciionline.org/Services/70/default.asp?Page=Environmental0Management%20Projects.htm

Czech National Cleaner Production Centre (2004), BAT Concept for the Czech Republic, April 2004, URL: http://www.cpc.cz/eng/index2.htm

Djoodatov Nurlan (2003), Fruits and vegetables canning industry: problems and perspectives. *Рынок Капиталов (Capitals Market)* Vol. 60-61 (10-11): 29

Dodds Felix (2001), Inter-linkages among Multilateral Environmental Agreements, United Nations University Centre, November 2003,
URL: http://www.unu.edu/interlink/papers/WG2/Dodds.doc

Environmental Management Centre (2002), Cleaner Production Global Status 2002, Mindfully, December 2003, URL:http://www.mindfully.org/Sustainability/Cleaner-Production- 002UNEPJun02.htm

Environmental Management Centre (2003), Research Capsule B-1, The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, November 2003, URL: http://www.emcentre.com

Environmental Management Centre (2004), Policy Case studies, July 2004, URL: http://www.emcentre.com/unepweb/policy/czech%20Republic/Czech%20Republic.htm

European Union (2003), Multilateral Environmental Agreements, December 2003
URL: http://europa.eu.int/comm/environment/international_issues/agreements_en.htm

Frank van den Akker (2002), Cleaner Production: history, concepts, policies and instruments, incentives and practical examples. Water recycling and resources recovery in industry: technologies and implementation. Edited by P Lens, L Hulshoff Pol, P Wilderer, T Asano. IWA Publishing, ISBN: 1843390051

Gaynutdinova, Tamilla (2001), Preventative Strategies for More Effective Multilateral Environmental Agreements: Potential of Cleaner Production, December 2003
URL: www.glogov.org/publications/bc2001/gaynutdinova.pdf

J. Hilborn (2002), Cleaner Production and sustainable consumption: strategies to implement multilateral environmental agreements. *Industry and Environment*, 25 (3-4): 16 – 17

J. Uosukainen (2002), Cleaner Production and sustainable consumption: strategies to implement multilateral environmental agreements. *Industry and Environment*, 25 (3-4): 20 – 21

ICETT (2004), Introduction to Cleaner Production in Thailand, July, 2004
URL:http://www.icett.or.jp/techinfo.nsf/0/ed1038aef43ef54c492569d7001786aa?OpenDocument

Kal Raustiala (2001), Reporting and Review Institutions in 10 Multilateral Environmental Agreements, Division of Early Warning and Assessment, Nairobi, Kenya: UNEP, 2001. United Nations

Maged M. Hamed, Yehia El Mahgary (2002), Outline of a National Strategy for Cleaner Production: The Case of Egypt, December 2003
URL: www.uneptie.org/pc/cp7/PDFs/otherpaper/egypt.pdf

Ministry of Environmental Protection and Emergency Situations of the Kyrgyz Republic (1997), *State of the Environment Kyrgyzstan-1997*, Bishkek, Kyrgyzstan

Ministry of Environmental Protection and Emergency Situations of the Kyrgyz Republic (2001), *State of the Environment Kyrgyzstan-2000*, Bishkek, Kyrgyzstan

Ministry of Environmental Protection and Emergency Situations of the Kyrgyz Republic (2003), *First National Communication of the Kyrgyz Republic under the UN Framework Convention on Climate Change*, Bishkek, (Kyrgyzstan), 2003, 98 pp. ISBN 9967-21-478-3

Miroslav Chodak (1995), Major Constraints to Successful Implementation of Cleaner Technologies to Slovak Industry, Cleaner Technologies and Cleaner Products Sustainable Development, Edited by H.M. Freeman, Z. Puskas, R. Olbina. Proc. of ARW, Budapest (Hungary), 1995, Springer – Verlag, ISBN 3-540-59126-5

National Statistic Committee (2003), *Industry of the Kyrgyz Republic 1998-2002*, National Statistic Committee, Bishkek, Kyrgyzstan

Ralph Luken (1996), UNIDO technical assistance for Cleaner Production, Clean Production-environmental and economic perspectives. Edited by K.B. Misra, Springer-Verlag, ISBN 3-540-60189-9

Ralph A. Luken and Anja Sedic (2002), National Policies for efficient resource utilization and protection, Water recycling and resources recovery in industry: technologies and implementation. Edited by P Lens, L Hulshoff Pol, P Wilderer, T Asano. IWA Publishing, ISBN: 1843390051

Sanchez San Francisco L., (2002), Enforcement of Cleaner Production practices in shrimp farming through economic and regulatory measures: a case study in Thailand, AIT Thesis No. EV-02-14

Soros – Foundation Kyrgyzstan (2001), Small and Medium Scale Business in Kyrgyzstan: state, problems and perspectives. Bishkek, Kyrgyzstan

State Investment Agency (2004), Investment opportunities in Kyrgyzstan, June, 2004
URL: http://eng.investment.kg/light

Stevenson, R.S. (2002), Guidelines for Policy Integration and Strategic and Action Planning for the Promotion of Cleaner Production, Published by the Asian Development Bank, Manila, Philippines, ISBN 971-561-442-6, Stock No. 040102

Surya Chandak (2002), Vietnam a Cleaner Production Centre in Vietnam - disseminating sustainable production and consumption practices using local expertise, April 2004. URL: www.virtualexhibit.net/new/globalShowcaseTemplate.php

The Montreal Protocol to the Vienna Convention (2003), November 2003
URL: http://www.unep.org/ozone/montreal.shtml

The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, December 2003
URL: http://www.pic.int/en/ViewPage.asp?id=104

The UNEP Working Group for Cleaner Production in the Food Industry, the Benefits of Cleaner Production, December 2003,
URL: http://www.geosp.uq.edu.au/emc/CP/CPs/xbenifits.htm

The United Nations Framework Convention on Climate Change (UNFCCC), (2003), December 2003 URL: http://unfccc.int/resource/docs/convkp/conveng.pdf

The United Nations Convention to Combat Desertification (UNCCD), (2003), December 2003 URL: http://www.unccd.int/convention/menu.php

Tiong, T. K., (1998).Use of Economic Tools for Industrial Environmental Management, AIT Thesis No. EV-98-31,

United Nations Economic Commission for Europe, (2001), Environmental performance Review of Kyrgyzstan, December 2003
URL: http://www.unece.org/env/epr/studies/kyrgyzstan/

UNEP Chemicals (2004), Canada POPs Fund, May 2004
URL: http://www.chem.unep.ch/CanadaPOPsFund/Default.htm

UNEP DTIE (1998), Promoting Cleaner production investments in developing countries. *Industry and Environment*, October – December, 21 (4): 22 – 24

UNEP DTIE (2002), Learning from the experience of national Cleaner Production Centers, April 2004, URL: http://www.uneptie.org/pc/cp/ncpc/home.htm.

UNEP TIE/InWEnt, (2003), Using Cleaner Production to facilitate the Implementation of Multilateral Environmental Agreements, May 2004
URL http://www.uneptie.org/pc/cp/ncpc/home.htm

UNEP GRIDA (2002), State of Environment of Kyrgyz Republic, December 2003
URL: http://www.grida.no/enrin/soe.cfm?country=KG

UNFCCC (2001), *The Marrakech Accords and the Marrakech Declaration*, June 2004,
URL: http://www.unfccc.int/cop7/documents/accords_draft.pdf

United Nations Environment Programme (2003), Understanding of Cleaner Production, December 2003
URL: http://unepie.org/pc/cp/understanding_cp/home.htm.

UNIDO (2003), Network of National Cleaner Production Centers, April 2003,
URL: http://www.unido.org/doc/331390.htmls

UNIDO (2004), The priority area of UNIDO with the Global Environment Facility is Persistent Organic Pollutants (POPs), June 2004,
URL: http://www.unido.org/en/doc/4731

Vladimir Dobes (1995), Cleaner Production in the Czech Republic, Cleaner Technologies and Cleaner Products Sustainable Development, Edited by H.M. Freeman, Z. Puskas, R. Olbina. Proc. of ARW, Budapest (Hungary), 1995, Springer – Verlag, ISBN 3-540-59126-5

World Bank (2004), Structure of the economy, June, 2004
URL: http://www.worldbank.org.kg/ECA/Kyrgyz.nsf/

Appendix A

Table A.1: Environmental Legislation in Kyrgyzstan

General	Law of the Kyrgyz Republic "On ecological expertise", 16th of June 1999, No. 54 Law of the Kyrgyz Republic "On safety against radiation of population in the Kyrgyz Republic", 17th of June 1999, No. 58
Biodiversity	Law of the Kyrgyz Republic "On environmental protection", 16th of June 1999, No. 53 Law of the Kyrgyz Republic "On especially protected natural areas", 28th of May 1994, No. 1561-XII Law of the Kyrgyz Republic "On fauna", 17th of June 1999, No. 59 Wood code of the Kyrgyz Republic, 8th of July 1999, No. 39 Law of the Kyrgyz Republic "On fishery", 25th of June 1997, 39
Atmosphere	Law of the Kyrgyz Republic "On ambient air protection", 12th of June 1999, No. 51
Water	Water Law of the Kyrgyz Republic, 14th of January 1994, No. 422-XII Potable water Law of the Kyrgyz Republic, 25th 1999, No. 33
Land/soil	Land code of the Kyrgyz Republic, 2nd of June 1999, No. 45 Law of the Kyrgyz Republic "On bowels", 2nd of July 1997, No. 42

Appendix B

Table B.1: Multilateral Environmental Agreements joined by the Kyrgyz Republic

#	Name of Convention	Year of adoption	Date of joining
1	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1989	1996
2	Convention on Biological Diversity (CBD)	1992	1996
3	Convention on Long – range Transboundary Air Pollution	1979	2000
4	UN Framework Convention on Climate Change (UNFCCC)	1992	2000
5	Rotterdam Convention on Prior Informed Consent	1998	2000
6	Vienna Convention for the Protection of the Ozone Layer	1985	2000
7	Montreal protocol on Ozone Depleting Substances	1987	2000
8	Stockholm Convention on Persistent Organic Pollutants (POPs) (2001)	2001	2002

Source: Ministry of Environment, National Statistic Committee, 2001, the Stockholm Convention, 2004**.**

Appendix C

Project proposals qualifying for funding under the Strategic Plan for 2003-2004 of Basel Convention in accordance with the criteria adopted by The Conference of the Parties at its sixth meeting

Region	BCRC or Party	Title of Project	Total amount required in 2003-2004
Africa	Egypt	Hazardous Wastes Landfill (Site Selection, Design and preparation of operating plans) in Arab Region	135,541
	Senegal	Inventory of Hazardous Wastes in French speaking countries covered by BCRC-Dakar	97,903
	South Africa	Development of a database for use by the countries in the region	19,581
	Nigeria	Regional workshop on successful case studies of recycling, reuse and recovery methods towards the environmentally sound management of hazardous wastes and implementation of the Basel Convention in Africa.	90,651
	Africa	Assessment and recycling of used oils in Africa	36,260
		Regional sub total	**379,936**
Asia	China	A new Partnership with Local Authorities for the environmentally sound management of hazardous and other wastes in urban areas.	108,781
	Cambodia	Inventories of waste lead-acid batteries	45,688
	Jordan	Hazardous waste management in Small Medium Enterprise (SME) in the context of Integrated Life Cycle Management of Materials.	43,512
		Regional sub-total	**197,982**
CEE	Slovak Republic	"Implementation of waste minimization – cleaner production project" - training	30,687
		Regional sub-total	**30,687**
GRULAC	Argentina	Implementation of the control, detection and prevention of illegal traffic of hazardous wastes.	36,260
	Trinidad & Tobago	Assessment of the environmentally sound management of used oil in the Caribbean.	72,521
	El Salvador	Preparation of a regional strategy for the environmentally sound management of used lead-acid batteries in Central America and the Caribbean.	72,521
	Uruguay	Training program for municipal officers in environmentally sound management of hazardous wastes.	44,600
	GRULAC	Pilot program for the minimization of impacts generated by hazardous waste.	32,090
		Regional sub-total	**257,993**
WEOG	Germany	Scoping Paper on transfer of national experiences with waste prevention and minimization to a transregional or an international level.	13,402
		Regional sub-total	**13,402**
GRAND TOTAL			**880,000**

Source: http://www.basel.int/stratplan/oewg1/projprop.pdf Accessed July, 2004

Appendix D

The priority area of UNIDO with the Global Environment Facility is Persistent Organic Pollutants (POPs)

With the signing of the Stockholm Convention on POPs, two types of POPs-related interventions eligible for GEF funding can be undertaken by UNIDO with immediate effect: the Enabling Activities, which include the development of a National Implementation Plan; and Pilot Demonstration Projects. Both types of programs aim at capacity building.

The priority area of UNIDO with the GEF is POPs. UNIDO's experience with POPs goes back to the 1970s, with projects dealing with the reduction of POP by-products, i.e. POPs generated unintentionally, as they are in the Pulp and Paper and Cement industries. UNIDO's activities with POPs actually predate the word itself, which came into popular use in the 1980s. UNIDO is a member of GEF's Inter-Agency Task Force on POPs and works in close cooperation with the GEF Science and Technology Advisory Panel. Already this year, a US$ 250,000 Project Development Facility-B (PDF-B) category POPs project on Non-Combustion Technologies For Destroying POPs in the Philippines and Slovakia has been approved. A further three PDF-B POPs project proposals were submitted in the first quarter of 2001, one of these, a project in China, is UNIDO's first submission on Enabling Activities to implement the Stockholm Convention. Three more are at the formulation stage, including the Africa Stockpile Project, a US$250 million initiative promoted by the World Bank, GEF and the World Wildlife Fund with FAO, UNEP and UNIDO.

Although POPs is the priority for UNIDO, the GEF Secretariat has expressed its agreement to accept proposals for the other focal areas in the following order of priority: Climate Change/Energy Efficiency; International Waters and Biodiversity. This year full project approvals in the Climate Change / Energy Efficiency (CC/EE) and International Waters focal areas amount to US$9.3 million. This includes a US$8 million CC/EE program on Town and Village Enterprises development in China. A further four International Waters projects with a total budget of US$8-9 million are at the final approval stage.

Source: http://www.unido.org/en/doc/4731 Accessed June, 2004.

Appendix E

Technical Assistance for the implementation of the Rotterdam (PIC) – Convention in Argentina and Thailand

Project supported by the European Commission and Germany
August 1999 - December 2000

Executive Summary

Introduction

To promote the technical implementation of the Rotterdam Convention in developing countries a Pilot Project was initiated in Thailand and Argentina jointly sponsored by the European Commission (EC) and the German Ministry for Economic Cooperation and Development (BMZ). The activities were coordinated by the German Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH).
The project started 01 August 1999 and ended 31 December 2000. This project is a contribution to the requirements of article 16 of the Rotterdam Convention that parties with more advanced programs for regulating chemicals should provide technical assistance to other parties. The project provided exchange of DNA representatives from Argentina, Thailand and the EU, information networking facilities, field test kits for certain chemicals, and short term experts for specific topics.

Argentina

In Argentina it was decided to elaborate a "National Action Plan" for the implementation of the Rotterdam Convention. Participants of a workshop held in Buenos Aires discussed the responsibilities they have with the implementation of the Rotterdam Convention and also have seen the benefits the country could have from the process. The outstanding result of the workshop was the formation of the DNA as an official body which permits the cooperation between responsible organizations. It contains on the one hand technical institutions, formed by five ministries, i.e. the Ministry of Work, Agriculture, Environment, Health, and Interior, and on the other hand the organizing body within the Ministry of External Affairs with its international competence. At the beginning of August 2000 the Rotterdam Convention has been approved by the Argentinean Parliament.

When the project started Argentina stressed the plan to achieve a prohibition of the use, distribution and commerce of amphibole asbestos and crysotile in Argentina and the intention to notify the ban for the list of PIC chemicals. The representatives of the Argentinean authorities discussed in detail with German and Dutch experts the stepwise prohibition of the use of asbestos as well as the intensification of labor protection regulation. Argentina has banned the production, import, commerce and use of amphibole asbestos on 10 October 2000. The restriction of crysotile is in preparation.

Thailand

Throughout the training visit of the Thai DNAs to the Germany and Italy, one of the most important achievements was related to the implementation of the import and export notification. Being a chemicals importing country, Thailand has only received export

notifications but never issued any. Having discussed and learned from EU system, the Thai partners understand better now how the notification is being issued.

However, language translation is still a main problem. Even though Thailand is considerable strong in its legislation system it is still weak in implementation. Following the training visits, it is found that the responsibility and performance of the Thai customs is also relatively weak. It needs to be improved and rearranged.
The following activities could further strengthen the co-operation in the region and between Thailand, Germany and the EU:

- Presentation of the practical results in a subregional workshop in cooperation with the FAO/UNEP PIC Secretariat,
- Coordination of notifications (two parties from two PIC regions) starting with cooperation Thailand/EU on azinophos ethyl, dinoterb and DNOC,
- Participation of an expert from Thailand as an observer at the PIC/ICRC 2 to receive input by Thailand experience with notifications and import decisions,
- Cooperation in the area of risk assessment and risk management,
- Funding to study the situation of banned and severely restricted chemicals under the Rotterdam Convention, e.g. to identify which chemicals banned and severely restricted in Thailand should be notified according to Article 5 or Article 14 1(c) of the Convention.

With the assistance of an external expert a national inventory of PCB and PCB containing capacitors and transformers was initiated. Inspectors have been trained in view of field and desk activities. PCB management guidelines has been provided, and a mailing list for the questionnaire to obtain data for the inventory has been developed for the public and private sector. Next steps will be mailing of the questionnaire to private companies, site inspection, PCB detection in mineral transformers, and the completion of the inventory database. From the beginning the customs office has been involved in the project. It needs to control the import and export of products which might contain PCBs. The inventory data and PCB management guidelines are valuable tools to implement the concept and procedure to check products which are suspected to contain PCBs or to be PCB-contaminated.

PIC Intergovernmental Negotiating Committee

In October 2000, a progress report of the project was forwarded to the INC when it met for its seventh session in Geneva. The INC expressed its satisfaction to countries which had provided technical assistance and strongly urged other parties that were in the position to do so to follow suit.

Final remarks

To facilitate the discussion a table (see below) was developed to describe the responsibilities of the country and to identify the necessary activities and subactivities for the implementation of the Rotterdam Convention on national level. To increase transparency the activities are structured in correspondence to the respective articles of the Rotterdam Convention. This table has been used successfully in the two pilot countries. It is recommended that this structured and transparent approach is used by other developing countries, too.

The necessities and activities regarding the implementation of the Rotterdam Convention in the respective countries are very different. The flexible concept of the project was a strong advantage to tailor the project activities specifically to the needs of Argentina and Thailand. Consequently, the partner countries could gain a maximum benefit out of the limited resources provided. In Europe, expertise from several EU member states and institutions promoted the project directly, in particular:
The DNAs of Germany and the Netherlands, the European Chemicals Bureau in Ispra/Italy, Short Term Experts from France and Germany. The excellent cooperation between the partner countries and the different EU member states has demonstrated that this kind of joint project is a viable approach for capacity building in developing countries in line with article 16 of the Rotterdam Convention.

Source: http://www.gtz.de/chs/englisch/02hg_03pe.htm#exsum, Accessed July 2004

Appendix F

Parties to the United Nations Framework Convention on Climate Change

Annex I - the developed and economies in transition country Parties

Australia
Austria
Belarus a/
Belgium
Bulgaria a/
Canada
Czechoslovakia a/
Denmark
European Economic Community
Estonia a/
Finland
France
Germany
Greece
Hungary a/
Iceland
Ireland
Italy
Japan
Latvia a/
Lithuania a/
Luxembourg
Netherlands
New Zealand
Norway
Poland a/
Portugal
Romania a/
Russian Federation a/
Spain
Sweden
Switzerland
Turkey
Ukraine a/
United Kingdom of Great
Britain and Northern Ireland
United States of America

_____

a/ Countries that are undergoing the process of transition to a market economy

Annex II - the developed country Parties

Australia
Austria
Belgium
Canada
Denmark
European Economic Community
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Luxembourg
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
Turkey
United Kingdom of Great
Britain and Northern Ireland
United States of America

Source: UNFCCC, June, 2004 <http://unfccc.int/resource/docs/convkp/conveng.pdf>

Appendix G

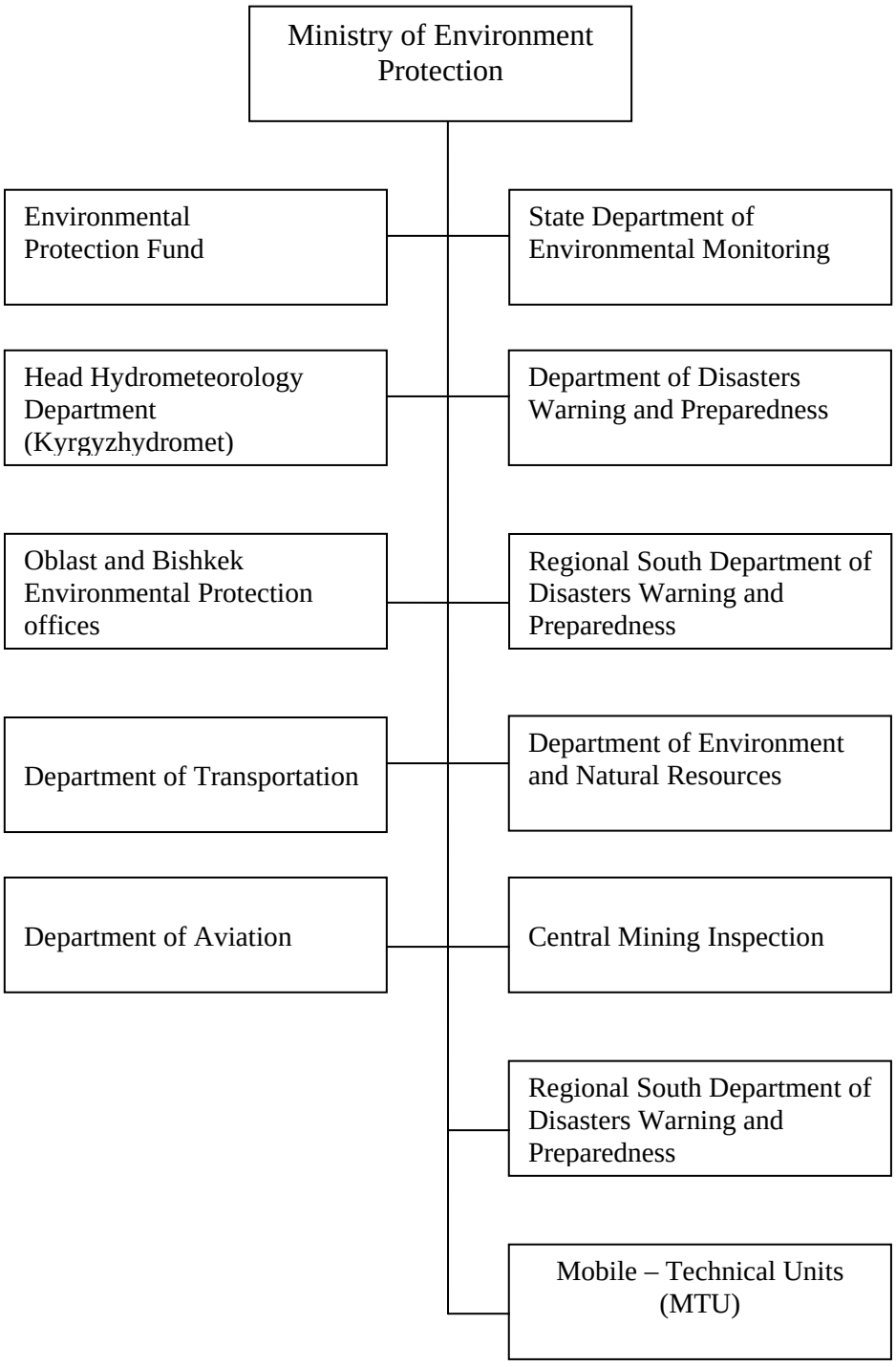


Figure G.1: Structure of the Ministry of Environment Protection of the Kyrgyz Republic

Source: Ministry of Environment and Emergency Situations, 2000

Appendix H

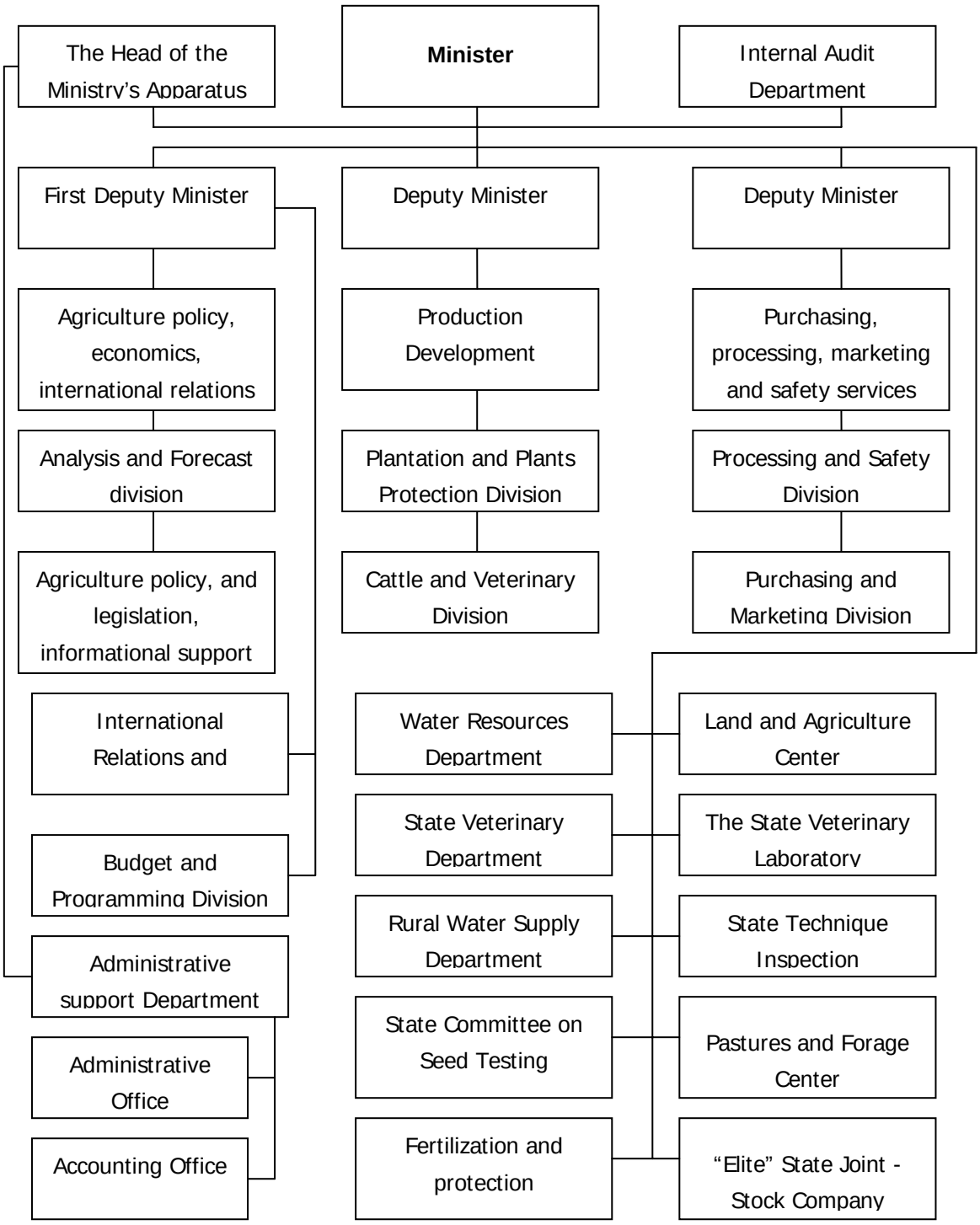


Figure H.1: Structure of the Ministry of Agriculture, Water Resources and Processing Industry

Source: Ministry of Agriculture, Water Resources and Processing Industry, 2004

Appendix I

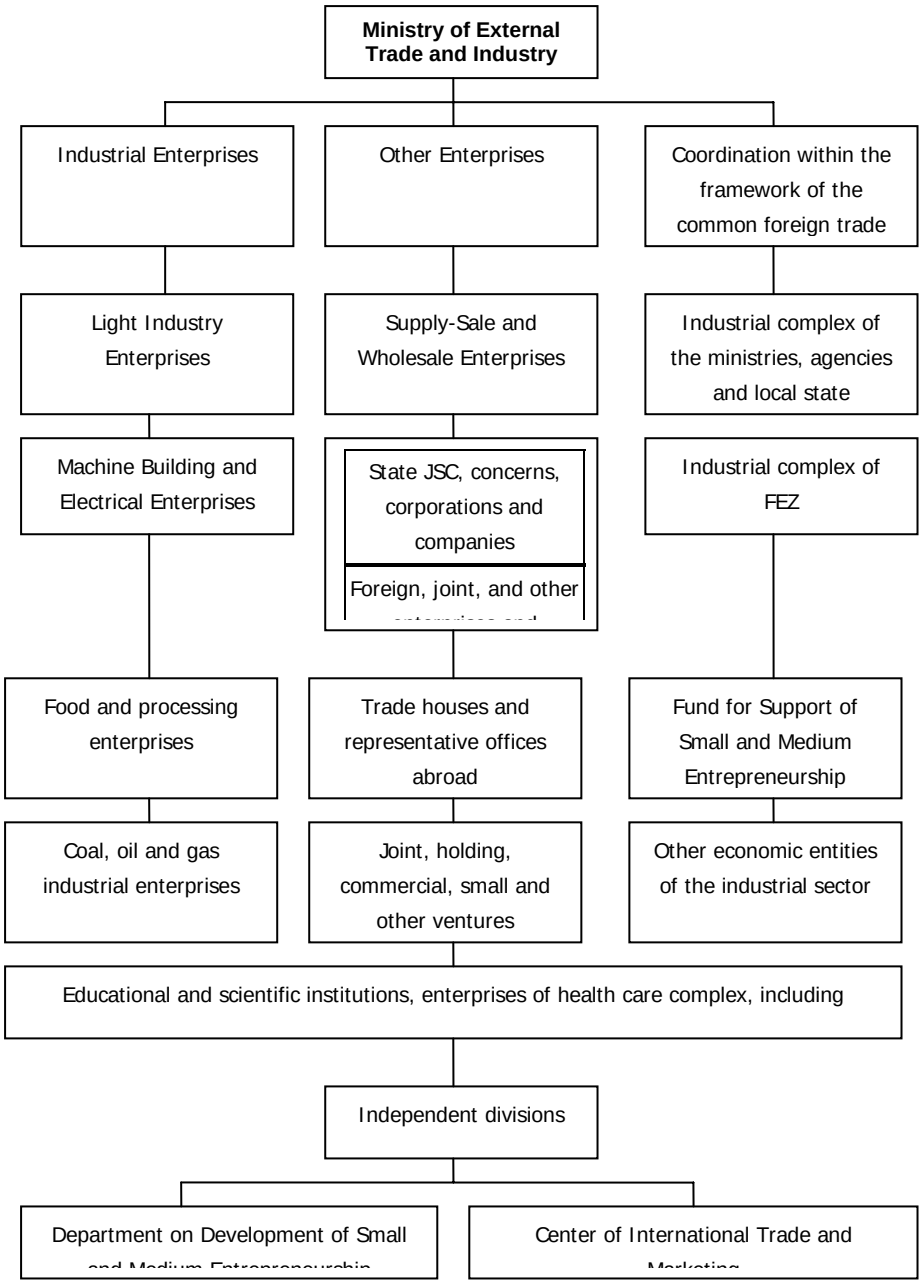


Figure I.1: Management Chart of the Ministry of Foreign Trade and Industry
Source: Ministry of Foreign Trade and Industry, 2004

Appendix J

“Bulgaary” JV Company	The Coca Cola Company	“Kyrgyz Mebel” Company
		
		
		
		
		

Figure: J.1: Environmental Management at different companies

Key Provisions of the core MEAs of Chemical and Atmosphere clusters relevant to Cleaner Production

1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989);
2. Stockholm Convention on Persistent Organic Pollutants (POP) (1998);
3. Rotterdam Convention on Prior Informed Consent (PIC) for Certain Hazardous Chemicals and Pesticides in International Trade (1998);
4. UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol (1997);

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

The Basel Convention entered into force in May, 1992

Objectives

Among other MEAs, the Basel Convention has a strong focus on prevention of hazardous waste generation, which is pointed in the objectives of the Convention, that, the reduction of transboundary movements of hazardous waste and other wastes, prevention and minimization of their generation, and moreover, environmentally sound management of generated wastes. Transfer and use of clean technologies is actively promoted by the Basel Convention.

The objectives on prevention and minimization of generation of wastes are strongly emphasized in the Basel Declaration on Environmentally Sound Management of Hazardous Waste.

Implementation mechanisms

As it already mentioned before, Convention is governed by the Conference of Parties (COP) and referring to the Basel Convention, Implementation Working Group (IWG), Legal Working Group (LWG) and Technical Working Group (TWG) established by the COP – 5.

All processes regarding Information Dissemination and Collection, co-ordination between parties and partners is carried out by the Secretariat of the Convention. It also involved directly in some of the implementing activities at the national level.

The Convention operates through the representatives of each party, i.e. focal points and Competent Authorities. Moreover, one of the key mechanisms in implementation of the Basel Convention is Regional Centers for Training and Technology Transfer around the world. In order to build up capacities of the parties and non-parties, allowing them meet requirements of the Basel Convention, the Regional Centers established. The Regional Centers are spread Worldwide, in the following countries: Argentina, China, Egypt, El Salvador, Indonesia, Nigeria, Senegal, Slovak Republic, Russian Federation, South Africa, Trinidad & Tobago and Uruguay (Basel Convention, 2004).

Capacity Building and Financial Aspects

Article 16 “Secretariat”. The Secretariat is obliged to prepare and transmit reports based upon information received in accordance with provisions of the Convention, including information on minimization of waste generation. Inter alia, it is obliged to provide information on sources of

technical assistance and training, available technical and scientific know-how, sources of advice and expertise, and availability of resources with a view to assisting to the Parties, “in the area of environmentally sound technologies relating to hazardous wastes; such as low- and non-waste technology”.

Annex I – Wastes to be controlled
Annex II – Wastes requiring special consideration
Annex III – List of Hazardous Characteristics
Annex IV – Disposal Operations
Annex V- Information to be provided on notification
Annex V- Information to be provided on the movement document
Annex VI – Arbitration
Annex VII – Wastes that are characterized as the hazardous but their designation on this list does not preclude the use of the Annex III to demonstrate that a waste is NOT hazardous
Annex VIII –Waste that are not characterized as the hazardous and are not to be controlled, unless they contain Annex I material to the amount causing them to demonstrate the characteristics of the Annex III The Secretariat is involved in the implementation of projects on the regional and national levels.

2.6.2 Stockholm Convention on Persistent Organic Pollutants (POP)

The Stockholm Convention entered into force since May 17, 2004.

Objective

The objective of the Convention is precautionary approach in using of chemicals in order to protect human health and the environment from persistent organic pollutants. Precautionary approach is applied in practice through preventive strategies; therefore Cleaner Production is integrated into the Convention.

Control Provisions

In its provisions, the Stockholm Convention has direct reference to Cleaner Production, which is required minimization and where it’s possible elimination of POPs. All articles of the Convention contain references to components of Cleaner Production, such as Best Available Techniques (BAT), good housekeeping, Best Environmental Practices (BEP), training of labor and policymaking to reduce and eliminate POPs from the production processes of enterprises and from agriculture use as well.

Control provisions contain separate articles on intentionally and unintentionally produced substances, and both pertaining to Cleaner Production.

Article 3 of the Convention deals with measures to reduce or eliminate releases from intentional production and use of substances. It requires parties to adopt regulatory approach, which is directly related to Cleaner Production.

Measures on unintentional production and use of POPs is mentioned in Article 4, by setting a goals to continuous minimization and where it possible ultimate elimination of the substances (Stockholm

Convention, 2003). All paragraphs of the article are relevant to Cleaner Production and its different components, policy, technological aspects.

Implementing mechanisms

Intergovernmental Negotiating Committee (INC) is managing the Convention in the interim period. The Secretariat serves as a clearinghouse for the Convention. The Convention requires parties to develop implementation plan within to years by involving all interested stakeholders, review it and update the plan on a periodic time. Moreover, it is suggested to integrate implementation plan into national sustainable development.

Parties are obliged to facilitate and launch information exchange by the Article 9 of the Convention, in order to reduce or eliminate POPs. All parties are required to set up a national focal point for information exchange.

Technical and Financial Assistance

Technical assistance to developing parties and parties with economies in transition are provided by developed parties with the purpose of Promotion of technology transfer and capacity building.

Financial assistance is provided by developed parties, according to Article 13 of the Convention, in order to meet the costs of the implementing measures to fulfill their obligations of the Convention. By the requirement of the Convention, financial mechanism is functioning under the authority, which is accountable to the Convention for the purpose of the Convention.

2.6.3 Rotterdam Convention on Prior Informed Consent (PIC) for Certain Hazardous Chemicals and Pesticides in International Trade

The Convention entered into force on 24 February 2004.

The convention's mandate has not strong focus on the preventive strategies, set out by the references to some Cleaner Production components in the objectives. The preamble of the Convention recognizes "contribution to the environmentally sound use of hazardous chemicals, by facilitating information exchange about their characteristics," and "providing national decision making process to Parties".

Objective

Promotion of shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm is the objective of the Convention. As a precautionary approach is implemented into practice through preventive strategies, therefore, Cleaner Production is somehow embodied into the Convention's mandate.

Control provisions

Control provisions include articles for the environmentally sound use of chemicals, pertaining to Cleaner Production. However, articles do not contain direct link to Cleaner Production components and techniques.

By Article 10 each party is required to implement appropriate legislative or administrative measures to ensure timely decisions with respect to import of chemicals listed in Annex III of the Convention.

Implementation mechanisms

The administrative functions required by the Convention are performed by the Designated National Authorities (DNA), designed by the parties. Parties adopted final regulatory action, and are required to notify the secretariat in writing of such action

A Secretariat is arranged meetings of the Parties and assists to the Parties on request, in the implementation of this Convention. Also the Secretariat coordinates cooperative activities with other international bodies.

In order to implement the Convention, parties are required to facilitate the exchange and provision of information about chemicals within the Convention, among parties and to public.

According to Article 15 of the Convention, for the effective implementation of the Convention, all the parties are obliged to take measures to establish and strengthen its national infrastructures and institutions, by establishing of national registers, databases, including safety information for chemicals. Moreover, industries shall be encouraged for their initiatives to promote chemical safety.

Financial and Technical Assistance

As the Rotterdam Convention does not clearly mandate preventive strategies, and therefore, Convention does not have direct linkage to financing CP options.

However, provision of the technical assistance is given in Article 16 of the Convention. Developed Parties shall, shall understand the needs of developing countries and countries with economies in transition and cooperate in promoting technical assistance for the development of the infrastructure and the capacity necessary to manage chemicals to enable implementation of this Convention.

Parties with more advanced programs for regulating chemicals should provide technical assistance, including training, to other Parties in developing their infrastructure and capacity to manage chemicals throughout their life-cycle.

According to Article 11, each exporting Party shall advise and assist importing Parties, by obtaining further information to help them to take action and strengthen their capacities and capabilities to manage chemicals safely during their life-cycle.

2.6.4. UN Framework Convention on Climate Change (UNFCCC) (1992) and the Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC) in June 1992 was signed in the First World Summit in Rio de Janeiro by over 150 nations.

The UNFCCC will become as the base for international co-operation within the climate change area. The Convention is highlighted the seriousness of the Climate Change. There is a concern that anthropogenic activities are accelerating the natural greenhouse effect, which can have serious consequences on human habitat and ecosystems.

The Convention divides countries into three main groups according to differing commitments:

Annex I parties include the industrialized countries that were members of the OECD (Organization for Economic Co-operation and Development) in 1992, plus countries with economies in transition (CEIT), including the Russian Federation, the Baltic States, and the several Central and Eastern European States. A requirement to Annex I only is to adopt climate change policies and measures to reduce emissions of the greenhouse gases (GHG) to 1990 levels by the year 2000.

Annex II contains the OECD countries only from Annex I, excluding CEIT countries. They are required to provide financial assistance to Non–Annex I Parties or developing countries, in order to take measures to reduce emissions of the GHGs, and to help them to adapt to unfavorable effects of climate change. Moreover, they are required to promote the development and transfer of clean technologies to CEIT Parties and developing countries as well.

Objective

The convention's overall objective is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Institutions

The Convention is governed by its Conference of the Parties (COP). It meets every year and reviews the implementation of the Convention, adopts decisions to further develop rules of the Convention and negotiates new commitments. The COP has two subsidiary bodies: The Subsidiary Body for Scientific and Technological Advice (SBSTA) and The Subsidiary Body for Implementation (SBI).

- The SBSTA provides advice to the COP on scientific, technological and methodological issues, including guidelines for improving standards of national communications and emission inventories.
- The SBI helps to assess and review the Convention's implementation, by analyzing communications submitted by Parties. It also deals with financial and administrative matters of the Convention.

Implementation mechanisms

The third COP meeting in Kyoto, Japan in 1997 resulted in the "Kyoto protocol" and it was the first step in taking concrete quantitative measures in order to reach the objectives of the Climate Convention.

The protocol regulates six greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF6).

The Protocol is legally obliged 38 industrialized countries, including 11 countries in Central and Eastern Europe, to return their emissions of GHGs to an average of approximately 5.2 percent below their 1990 levels as an average over the period 2008-2012. The Kyoto Protocol has not entered into force, and it is expected to come into force, following Russia's expected ratification.

The Kyoto protocol is supplementary instrument to the Convention, in a way to strengthen the Convention. A principle of operation of the Kyoto Protocol is same, as the Convention, by sharing common objective. Annex groups are remained as in the Convention, grouping into Annex I, Annex II and non- Annex I. Parties. Conference of the Parties will serve as "Meeting of the Parties" to the Protocol. The Intergovernmental Panel on Climate Change (IPCC) will support the Protocol on scientific, technical and methodological matters as it does the Convention the advice provided by the Subsidiary Body for Scientific and Technological Advice..

The Kyoto Protocol focuses on:

- Commitments, including legally binding emissions targets and general commitments;
- Implementation, including domestic steps and three novel implementing mechanisms;
- Minimizing impacts on developing countries;
- Compliance, including a compliance Committee to assess and deal with problem cases;

The flexible mechanisms

The Kyoto protocol gives the Annex I countries the option to fulfill a part of their commitments through three "flexible mechanisms". Through these mechanisms, a country can fulfill a part of their emissions reductions in another country or buy emission allowances from another country. It also could be one of the possible instruments to implement Cleaner Production options in developing countries, by using these three "flexible mechanisms".
There are three flexible mechanisms:

(a) Emissions Trading: In order to meet requirements of the Protocol, it opens emissions trading between countries that have made commitments to reduce greenhouse gas emissions, as it mentioned in Article 17 of the Convention (UNFCCC, 2003). The countries have the option to delegate this right of emissions trading to companies or other organizations.

The total amount of emissions permitted is pre-defined in emissions trading system. Through trading, installations with low costs for reductions are stimulated to make reductions and sell their surplus of emissions allowances to organizations where reductions are more expensive. Both the selling and buying company wins on this flexibility that trade offers with positive effects on economy, resource efficiency and climate. The environmental advantage is that one knows, in advance, the amount of greenhouse gases that will be emitted. The economical advantage is that the reductions are done where the reduction costs are the lowest. The system allows for a cost effective way to reach a pre-defined target and stimulates environmental technology development.

(b) Joint Implementation: Article 6 of the Kyoto protocol states that an Annex I country that has made a commitment for reducing greenhouse gases, can offer to or obtain from another Annex I country greenhouse gas emissions reductions. These emissions reductions shall come from projects with the objectives to reduce anthropogenic emissions from sources or increase the anthropogenic uptake in sinks.

In order to be accepted as JI-projects, the projects have to be accepted by both parties in advance. It also has to be proven that the projects will lead to emissions reductions that are higher than what otherwise would have been obtained.

JI-projects are an instrument for one industrial country to invest in another industrial country and in return obtain emissions reductions. These reductions can be used to help fulfill their own reduction commitments at a lower cost than if they had to do the reductions in their own country.

(c) Clean Development Mechanism: Both above mentioned "flexible mechanisms" are related to Developed countries Parties, and the Clean Development Mechanism (CDM) is aimed to assist Parties not included in Annex I in achieving sustainable development and in contributing to the objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments.

Article 12 of the protocol defines the CDM, the CDM has dual purpose, and they include:

1. to contribute to sustainable development in developing countries;
2. to help Annex I-countries under the Kyoto Protocol to meet their target.

With the help of CDM, countries which have set themselves an emission reduction target under the Kyoto Protocol (Annex I countries) can contribute to the financing of projects in developing countries (non-Annex I countries) which do not have a reduction target. These projects should reduce the emission of greenhouse gases while contributing to the sustainable development of the host country involved. The achieved emission reductions can be purchased by the Annex I country in order to meet its reduction target.

In order to be accepted as CDM-projects, the projects have to be accepted by both parties in advance. It also has to be proven that the projects will lead to emissions reductions that are higher than what otherwise would have been obtained.

The difference between JI-projects and CDM-projects is that JI-projects are done between countries that both have commitments, while the CDM-projects is between one country that has commitments and another country that does not have commitments. Emissions reductions that have been done through CDM-projects during the period 2000 to 2007 can be used for fulfilling commitments in Annex I countries for the period 2008-2012.

The scheme of Flexible Mechanisms of the Kyoto Protocol is illustrated in Figure 5.1

Financial Assistance

Since 1991, about US$ 1.3 billion have been provided in grants from the GEF Trust Fund for climate change activities in developing countries, of this total only 3% was used to fund national communications of non-Annex I Parties. Another US$ 6.9 billion was contributed through co-financing from bilateral agencies, recipient countries and the private sector, making a total of US$ 8.2 billion. As part of the Marrakesh Accords, the COP advised the GEF to expand the scope of activities eligible for funding, such as work on adaptation and capacity-building. The Accords also established two new funds:

A Special Climate Change Fund to finance projects relating to capacity-building, adaptation, technology transfer, climate change mitigation and economic diversification for countries highly dependent on income from fossil fuels. It will be complementary to other funding mechanisms. A Least Developed Countries Fund to support a special work program to assist LDCs. Several Annex II Parties have already declared that they will collectively contribute US$ 410 million a year in extra funding for developing countries by 2005, with this level to be reviewed in 2008. These funds will be managed by the GEF as the entity operating of the Convention's financial mechanism. In addition, the Marrakesh Accords established an Adaptation Fund which will be managed by the GEF and funded not only by the adaptation levy on CDM projects, but also by additional contributions from Annex I Parties.

The Adaptation Fund will finance practical adaptation projects and programs in developing countries, and also support capacity-building activities. Parties to the Protocol have to report yearly on their contributions to the fund and the COP/MOP will review these reports.

Appendix????

The priority area of UNIDO with the Global Environment Facility is Persistent Organic Pollutants (POPs)

With the signing of the Stockholm Convention on POPs, two types of POPs-related interventions eligible for GEF funding can be undertaken by UNIDO with immediate effect: the Enabling Activities, which include the development of a National Implementation Plan; and Pilot Demonstration Projects. Both types of programmes aim at capacity building.

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- Presentation of the practical results in a subregional workshop in cooperation with the FAO/UNEP PIC Secretariat,
- Coordination of notifications (two parties from two PIC regions) starting with cooperation Thailand/EU on azinophos ethyl, dinoterb and DNOC,
- Participation of an expert from Thailand as an observer at the PIC/ICRC 2 to receive input by Thailand experience with notifications and import decisions,
- Cooperation in the area of risk assessment and risk management,
- Funding to study the situation of banned and severely restricted chemicals under the Rotterdam Convention, e.g. to identify which chemicals banned and severely restricted in Thailand should be notified according to Article 5 or Article 14 1(c) of the Convention.

With the assistance of an external expert a national inventory of PCB and PCB containing capacitors and transformers was initiated. Inspectors have been trained in view of field and desk activities. PCB management guidelines has been provided, and a mailing list for the questionnaire to obtain data for the inventory has been developed for the public and private sector. Next steps will be mailing of the questionnaire to private companies, site inspection, PCB detection in mineral transformers, and the completion of the inventory database. From the beginning the customs office has been involved in the project. It needs to control the import and export of products which might contain PCBs. The inventory data and PCB management guidelines are valuable tools to implement the concept and procedure to check products which are suspected to contain PCBs or to be PCB-contaminated.

PIC Intergovernmental Negotiating Committee

In October 2000, a progress report of the project was forwarded to the INC when it met for its seventh session in Geneva. The INC expressed its satisfaction to countries which had provided technical assistance and strongly urged other parties that were in the position to do so to follow suit.

Final remarks

To facilitate the discussion a table (see below) was developed to describe the responsibilities of the country and to identify the necessary activities and subactivities for the implementation of the Rotterdam Convention on national level. To increase transparency the activities are structured in correspondence to the respective articles of the Rotterdam Convention. This table has been used successfully in the two pilot countries. It is recommended that this structured and transparent approach is used by other developing countries, too.

The necessities and activities regarding the implementation of the Rotterdam Convention in the respective countries are very different. The flexible concept of the project was a strong advantage to tailor the project activities specifically to the needs of Argentina and Thailand. Consequently, the partner countries could gain a maximum benefit out of the limited resources provided. In Europe, expertise from several EU member states and institutions promoted the project directly, in particular:
The DNAs of Germany and the Netherlands, the European Chemicals Bureau in Ispra/Italy, Short Term Experts from France and Germany. The excellent cooperation between the partner countries and the different EU member states has demonstrated that this kind of joint project is a viable approach for capacity building in developing countries in line with article 16 of the Rotterdam Convention.

Source: http://www.gtz.de/chs/englisch/02hg_03pe.htm#exsum, Accessed July 2004

Development of Cleaner Production Promotion Strategies for Kyrgyz Republic

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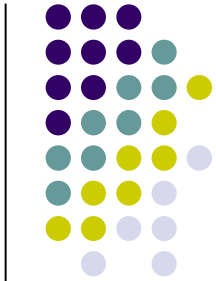
Contents of Presentation



- Introduction
- Objectives
- Literature review
- Methodology
- Chapter 4: Industrial sector in Kyrgyzstan and State of Environment
- Chapter 5: Potential of the MEAs to finance CP projects and National Institutional capacity to promote CP in Kyrgyzstan
- Chapter 6: Conclusions and Recommendation

Introduction

The Kyrgyz Republic

- **Population**: 5 million people
- **Territory:** 199,900 square kilometers; bordering on China, Tajikistan, Kazakhstan, Uzbekistan.
- **Capital:** Bishkek (800 000 people)

Major Industries:

Agriculture and food processing; Manufacturing
Mining (Gold mining); Hydro energy (electricity)
Tourism (eco and adventure); Textiles; Construction

Problems in Kyrgyz Industry:

Inefficient production processes, Some financing is not available, Irresponsibility of the Managerial Staff of the Industries

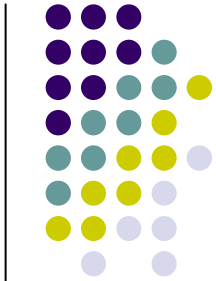
Introduction

- However, one of the ways of rational use of natural resources and energy is Cleaner Production (CP).

- To implement CP options in a country scale, it is required to establish Cleaner Production Centers, for coordination of projects, capacity building of Industries, international co-operation and financing of CP activities.

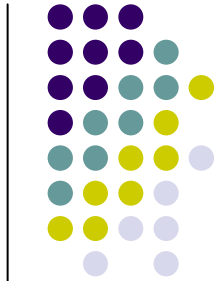
- Nevertheless, CP activities are need financial support. One of the options for financing CP activities is implementation of international environmental conventions or Multilateral Environmental Agreements (MEA) in CP activities.

Objectives of the study:



- To review the existing Multilateral Environmental Agreements (MEA), in order to identify links to Cleaner Production Promotion.
- To review the current status of industrial activities and the associated pollution issues.
- To review of the on-going CP Projects, identifying the promoters and the barriers.
- To review national institutional and capacity building aspects to promote CP.
- To develop CP strategies by incorporating existing MEAs in Kyrgyz Republic.

Literature review



Multilateral Environmental Agreements

- International instrument binding three or more nations
- Take measures to remedy, mitigate or otherwise deal with global and/or regional environmental concerns

  - have a goal of environmental protection
  - are concluded between a large number of states or international organizations as parties
  - concluded in written form
  - governed by international law
  - can be embodied in a single instrument or in two or more related instruments

Literature review

Institutional Elements of MEAs

- Conference of Parties (COP);
- Secretariat;
- Executive and subsidiary bodies;
- Clearinghouses;
- Implementation actors on national level;
- Financial mechanisms;

Literature review

- Cleaner Production - continuous application of an integrated preventive environmental strategy applied to **processes**, **products** and **services** to increase overall efficiency and to reduce risks to humans and to the environment.

- Related terms include:
  - Pollution prevention (P2) – North America
  - Eco-efficiency - WBCSD
  - Green Productivity – APO, Japan

Literature review:

The National Cleaner Production Centres (NCPC)

- The National Cleaner Production Centres (NCPC) Programme is a joint initiative by UNIDO and UNEP DTIE to build local capacity to implement Cleaner Production in developing countries and economies in transition.
- There are, 24 NCPCs Worldwide.

The core activities of the NCPCs are:

- Awareness rising;
- Technical assistance;
- Training and demonstration projects;
- Information dissemination;
- Policy advice;

Financing their activities from various sources such as:

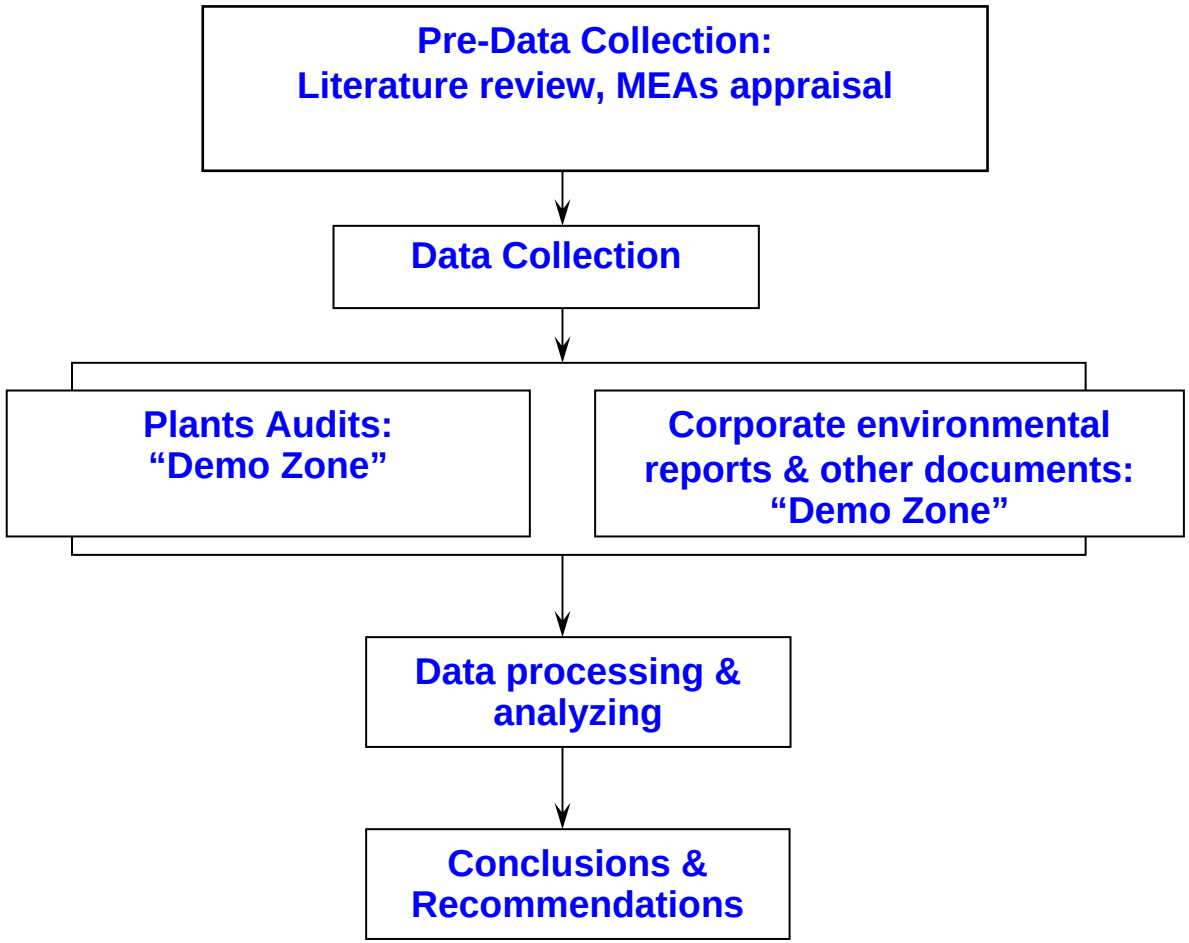
- Domestic funding;
- Operational income;
- International funding;

Literature review:

National Policy Requirement to promote Cleaner Production in Asia

1.	China	The Cleaner Production Promotion Law (China NCPC, 2003).
2.	Sri Lanka	The Government of Sri Lanka implemented a one year "Clean Industry Development Project“ program on a country level. (Sri Lanka NCPC, 2001).
3.	Thailand	The Cleaner Technology (CT) has been highlighted under the 8th National Economic and Social Development Plan (ICETT, 2003).

Methodology



General Methodology Outline

Methodology

Proposed Field Data collection was based on three stages or areas:

1. Present Situation: It is a key area which provides a milieu for other areas. This area determines the total potential of country for CP.

2. Government, Policy Instruments:

- Role of the Government in Environmental Regulation;
- Existing environmental regulatory instruments;

3. Enterprises:

- Existence of Environmental Management System (EMS);
- Compliance with Environmental Regulations;
- Barriers and promoters for implementation of CP;

Methodology

Data collected by visiting Government Agencies:

- State Energy Agency;
- Environmental Protection Department, under the Ministry of Environment;
- National Statistics Committee;

Following enterprises visited during study period of time:

- “Bulgaary” JS Company (Tannery);
- “Kyrgyzmebel” JS Company (Furniture);
- “Coca Cola Bishkek Bottlers” JS Company (Beverages);

Other sources of data:

- UN Library;
- Technical Library;
- Kyrgyz-Russian University ;

Chapter 4:
Industrial sector in Kyrgyzstan

Production Value and Employment by Enterprise Type in year 2002 (%)

Industries	Number of enterprises	Production Value	Employment
State	10.6	4.5	10.6
Private:	89.4	95.5	89.4
- individual	18.6	12.1	5.6
- joint stocks	66.1	79.6	80.8
- joint-ventures	4.7	3.8	3.0
Total:	100	100	100

Chapter 4:
State of Environment

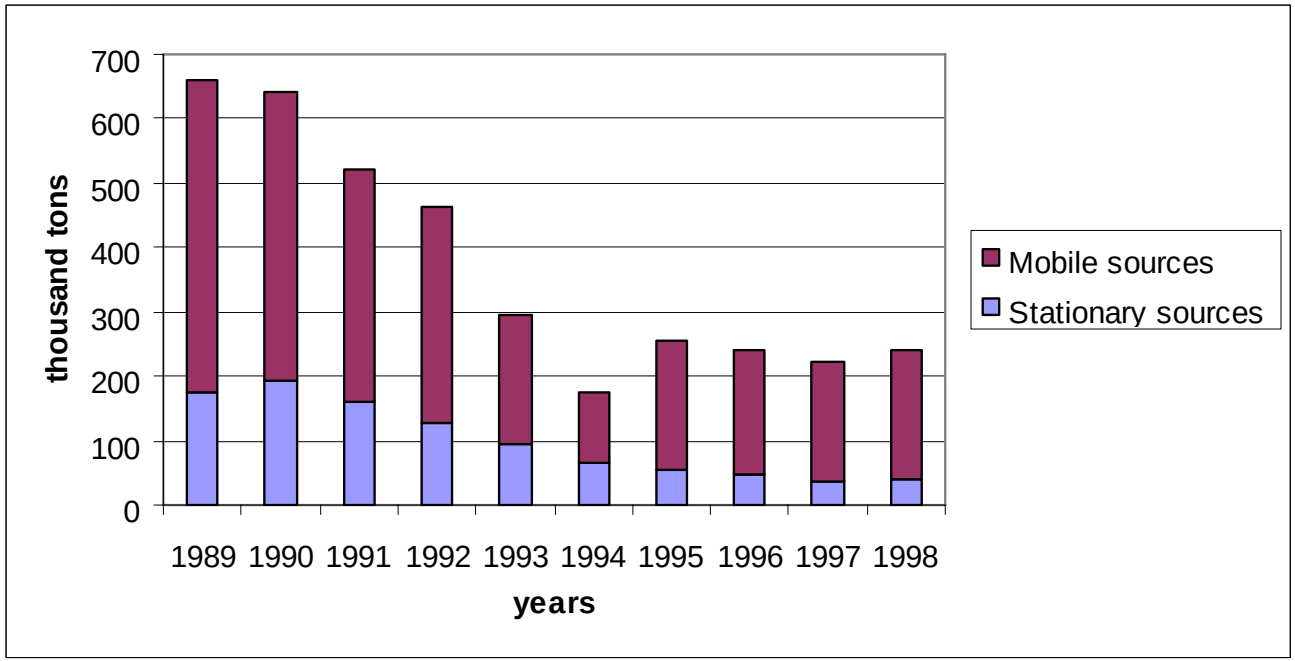
Water Pollution

Basic indices of the wastewater discharges (million cubic meters/year)

Wastewater	1995	1996	1997	1998	1999	2000
Discharged wastewater	301	654	N/A	601,6	933,1	746,3
Wastewater	136	122	111	116,9	150,3	137,7
Untreated wastewater	0,85	4,46	4,0	4,0	3,8	11,8

Chapter 4:
State of Environment

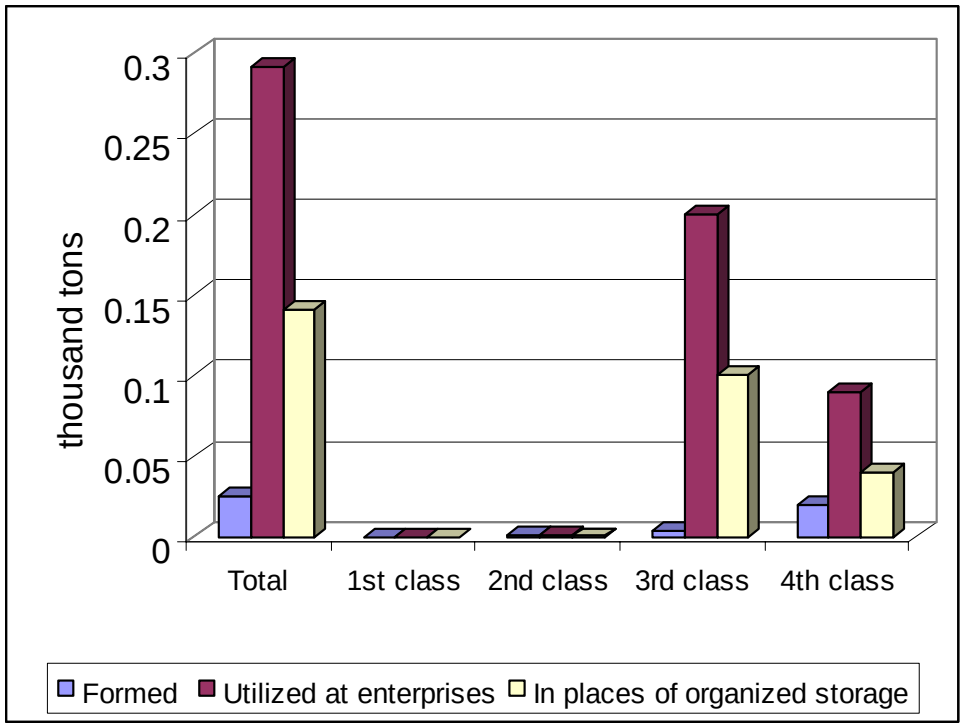
Air Pollution



Emissions of Pollutants to the Atmosphere by sources, 1989-1998

Chapter 4:
State of Environment

Hazardous Waste



Generation and disposal of toxic wastes in 1999, thousand tons

Chapter 4:
Environmental Protection Instruments

Regulatory instruments for environmental protection

- ***Licensing and environmental impact assessment (EIA):***
  The prospecting and exploitation of mineral resources.
  The withdrawal of surface and groundwater for irrigation.
- ***Permits and related procedures:***
  For all kind of activities, like: emissions from stationary sources; waste generation and management; waste water discharges; use of natural resources.
- ***Environmental inspection:***
  The aim of the controlling is the conformity of the activity with the granted permit, as well as the emission or discharge information provided by the enterprise.

Chapter 4:
Environmental Protection Instruments

Economic instruments for environmental protection:

- *User charges* applied to water supply, (domestic) sewerage, sewage treatment and water management;
- *Emission charges* for air pollution, waste-water generation and waste disposal;
- *Product charges* applied to transport and the use of natural resources;
- *Penalties* for excessive pollution or for unlicensed activities;

Financing environmental expenditures

- ***Environmental expenditures:***
  Composed of capital expenditures and non-capital expenditures
- ***National source of financing:***
  The State Environmental Fund, The Fund consists of:
  - National Environmental Protection Fund at the central level;
  - Regional Environmental Protection Funds;

Chapter 5: Results and Discussions

Three Core MEAs - with direct relevance to CP activities:

- Chemical and hazardous waste
  - Basel Convention on hazardous waste.
  - Stockholm Convention on POPs.
  - Rotterdam Convention on PIC.
- Atmosphere
  - The Kyoto Protocol (UNFCCC).

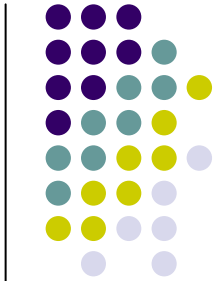
Chapter 5: Results and Discussions

Potential of Basel Convention - Overview

- **The Basel Convention entered into force in May, 1992**
- **Objectives:** Reduction of transboundary movements of hazardous waste and other wastes, prevention, minimization of their generation and environmentally sound management of generated wastes.
- **Implementation mechanisms:** Conference of Parties; Secretariat; Expanded Bureau;
- **Financial assistance:** Regional Training Centres are to promote waste minimisation and cleaner production in developing countries.

  Example: Slovak Republic project proposal "Implementation of waste minimization – cleaner production project" has been approved by OEWG on US$ 30, 687 for training.

Chapter 5: Results and Discussions
Potential of Stockholm Convention - Overview



- The Stockholm Convention entered into force since May 17, 2004.
- ***Objective:*** To protect human health and the environment from persistent organic pollutants.
- ***Implementing mechanisms:*** Intergovernmental Negotiating Committee (INC), The Secretariat.
- ***Financial Assistance:*** Financial assistance is provided by developed parties, according to Article 13 of the Convention. The interim expenses of the secretariat is financed by GEF.

Example: Canada POPs Fund has supported projects on capacity building in developing countries and countries with economies in transition (CEITs). In 2002, Canada POPs Fund financed the project aimed to improve India's capacity to ratify and implement the Stockholm Convention.

Chapter 5: Results and Discussions

Potential of Rotterdam Convention - Overview

- The Convention entered into force on 24th of February 2004.
- ***Objective:*** Promotion of shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals.
- ***Implementation mechanisms:*** the Designated National Authorities (DNA), Secretariat;
- ***Financial and Technical Assistance:*** Developed Parties shall provide technical and informational assistance to developing countries.

Example: in 1999, two pilot projects of the Rotterdam Convention were implemented in Argentina and Thailand, in order to follow the requirements of the Articles 11 and 16 of the Convention. The projects were funded by the EC and the German Ministry for Economic and coordinated by GTZ

Chapter 5: Results and Discussions

Potential of the Kyoto Protocol - Overview

- Adopted: 1997; not yet in force
- ***Objectives:*** commits industrialized countries to achieve quantified targets for decreasing their greenhouse gas emissions;
- ***Implementation mechanisms:*** Conference of Parties: Secretariat, Subsidiary Body for Scientific and Technological Advice
- **Technical assistance:** Clean Development Mechanism (CDM), Join Implementation (JI); Emissions Trading (ET);
- **Financial assistance:** Adaptation Fund, as a result of COP – 7 in Marrakesh, GEF for financing projects in developing countries; LDCs fund, Special climate change fund.
- **Example:** Costa Rica CDM project on energy efficiency at dairy plant, with the following outcomes energy savings: US $9 730 / year; Reduction of CO2: 127.93 Tons CO2

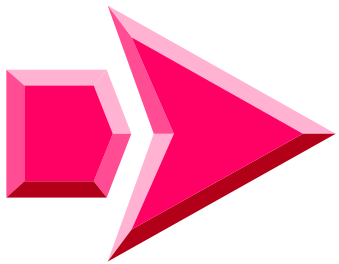
Chapter 5: Results and Discussions

Case Study: Costa – Rican experience

- Costa-Rican NCPC has attracted funding from:

- **The Kyoto Protocol, CDM:** Pilot project during 2000 (Quick Scans) in 4 sectors: Cement; Food; Textile; Transport

- Energy efficiency project at "**Dos Pinos"** Dairy plant:



Implemented measures:

Fuels:

7.5% reduction in Fuel Oil consumption or boilers

43 872 Liters/year

US $9 730 / year

127.93 Tons CO_2

Estimated Investment **US$5 000**

Return of Investment: **0,51 years**

Chapter 5: Results and Discussions

Case Study: Costa – Rican experience

- **Basel/POPs Convention projects on:**
- Joint Course and Regional Lead Project and support on local study (2002)
- PCB Training workshop for Power, Transmission and Distribution Utilities (March 2004)
- Hazardous Material Regional Workshop (July 2004)
- **Material substitution project** at "Equipos El Prado" Metal processing: Substitution of toxic Cr IV by Cr III

Benefits:

- They eliminate the use of the only carcinogenic substance of the process
- Reduction in water treatment costs
- Increase in production costs of only 7%.
- Product quality is the same and is accepted by the companies

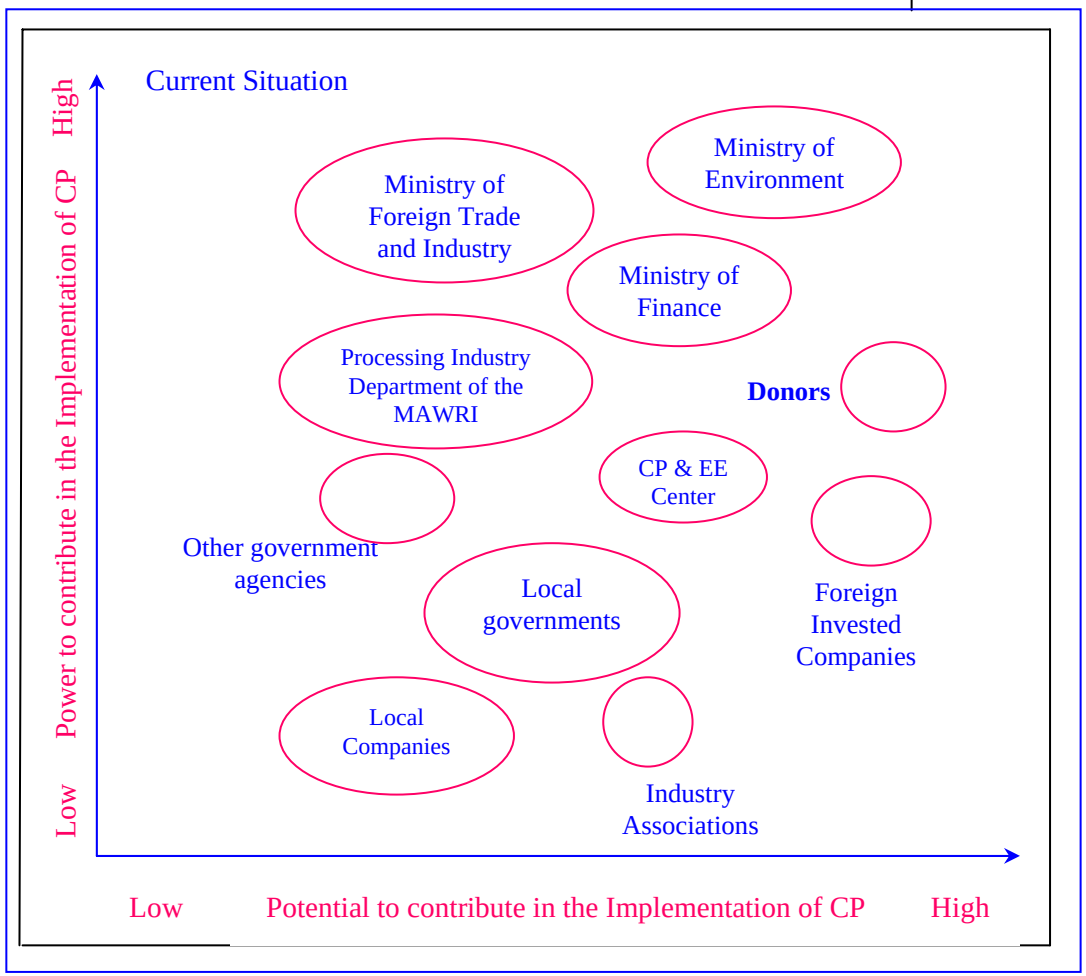
Chapter 5: Results and Discussions

National institutions to promote CP

Kyrgyz State agencies:

- Ministry of Environment and Emergencies;
- Ministry of Agriculture, Water Resources and Processing Industry;
- Ministry of Finance;
- Ministry of Foreign Trade and Industry:

Current situation of the institutions



Chapter 5: Results and Discussions
Ongoing CP Projects in Kyrgyzstan

Results of CP & EE Program in Kyrgyzstan

Savings	**Unit**	**Identified Potential**	**Achieved Results (February, 2004)**
Electricity	kWh/year	740 938	372 353
Water	t/year	49, 673	39, 561
Heat	kWh/year	302 308	302 308
Raw materials	t/year	0. 924	N/A
Economical effect	**USD/year**	**31 159**	**21 533**

Chapter 5: Results and Discussions

Examining Root Causes

- Root Cause Number One: The Policy Environment in Kyrgyzstan:

- Root Cause Number Two: Unskilled Government:
  - Political and economic instability
  - Unskilled Government
  - Bureaucracy and Administration
  - Corruption
  - State budget deficit

- Root Cause Number Three: Traditional Culture at the Enterprises:
  - Outdated technology
  - Lack of capital
  - Company performance
  - Management system
  - Incentive system
  - Belief in pollution control

Chapter 5: Results and Discussions

Comparative Analysis of companies

Company	"Bulgaary" JV Company	Coca Cola Company	Kyrgyz Mebel
Economic performance	Weak	Strong	Improving
Management commitment	Management is committed	Management is committed, Applying to ISO 9001	Management is committed
Environmental management	Poor	Good	Poor

Chapter 5: Results and Discussions

Comparative Analysis of companies

Local company

Foreign invested company

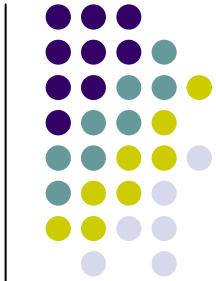
Chapter 6:
Conclusion and Recommendations

- Most of the studied MEAs have relevant provisions to Cleaner Production in their objectives and implementing mechanisms.

- Cleaner Production is new in Kyrgyzstan.

- Kyrgyz Industry does not consider Cleaner Production initiatives as an option for improving productivity parallel to an increased protection of the environment.

Chapter 6:
Conclusion and Recommendations



- **Regulatory enforcement:**
  User charges;
  Polluter pays;
  New regulatory development;

- **Application of economic instruments:**
  Economic resource pricing;
  Market economy;
  Eco-labeling;

- **Institutional capacity building:**
  The CP & EE Center: