

**CONTRIBUTION OF THE MANUFACTURING
SECTOR TO SUSTAINABLE DEVELOPEMNT**

IN

ZIMBABWE

A SURVEY BY SIRDC FOR UNIDO

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ACRONYMS AND ABBREVIATIONS

CBI	Cross Border Initiative
COD	Chemical Oxygen Demand
COMESA	Common Market for Eastern and Southern Africa
CPCZ	Cleaner Production Centre for Zimbabwe
CPT	Cleaner Production Technologies
CZI	Confederation of Zimbabwe Industries
DANIDA	Danish International Development Agency
DTI	Danish Technology Institute
ECOM	Environmental Conscious Manufacturing
EIA	Environment Impact Assessment
ELMS	Environment and Land Management Sector (of the Southern African Development Community)
EPZ	Export Processing Zone
ESAP	Economic Structural Adjustment Programme
EST	Environmentally Sound Technologies
GoZ	Government of Zimbabwe
GDP	Gross Domestic Product
GNI	Gross National Income
GSTP	Generalised System of Trade Preferences
IBDC	Indigenous Business Development Centre
IBWO	Indigenous Business Women's Organisation
LIZ	Leather Institute of Zimbabwe

MET	Ministry of Environment and Tourism
NCS	National Conservation Strategy
NGO	Non Governmental Organisation(s)
PAZ	Privatisation Agency of Zimbabwe
SADC	Southern African Development Community
SD	Sustainable Development
SDF	Social Dimension Fund
SIDA	Swedish International Development Agency
SIRDC	Scientific and Industrial Research And Development Centre
SME	Small and Medium Enterprises
UNEP	United Nations Environmental Programme
UNESCO Organisation	United Nations Education, Scientific and Cultural
UNIDO	United Nations Industrial Development Organisation
USAID	United States Agency for International Development
WTO	World Trade Organisation
ZIC	Zimbabwe Investment Centre
ZIMPREST Transformation	Zimbabwe Programme for Economic and Social

I. INTRODUCTION

Zimbabwe is one of the Southern African Development Community (SADC) countries and is in the Sub-Saharan region of Africa. The country attained its independence from the United Kingdom in 1980. The country covers an area of 390,757 km² with a population of 12.4 million people growing at a rate of 3% (1992 census). The population density increased from 19 persons per square kilometre in 1982 to 27 persons per square kilometre in 1998. Of the total population 35 % live in urban areas whilst the remainder live in rural communal areas. The major government policy at independence was Growth with Equity aimed at eliminating previous economic and social inequalities, which existed along the racial divide. Major strides were gained in the provision of access to improved sanitation facilities with 51% and 98% coverage in rural areas and urban areas respectively. Government of Zimbabwe (GoZ) spends 7% of GDP on education and the public health expenditure constitute 2.9% of GDP (1998 figures). The private sector contributes 3.7% of GDP. A further affliction of the country is the decimation of the population by AIDS. It is suggested that the AIDS epidemic will halt or even reverse population growth in Zimbabwe. Economic growth is necessary and central to alleviate poverty and unemployment. GNI per capita is USD 530 (1999) and thus, Zimbabwe is ranked 154 in the world (World Development Report; 2000/2001).

Zimbabwe embarked on the Economic Structural Adjustment Programme (ESAP) from 1990-1995. The measures that were to be implemented were:

- Privatisation of loss making parastatals and reduction of recurrent expenditure.
- Price adjustments in the energy sector (oil and electricity).
- Reduction of GoZ fiscal deficit to about 5% of GDP.
- Domestic deregulation.

Manufacturing declined during ESAP as domestic demand stagnated while fierce competition from imports increased. In this respect ESAP failed to deliver efficiency and competitiveness of the economy. Furthermore there were serious flaws in the management of ESAP by government and the respective sequencing of policy instruments. The GoZ response was inadequate in putting in place coherent policies to restore macro-economic stability and fundamentals that would spur growth in production. The situation was further exacerbated by a severe drought during the 1991/92 period. As a result of these measures it was necessary to protect the most vulnerable groups of society by introducing the Social Dimension Fund (SDF) and the Poverty Alleviation Plan. The absence of institutional frameworks has made the delivery of social needs impossible.

As shown in **Table 1**, annex 1, poverty in Zimbabwe is currently very high. Approximately 61% of all Zimbabweans are living in households with income per person below a level sufficient to provide basic needs. About 45% of all households are not able to meet basic nutritional needs. Rural poverty is more

prevalent as 75 % of the rural households are categorised as totally poor, compared to about 39% of all urban households. Although these traditional indicators have been selected, it is important to note that poverty is multidimensional and more complex than portrayed. There are no sustainable development indicators formally agreed in Zimbabwe.

Serious environmental policy initiatives began with the establishment of the Ministry of Environment and Tourism (MET) and considerations for the environment took centre stage after the publication of the National Conservation Strategy (NCS) in 1987. The document is hardly referred to in the National Development Plan and is invariably perceived as a sectoral activity. The GoZ in its response to UNCED in 1992, identified key environmental issues which included:

- Poverty and its attendant problems of dependency on ecosystems
- Atmospheric pollution due to industrialisation and other factors
- Water scarcity due to rainfall variability and ineffective water management measures
- Drought and climate change

Parallel to this programme the GoZ committed itself to carry out the following:

- Develop a coherent environmental policy framework
- Increase budgetary allocation for environmental programmes
- Raise the level of environmental awareness
- Acknowledge the role of NGOs
- Recognition of mutual dependence on health

This was on the proviso that the process does not render national and or local regulations ineffectual and does not constrain third world countries.

Zimbabwe is signatory to a number of international environmental related conventions and other SADC protocols such as the SADC-Environment Land Management System (ELMS). This recognises and acknowledges that some environmental problems can be global and regional in nature, requiring concerted efforts by all nations. It is also pertinent to note that most of these environmental agreements contain trade-related provisions. A review carried out to establish localised implementation of Agenda 21 revealed that there was lack of knowledge and awareness among government agencies, private sector and the general public on Agenda 21 and its requirements.

At the international level Zimbabwe is signatory to the following conventions:

- Climate Change 1994
- Ozone layer 1993
- CFC control 1993
- Biological diversity 1995
- Law of the sea 1994

Climate change in particular is likely to lead to decrease in precipitation increasing the vulnerability of most countries in Sub-Saharan Africa to droughts (which they are already highly susceptible to) and related national economic problems. Implementation of some of these conventions at the local level has occurred with a low degree of success.

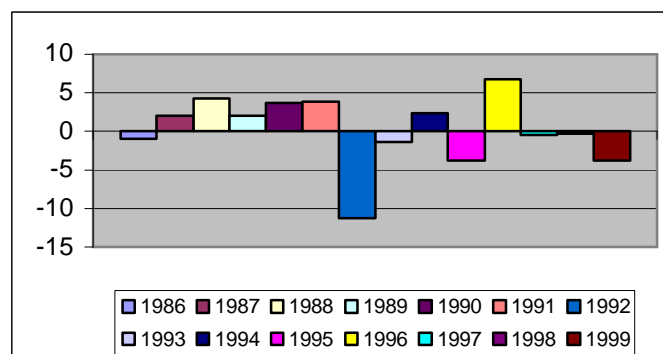
II. DEVELOPMENT OF INDUSTRY AND ACHIEVEMENTS IN THE VARIOUS DIMENSIONS OF SUSTAINABLE DEVELOPMENT

Zimbabwe had a dualistic economy at independence comprising of the formal manufacturing sector and the informal sector. The formal manufacturing sector of the employs 17% of the formal labour force (over 200,000 people) in approximately 40,000 enterprises. Most of these are SME's with 5-100 employees. Women constitute 7% of those employed in the manufacturing sector. There are a number of Trans National Co-corporations operating in Zimbabwe. These Anglo-American, Rio Tinto and Delta Corporation and Broken Hill Prospecting (BHP, an Australian mining house) operating in Zimbabwe. It is mainly the Trans National Corporations, which have by and large Safety, Health and Environment (SHE) policies and strategies through the application and diffusion of corporate environmental management practices.

The Zimbabwean economy is based on agriculture, mining and quarrying, and manufacturing contributing about 21% to GDP. Table 2 (annex 2) shows average annual growth rates (%) of manufacturing value added per employee.

The performance of the manufacturing sector has remained depressed registering an estimated GDP slump of 11% in 1994. Figure 1 shows the annual growth rate from 1986 to 1999.

Fig.1: Annual Growth Rate at Constant Prices (%)

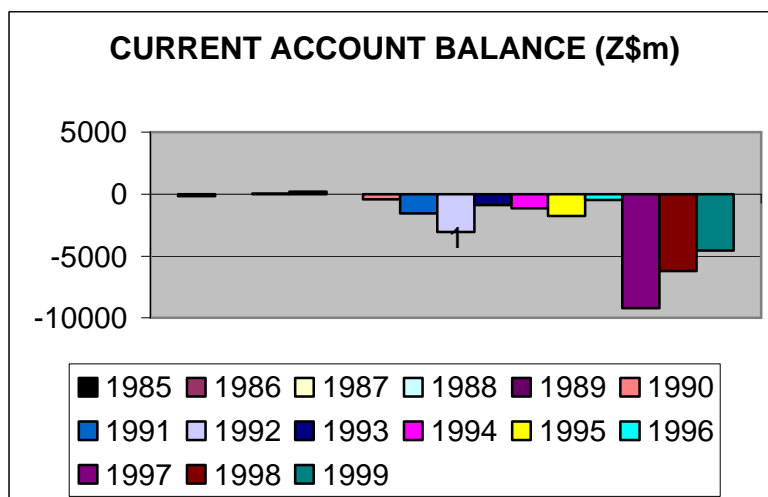


Source: CSO, 2001.

During the year 2000, manufactured exports accounted for 20 % of total exports revenue whilst crude material including unprocessed food accounted for 24 %. This situation is not sustainable; hence the need to increase production of value added manufactures in the export basket. Although the volume of export commodities has increased their value has decreased thus having no impact on the country's foreign debt which currently stood at USD 596 Million, in November 2000.

Fig.2 below shows the national balance of payments from 1985 to 1999.

Fig 2: National Balance of Payments (Z\$M)



Source: CSO, 2001.

A combination of policies is required to maintain the balance of payments. The GoZ is encouraged to address the macro economic problems facing the country and return normal relations with the donor community especially the multilateral aid agencies to secure balance of payments support.

Zimbabwe's industry is distributed across the whole country with varying degrees of sophistication. Incidentally the highest number of industries are located in the capital city of Harare. Industry usually locates near areas close to their natural resource inputs but in the case of industrial locations in Zimbabwe the evidence seems to point at other factors such as availability of infrastructure and services which are concentrated in the capital city, being the primary factors for location. Table 3 (overleaf) shows the geographical distribution of industry in Zimbabwe.

In towns and cities the Urban Councils Act applies by way of regulating land-use and zoning. If adhered to, this has a positive effect on pollution management and

safeguarding human health. Pollution in urban areas although not well researched is a cause for concern to most urban residents.

Table 3: Geographical spread of Industrial Sector in Zimbabwe

REGION	No OF INDUSTRIES	% of Total
HARARE	7535	45.93
BULUWAYO	3162	19.27
GWERU	1615	9.84
MUTARE	1589	9.68
MASVINGO	1164	7.11
CHINHOYI	1340	8.17
Totals	16405	100

Source: Worker's compensation Summary of adjusted Assessments for Financial year 91/92

Demand for energy and motor vehicle transportation has led to deterioration in urban air quality. The City of Harare's initiatives to build capacity in urban air quality management have been supported by government, and equipment has been installed to monitor trends and levels of air pollutants. Results of earlier attempts to measure levels of pollution in Harare are given in Table 4. Under normal troposphere conditions, ozone concentrations range from 20 –80ppb.

Table 4. Concentration of ozone sulphur dioxide and oxides of nitrogen in Harare.

Period	CONCENTRATION (ppb)		
	O ₃	NO _x	SO ₂
Jul-97	14.25	24.7 5	39.39
Aug-97	17.04	16.9 6	45.87
Sep-97	20.04	21.2 7	49.77
Oct-97	22.14	20.4 7	49.17

Source:

Rural to urban migration is a problem that all developing cities are facing. Zimbabwean cities are no exception. Rural to urban migration has resulted in municipalities failing to cope with the demand for social services and

deteriorating infrastructure. Urban sprawl has been on the increase with its attendant social problems.

III. POLICIES DIRECTED AT THE DEVELOPMENT OF INDUSTRY

Many economies on the African continent are small and depend very much on primary product exports. Regional integration arrangements serve various objectives; in the case of Zimbabwe, which is land locked the issue of regional neighbours is very relevant with respect to accessing the export/import routes. Zimbabwe's bilateral trade agreements number up to 40 in the most favoured nation category. These are designed to eliminate inefficient trade restrictions and access to larger markets and economies of scale. It is pertinent to note the following agreements that Zimbabwe is a signatory:

- World Trade Organisation - WTO
- Common market for Eastern and Southern Africa - COMESA
- Cross-Border Initiative - CBI
- Generalised System of Trade Preferences - GSTP
- Global System of Preferences
- Lome' Convention
- Group of Fifteen

Exchange controls and import licenses have been dismantled in all member countries who are signatory thereto. COMESA for example aims to eliminate tariffs, facilitating expansion of trade and ways of technology transfer. The LOME'CONVENTION allows Zimbabwe's products into the European Union duty free or qualifies them for reduced customs rates. Zimbabwe implemented the SADC Trade Protocol on 1st June 2001, whose rules of origin require 25% local content which is in consonant with the value added.

Small and Medium Scale Enterprises are a speciality sector, which has capacity to absorb the bulk of the unemployed if they produce both for the domestic and export markets, thus contributing to the Sustainable Development (SD) dimension of Agenda 21. The institutional framework to support and enable trade initiatives include a host of organisations in Zimbabwe which include ZimTrade, Zimbabwe Investment Centre (ZIC), Privatisation Agency of Zimbabwe (PAZ) and the Export Processing Zones (EPZ). Further details on the various programmes of these organisations will be detailed at this point.

ZimTrade

ZimTrade is a non-profit government organisation and has initiated programmes for nurturing SME's. Export start-ups have been a vital component of its entire export development and promotion agenda. This is relevant given the fact that the combined markets of COMESA and SADC have a consumer base of at least

400 million people and a GDP of USD 360 billion. ZimTrade offers programmes to enhance regional market penetration and diversification. These initiatives pave the way to regional and sub-regional economic integration.

There are static and dynamic gains to be had from trade between two countries but there is nothing in the theory of trade that determines that the gains are equitably distributed. Regional integration reduces the transaction costs on tradable goods relative to those non-tradable goods. It could be argued that Zimbabwe's manufacturing sector is inefficient and could collapse in the absence of protection from imports.

Export Processing Zones (EPZ)

The Export Processing Zones (EPZ) authority was established to administer the EPZ Act whose objective is to generate the much-needed foreign currency and create employment. Projects are approved on a qualified criteria; that is resource utilisation should be 90% locally-based and should be part of new investments. Apart from creating an enabling foreign direct investment environment by way of incentives the authority encourages the establishment of cluster industries. One key feature of the EPZ's is that local labour laws do not apply, and this seriously compromises the ability of National Employment Councils to negotiate for the welfare of the workers.

Exports remain Zimbabwe's survival route if the issues of supply and quality of manufacturing companies are addressed. Markets have by and large driven enterprises to adopt quality (ISO 9 000) and environmental standards (ISO 14 000). Table 5 (annex 3) summarises the performance of the authority to date.

Zimbabwe Investment Centre (ZIC)

The main mandate of the ZIC is to promote domestic and foreign investment as well as encourage cross border trading and investing initiatives. In an effort to bring in the formal sector into the mainstream of the economy government needs to adopt more appropriate policies for the development and employment promotion of the non-formal sector. This neglected sector has the potential of absorbing new technologies facilitating the growth of new types of manufacturing enterprises that allow more value addition in processing raw commodities to be captured in rural areas.

To deter rural-urban migration, GoZ has encouraged the growth point development concept where investors at growth points in rural areas get tax concessions and other incentives. Indigenisation of the economy is the deliberate economic empowerment of indigenous Zimbabweans mainly through economic expansion. It is a strategy for poverty alleviation among the majority of Zimbabweans. The exclusion of the poor from economic activities and discrimination on gender basis gave rise to organisations such as the Indigenous

Business Development Centre (IBDC) and the Indigenous Business Women's Organisation (IBWO). Both organisations serve to promote entrepreneurship for women and other disadvantaged groups by assisting with securing of loans among other things. Indigenous manufacturing activities however remain at the lower end of the sophistication scale due to skill and technological constraints. Table 6 below shows the domination of foreign investment in the economy, particularly in manufacturing.

Table 6. Distribution of Company Ownership in Zimbabwe

Ownership	Value	%
Non - Indigenous Zimbabwean Investment	184.7	20
Indigenous Zimbabwean Private Sector Investment	46.2	5
Foreign Private Sector Investment	692.6	75
Total Private Investment	923.4	100

Source: Quarterly Digest of Statistics, March 1996

Micro Finance

In order to remove financial institutional constraints the GoZ approved the establishment of micro finance schemes to assist SME's access finance. The majority of micro finance institutions are registered as international NGO's, local NGO's and private companies. The World Bank Apex administered by conventional finance houses has never been exhausted despite the unfulfilled demand. USAID and SIDA (for programmes such as the Zimbabwe Women Finance Trust Loan Guarantees) have long since suspended their developmental financing through financial institutions such as banks citing macro-economic instability as the major reason. Due to continued macro-economic instability, foreign direct investment, bilateral financing and donor funding and financing will remain scarce at present and in the near future.

IV. POLICIES DIRECTED AT INDUSTRIAL ENVIRONMENTAL MANAGEMENT

The SADC Policy and Strategy for Environment and Sustainable Development, 1996 provides the basis of implementing Agenda 21 in the Southern Africa context .The goals of the policy include:

- Supporting regional economic development on an equitable and sustainable basis for the benefit of present and future generations.
- To protect and improve the health, environment and livelihoods of the people in southern Africa with priority to the poor majority.

Examples of SADC level initiatives in implementing the 1996 policy include the SADC Protocol on Shared Water Course Systems which became operational in 1995. The Zambezi basin is witnessing growing pollution loads from energy and industrial activities from states within the basin. The Zambezi River Authority is implementing an environmental policy and strategy which seeks to limit the pollution loads of manufacturing activities from the two countries (Zambia and Zimbabwe). The SADC - ELMS has initiated training in Environmental Impact Assessment (EIA) in an endeavour to built capacity in the region.

The EIA process as set out in the recently drafted Environmental Management Bill in Zimbabwe which has been submitted for government consideration seeks to integrate the three dimensions of SD such that any project, programme or policy shall not be implemented unless an environmental impact assessment has been undertaken. Command-and- control regulations prevalent in the 1970's in Zimbabwe have been the traditional approach to industrial environmental management. The regulations based on the command and control principle are poorly enforced and fines imposed on violators are too low to be deterrent. They also do not reflect the resultant environmental damage. These regulations do not encourage the assimilation of clean technologies. The Confederation of Zimbabwe Industries (CZI) is lobbying government for a mixture of incentives and some reduction in the command and control regime. Although still voluntary and customer driven, at least 123 companies have been registered with CZI as meeting the minimum requirements of the ISO 9000 series of standards. Manufacturers are increasingly aware of the need to be accredited to the ISO 9000 standard in order to compete in the international market.

V. POLICIES DIRECTED AT TECHNOLOGY TRANSFER, PARTICULARLY “EST”

Zimbabwe does not currently have a Science and Technology (S&T) Policy nor a relevant institutional framework that can co-ordinate and promote technology development programmes involving all sectors of the economy. This lack of cohesion and co-ordination of S&T has resulted in no realisable progress in technology transfer and development. There is generally insufficient information about the levels of technology application in the country.

It should be noted that GoZ has recently started working on an S&T Policy. Further evidence in this realm is the establishment of the Scientific and Industrial

Research and Development Centre (SIRDC) set up to support innovation in technology development in industry. The policy objectives of SIRDC include:

- The transfer of technology by providing and assessing technological information on process, equipment and products, and demonstrating new technologies.
- The adaptation of technologies to local conditions.
- Development of new technologies by R & D activities to avoid inappropriate or expensive technology transfers.
- The industrial utilisation of local raw materials and natural resources.

It is with this policy view that major industrial associations such as the CZI and its various manufacturing associations participate and are partners in formulating S&T policy co-ordinated by SIRDC. It is being realised that without a science and technology policy, little effort will be directed towards any meaningful research and development in the country. At a recent stakeholder meeting held in co-operation with UNESCO it was apparent that the expenditure on R&D as a percentage of GNP was insignificant and it was proposed to increase this to about 1% by 2010. The overall S&T policy is to promote national scientific and technological self-reliance by ensuring:

- Environmentally sound development programmes.
- Adequate food production and shelter.
- Rapid and sustainable industrialisation.
- More employment creation.

Capacity to assist enterprises implement cleaner production methods has been developed at SIRDC and the Cleaner Production Centre (CPC) of Zimbabwe. In the absence of a Cleaner Production (CP) policy, the country has experienced technology dumping in some manufacturing sectors from the suppliers.

VI. EXPERIENCE WITH INTERGRATED POLICIES AND PROGRAMMES

Sustainable development policies involve the responsibility of several ministries and private sector entailing the need for better integration and co-ordination of economic, social and environmental objectives. The impacts of reform programmes on the environment and on sustainable development are less well understood and pervasive. GoZ has gazetted a Reformed Water Act whose objectives include environmental protection and efficiency. The use of economic incentives and penalties is one of the cornerstones of the Water Act. Water use and discharges attract a penalty above defined thresholds. Experience in the administration of environmental funds has yet to be gained.

The new Environmental Management Bill which is still being reviewed by government, interlay articulates the values and objectives to be weighed and taken into account in all resource and environmental decision making. It outlines

the procedures for environmental impact assessment and processes for resource and environmental management planning. The MET's role will be to facilitate co-ordination and integration of environmental issues across departments and agencies and furthermore MET will foster multi-sectoralism and balance competing and or conflicting agency interests. Recently (October 2000), SIRDC made policy proposals on Cleaner Production to the GoZ to use a mixture of regulatory and economic instruments for environmental management to manage environmental pollution.

The Central Statistics Office has recently published the Zimbabwe National Accounts 1985-1999 in accordance with the 1968 United Nations System of National Accounts. The more ambitious goal is to have SD indicators integrated into SNA.

Economics and Environmental Protection Subsidies

Studies have been carried out in the energy sector to explore the possibility of reducing Green House Gas emissions by improving energy efficiency in the manufacturing sector. Energy switching options from coal to gas is limited by the fact that the country has restricted energy sources; however gains could be obtained from energy demand management. With prevailing punitive tariff increases, for inefficient energy use this could stimulate demand for cleaner technologies. The same could be said for the water sector where a penalty is levied if one uses water in excess of 300m³ thus encouraging a culture of recycling. Tariffs based on the cost of supply of energy and water may trigger a new awareness of resource conservation and sustainable development. Carbon taxes were introduced recently on the transportation / motor vehicle sector; the revenue generated is intended to expand and maintain road networks thus reducing government expenditure.

Macroeconomic Management

High inflation and interest rates have negatively impacted on the poor it leads to slow growth of the whole economy and to negative growth for the income of the poor. There is no synchronisation between monetary and fiscal policy. Increase in the need for borrowed money has led to increased taxation and interest rates thus crowding out private investments at the enterprise level. Managed exchange rates impact on the productive sector which spill-over on employment and consumers as evidenced by shortages.

Land reform programme

The current National Land Reform Programme seeks to empower the vast majority of the landless rural population with assets such as title to land which would reduce their vulnerability provided that rights and title deeds are equitable. Due to the nature of the implementation of this reform programme there has

however been a slide in national image and strained donor relations which has further dampened the enthusiasm of would be investors and dried up balance of payments support. Furthermore, insecure property rights have been a major cause of farmer's lack of access to capital markets and of under investment in land improvement which will in turn lead to low agriculture productivity. This will in turn impact negatively on the agro-processing/manufacturing sectors.

Zimbabwe Programme for Economic and Social Transformation (ZIMPREST)

Zimbabwe Programme for Economic and Social Transformation (Zimprest, 1996-2000) was put in place when the GoZ failed to meet IMF targets of reducing fiscal deficit in 1995 to at least 5% of GDP. As a result the IMF and the World Bank, together with other donors followed suspended aid to Zimbabwe, with implications on the balance of payments support.

The ZIMPREST programme maintained the same policy thrust and economic strategies as in ESAP with due consideration for social concerns and negative impacts of droughts. Core themes included:

- Ensure quality of growth of democracy, good governance and elimination of corruption.
- Re – orienting the public sector.
- Investing in human resources.
- Economic empowerment and poverty alleviation.
- Facilitating public and private savings.
- Restoration of macro-economic stability.

Privatisation Agency of Zimbabwe

The Privatisation Agency of Zimbabwe (PAZ) was developed to spearhead the GoZ divestiture of some of its shareholding in both listed and unlisted companies and ensure the participation of indigenous people in the privatisation programme. In this regard, Zimbabweans working outside the country are encouraged to buy shares. This is expected to raise money needed by government in order to cut its domestic debt and raise foreign currency. Further to this, government will no longer have to finance state enterprise deficits. What also need to be improved in the process are the bidding process itself and the level of transparency.

VII. MAJOR CONSTRAINTS AND OBSTACLES IN ENHANCING THE CONTRIBUTION OF INDUSTRY TO SUSTAINABLE DEVELOPMENT

At the macro-economic level, the current lack of development of resources has caused unemployment and underemployment and has had significant impacts on the manufacturing sector. The average rate of inflation assumed an upward

trend rising by 8.9 % to 64.4% in June 2001. Cash flow difficulties, breakdown of equipment and machinery and the chronic shortage of foreign exchange has continued to compound shortages of imported inputs, machinery spare parts and fuel are cited as major constraints affecting the operations of the manufacturing industries. The realisation in terms of capacity is that utilisation has declined leading to retrenchments and /or reduced working hours.

The following factors could be cited as reasons for constrained growth:

- Foreign exchange shortages leading to erratic supply of raw materials.
- High interest rate which has raised the opportunity cost expansionary productive activity.
- Managed exchange rate policy.
- Lack of through put due to land distribution programme.
- Dwindling domestic market due to declining purchasing power.
- Acute fuel and energy supply and costs thereof.

VIII. MULTILATERAL AND BILATERAL SUPPORT PROGRAMMES THAT ARE ENHANCING THE CONTRIBUTION OF INDUSTRY TO SUSTAINABLE DEVELOPMENT

Some of the main donor supported programmes that are contributing to SD in industry will be discussed in this section. The projects include the Cleaner Production Technology (CPT) project, the National Cleaner Production Centre (NCPC) project and the Environmental Conscious Manufacturing (ECOM) project. Additionally the UNIDO supported project in the Leather industry and the UNEP CP projects will also be outlined.

Cleaner Production Technology project

The Cleaner Production Technology (CPT) project in selected industries in Zimbabwe is an example of technology transfer programmes being currently implemented in the country. The CPT project is a bi-lateral project between Zimbabwe and Denmark and includes the partners SIRDC, the National Cleaner Production Centre (NCPC) of Zimbabwe and the Danish Technological Institute (DTI). The Danish International Development Agency (Danida) provides a major part of the financing while the Zimbabwean partners, SIRDC and NCPC contribute a large percent of the local costs (such as infrastructure and human resources) in the project. The project started in April 1999 and will terminate in January 2002. The DANIDA support for the project is USD 2 million where USD 600,000 of the funding is for demonstration projects in selected industries.

The main objectives of the project are to assist the MET in developing a national policy/strategy on CPT and train national staff in undertaking environmental audits and proposals for CPT implementation. The project has carried out over 40 environmental audits in selected industries representing a wide range of sectors known to have environmental problems. Table 7 summarise the sectors covered.

Table 7: Industrial Sectors Covered under the CPT project (1999-2001)

Sector	Number of companies
Metal finishing	8
Leather processing	4
Foundry	6
Mining	2
Forestry, pulp and paper	2
Pharmaceutical	2
Chemical	4
Food processing	5
Paint manufacturing	2
Cable manufacturing	1
Textiles	4
Tobacco process	1
Transport	1
Total	42

The project financed specific CPT pilot interventions in 13 selected industries in order to establish successful demonstration cases for use in awareness raising in industries. Table 8 below summaries the pilot projects implemented.

Table 8. Demonstration projects under the CPT project

Sector	Number of companies
Leather processing	1
Metal finishing	3
Foundry	4
Pharmaceutical	1
Chemical	1
Food processing	2
Cable manufacturing	1
Total	13

Most of these pilot intervention projects have been completed. National Cleaner Production Workshops have been carried out where some of the projects were presented as case studies. Similar case studies have also been presented at seminars and workshops organised by SIRDC and the Environmental Forum of Zimbabwe (EFZ).

Examples of case studies in the CPT project

1.0 Cleaner Production at a Tannery

Imponente Tanning (Pvt) Ltd is a tannery in Harare established in 1972. It employs 200 people and specialises in processing bovine hides to wet-blue and finished leather. The plant processes 3 600 tonnes of raw hides per year and discharges 112 500m³ of solid and liquid wastes.

The major problem in the plant was the high Chemical Oxygen Demand (COD) levels in wastewater caused by the use of sulphides and other chemicals in the unhairing process. The chemicals remove the hairs from the hides by dissolving them. The dissolved hair and the chemicals end up in wastewater resulting in high COD levels. High COD levels are not desirable in the water bodies, as it is detrimental to aquatic plant and animal life. The company has been annually paying heavily on effluent discharged into the Municipal sewer due to the high COD in the wastewater. The COD levels were above the regulatory requirements set by the City Council.

Cleaner Production Principle

Technological changes and chemical substitution for the unhairing process.

Cleaner Production Application

For this project, Imponente Tanning required a hair press compacting filter for hair recovery and a change of the chemical recipe for the unhairing process. The hair-save process manipulates the conditions of alkalinity and the reducing agent in such a way that the hair comes out of its hair follicle without being pulped. As the hair is not broken down, a press-filter is used to remove the hair during the unhairing process. This means the hair is separated from the wastewater and the COD loading in the effluent is reduced.

Environmental and Economic Benefits

The hair-save unhairing technology has reduced COD levels in wastewater by about 50% and this makes Imponente Tanning comply with the Municipality of Harare's discharge limits of 3 000 mg/l of COD in the effluent. This is a great financial saving for the company as its effluent treatment and disposal costs are reduced.

The saved hair can be used as organic fertiliser. Trials on the use of the hairs in agriculture are being carried out at SIRDC and the Chemistry and Soil Research institute.

Total Project Cost: USD 40,670

Total annual savings: USD 13,500

Payback period of the project: 3 years

2.0 Cleaner Production at a Foundry

Jaks Engineering (Pvt) Ltd is a foundry in 1991 and specialises in castings of grey iron to produce electric motor components, stoker links and other products. The products are both for the local and export market. The company is a small sized enterprise with 100 employees and a total annual production of 340 tonnes of castings.

The foundry casts grey iron products in resin sand, therefore sand constitutes a large portion of the company's input cost per annum. The plant uses 1 250 tonnes of sand per annum. Before the CPT project about 30% of the sand was crudely reclaimed, whilst about 900 tonnes were dumped. The dumped sand was a big environmental problem as the sand contains phenolic resin, which contaminates the soil and the underground water, when it rains.

Cleaner Production Principle

Reuse and recycling of sand, good house keeping

Cleaner Production Application

For this project, the company needed a sand reclamation and reticulation plant. The project has been implemented and the company is already managing to reclaim about 80% of the used resin sand. By mechanising the sand reticulation, the contaminated sand stockpiles behind the plant have disappeared, as the reclaimed sand is now being stored in large storage hoppers leaving the factory floor much cleaner.

Environmental and Economic Benefits

With the implementation of the project, there has been a reduction in the loss of used sand from 900 tonnes to only about 200 tonnes annually. This means the company needs only 200 tonnes of new sand annually as compared to 900 tonnes required before the CPT project. The amount of hardener and binder used in the production process has been reduced by about 1%, which is a significant saving as these chemicals are quite expensive. The sand reclamation plant has also reduced the amount of dust emissions around the plant by about 35%. There are also savings in labour. Previously the company used 10 employees to do the crude reclamation of the used sand but now it is only using 3 employees to run the whole system.

Total Project Cost: USD 31,095

Total annual savings: USD 16,800

Payback period of the project: 1.8 years

3.0 Cleaner Production at an Electroplating Shop

Edisan Enterprises is an electroplating company that does electroplating in chromium, nickel, brass, bronze, copper and zinc. During electroplating, the surface preparation, electroplating and post-electroplating treatment stages consume a large amount of water for rinsing purposes. The wastewater produced during the rinsing processes contains drag-out chemicals from the electroplating baths, which include cyanide, heavy metal ions and complex ions. Most of these chemicals are toxic and end up in the main sewer.

Cleaner Production Principle

Technological changes.

Cleaner Production Application

The CPT option proposed was to reduce water consumption at the plant by employing a 3-stage counter current rinsing system where the same rinse water is let through all the rinse tanks. The water is let into the last tank and runs in the opposite direction compared to the direction of the work pieces. Fresh water is supplied in the third rinse tank and subsequently reused in the second and first rinse tanks. The overflow is from the first tank, from where the rinse water is let to the wastewater treatment plant.

A further saving of fresh water is realised by the introduction of a recycling system of the chemically treated wastewater. About one third of the treated wastewater can be reused in the less critical rinsing processes. The treated water is pumped into an overhead storage tank and then allowed to flow into the specified rinse tanks by gravity. At this plant, the chemically treated water is used for rinsing after the degreasing and pickling processes. Fresh tap water is still being used in other critical rinsing processes.

Environmental and Economic Benefits

Implementation of this project has the following advantages:

(a) Environmental advantages:

- 85% annual reduction of water consumption.
- Reduction of the volume of drag-out chemicals into the wastewater.
- Elimination or reduction of the discharge of cyanide and heavy metals into the main sewer.
- Improvement of the working environment.

(b) Economic advantages:

- Savings on the water bill.
- Savings on chemicals used for the wastewater treatment.
- Improvement of the quality of the rinsing system resulting in an improvement in the quality of the final product.

Total project cost: USD 36,200

Total annual savings: USD 11,090

Payback period of the project: 3.3 years

4.0 Cleaner Production Policy Proposal to GoZ (as part of the CPT project activities)

- Establishment of a “Green Bank / Revolving Fund”, a funding facility for enterprises to access soft loans for cleaner production projects. Under the current CPT project not all companies selected for environmental auditing received funding from DANIDA. The “Green Bank” would definitely assist these companies.

- Continued support to the MET on policy, legislation, standards and regulations. Currently the CPT project is assisting the MET in drafting a cleaner production policy paper. The new Environmental Bill currently being debated in parliament is expected to set up new environmental standards and ways of enforcing this law.

National Cleaner Production Centre

Zimbabwe established a National Cleaner Production Centre with UNIDO assistance in 1995. The centre has been assisting the MET in the following:

- Promoting Cleaner Production through dissemination of information.
- Organising demonstration projects in industrial establishments.
- Co-ordinating training programmes in Cleaner Production practices.
- Increasing awareness to key policy makers of the advantages of applying preventive approaches to industrial pollution to facilitate environmental policy.

Approximately 20 Cleaner Production assessments have been executed, awareness raising and training workshops organised and a start has been made in building local capacity for conducting Cleaner Production assessments.

GTZ – ECoM

The Germany Agency for Technical Co-operation (GTZ) in conjunction with CZI are implementing an Environmental Conscious (ECoM) Manufacturing project in nine selected industries. It is estimated that production losses in companies amount to 1-2% of Zimbabwe's GDP. Therefore the project focus is on:

- Cost saving hierarchy.
- Enhancing environmental performance.
- Organisational development.

Companies that have been included in the project represent the various manufacturing sectors (such as the food sector, chemical manufacturing sector and the pulp and paper sector).

UNIDO in the Leather Industry

Leather manufacturing in Zimbabwe dates back to humble beginnings as a rural artisan activity. The large livestock industry in Zimbabwe and the well-developed tanning and footwear industry, ensures a positive future for the sector. Zimbabwe's leather industry forms a significant source of income and is among the country's most successful exporters.

The leather production process uses a large volume of water in which chemicals are dissolved. The main environmental problem is the discharge of this process water, which can be ecologically harmful. Measures are available to reduce this potential pollution, such as effluent treatment, better housekeeping and cleaner technologies.

Pressure on the tanning industry in Zimbabwe is growing due to negative impacts on the environment. The tanneries are facing the challenge to control pollution within acceptable levels. At the same time, they need to increase productivity and maintain a high level of product quality in order to strengthen the position of Zimbabwe leather on local and international markets. An effective blend of cleaner technology and waste management is the only viable long-term solution to the challenge of combining an economically healthy industry with environmental protection.

In order to assist the industry with this difficult challenge, UNIDO in 1997 initiated the project: "Assistance in Tannery Pollution Control in Zimbabwe" funded by the government of Netherlands. The project was aimed to contain environmental pollution caused by the tanning industry. To meet this objective the project assisted three tanneries to improve pollution control at tannery level, through the upgrading of their effluent treatment plants. Eagle Tanning and Deraswiss were selected for a general overhaul of the existing effluent treatment plants. Imponente Tanning (Harare) was selected to improve the sludge drying step in the effluent treatment process. Furthermore, a demonstration unit for cleaner technology was established in Bulawayo and a research study on solid waste treatment was conducted at Bata Tannery including the establishment of a pilot sludge treatment plant. The CPT project was demonstrated at Midiron Enterprises in Bulawayo. The project also assisted municipalities through these project activities. The project activities took place in close co-operation with the Cleaner Production Centre of Zimbabwe and the Leather Institute of Zimbabwe.

The project financed equipment for effluent treatment, cleaner technology and laboratory equipment to improve on environmental monitoring. The project provided laboratory equipment to Eagle Tanning, Deraswiss, Leather Institute of Zimbabwe and municipalities of Marondera, Gweru and Kadoma. To improve the environmental awareness in the tanning sector in Zimbabwe, a training workshop on the operation and monitoring of tannery effluent treatment was held in 1999.

UNEP in the Financing of Cleaner Production Projects

An UNEP demonstration project supported by Norway was incepted in 1999. The project was to enhance sustainable production and green productivity, on the basis of a Cleaner Production strategy, through developing more effective interaction between the financial and manufacturing sectors. The project titled,

“Strategies and Mechanisms for Promoting Cleaner Production Investments in Developing Countries” had the following objectives:

- Show financial institutions and industrial authorities how to assess the merits of Cleaner Production investment proposals.
- Persuade financial institutions to introduce credit schemes customised to Cleaner Production investments.
- Induce new initiatives such as credit schemes, trust funds, policy changes and training.
- Teach Cleaner Production assessors how to make creditworthy loan applications.
- Improve the general environment for investment in Cleaner Production.

UNIDO – Cleaner Production Technologies

The National Cleaner Production Centre (CPC) was set up jointly by UNIDO and UNEP. Cleaner production requires a paradigm shift from end-of-pipe and waste disposal to waste prevention and minimisation. The programme focused on awareness raising, in-plant demonstration and lobbying for incentives for CP provisions into the Environmental Management Act.

An example of the project work is undertaken the work done with the Leather Institute of Zimbabwe (LIZ) whose membership is about seven companies; LIZ was involved in the treatment of tannery effluents to reach international discharge standards. Treatment of outputs from tanneries is important in minimising adverse environmental impacts and in this regard tanneries in Zimbabwe benefited by equipment investments of US250, 000. The programme included capacity building for environmental managers in tanneries.

IX. REFLECTIONS AND FUTURE DIRECTIONS FOR THE COUNTRY

GoZ should take the necessary policies and measures to achieve the following:

- Reaffirming the socio-economic objectives.
- Strengthen the institutional capacity for development planning and economic management.
- Adopting more appropriate policies for the development and employment promotion in the non formal sector.
- Promote industrialisation and exports.

Sustainability intrinsically implies a long term perspective with current investments for distanced future returns. This may clash with economic imperatives which can not afford the opportunity costs involved or their political expression, which is essentially short-term in nature. The inherent tensions

between multiple objectives are also the reason why the new Environmental Management Bill has taken so long to materialise. Much needs to be done in the area of policy research, as well as capacity development in analytical and integrative skills. For a developing country such as Zimbabwe the two dimensions of sustainable development that are a priority are the social and economic aspects.

GLOSSARY OF TERMS

Head Count Index (P0) – the proportion of the population below the poverty line

Foster-Green –Thorbecke – Measure – measures the severity of poverty. This poverty Index is calculated as for poverty gap but giving greater weight to those further below the poverty line

Poverty Gap Index (P1) – calculated as the product of (i) the gap between the poverty line and the mean income of the poor as a ratio to the poverty and (ii) the head count index

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Annexes

Annex 1:

**Table : Head Count (P0), Poverty Gap (PI) And Poverty Severity (FGT)-
National Level**

	P0	P1	FGT	
NATIONAL	0.61	0.36	0.26	
RURAL	0.76	0.48	0.36	
URBAN	0.39	0.17	0.11	

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Annex 2.
Table 2. Average Annual Growth Rates- Value Added Per Capita

SECTOR (ISIC)	Currency = USD				Average annual growth rate (%) of :		
	Value added per employee at current prices		Wages and Salaries per employee at current prices		Value added at 1990 prices	Employment	Value added per employee at 1990 prices
	1985	1998	1985	1998	1985-1999	1985 - 1999	1985 - 1999
TOTAL MANUFACTURING 300	12602	139733	5224	40018			
Food products-311	7639	136598	4993	40524	0.74	-1.74	2.35
Beverages-313							
Tobacco-314	20786	25761	5071	47401	1.93	-2.10	4.61
Textiles - 321	8761	119052	3694	27321	-7.43	-2.19	-5.23
Leather Product - 323	7375	55550	3750	30212	-1.23	0.34	-1.55
Furniture - 6026	6026	72288	3051	24316	3.49	3.80	0.64
Paper and products - 341	13378	110145	6933	44782	2.4	-0.41	3.72
Printing & publishing - 342	18125	130554	8675	60896	2.4	1.72	1.10
Industrial chemicals - 351	38162	32093	8970	8083	1.21	6.31	-5.93
Petroleum refineries - 353	37174	...a/	8739	...a/	1.21	4.35	-4.71
Other chemicals - 352	26660	224453	8340	84817	1.21	0.660	0.93
Misc. petroleum products -354	38177	..a/	8975	../a	23.24	5.92c/	-18.01/c
Glass & products - 362	14800	72309	8400	49603	2.54	4.68	-1.66
Other non-metallic mineral prod - 369	9347	176745	5347	42058	2.54	2.18	0.74
Iron & steel -371	12397	157204	7199	45142	-1.76	-1.66	0.33
Non-ferrous metals 372	14200	146805	4400	35813	-1.76	1.23	-2.53
Fabricated metal products - 381	9580	104264	5214	44036	-1.76	-0.21	-1.13
Machinery except electrical - 382	11767	105150	5200	39918	-1.76	-1.19	-0.14
Transport equipment - 384	13241	128309	6552	51840	3.10	-1.41	6.12
Professional & scientific equip - 385	18000	144861	8000	29506	-3.26	6.32	-8.59
Other manufactured goods - 390	8278	44178	4222	17859	-3.26	4.16	-7.09

Table 5 : Export processing Zones in Zimbabwe by Sector

Performance of EPZ Companies to date					
Sector	Number of Companies	Investment Million ZD (\$)	Exports Million USD	Exports (%)	Total Employment
Agro –Processing	30	1690.3	117.15	98.96	8883
Manufacturing	17	2750.0	45.22	94.24	1114
Furniture manufacturing	3	203.0	20.58	99.70	537
Floriculture	4	32.00	925012.69	94.72	93
Chemicals	1	194,998	5959758.90	79.71	72
Leather and Footwear	7	219.60	12338450.50	93.28	516
Timber Processing	2	3.0	131905.52	100.00	14
Textiles and Clothing	3	52.0	59643734.64	83.26	4727
Services	7	197.70	4348618.52	92.08	59
Total	74	5,343.83	266,299185.01	93.38	16015

Source:

Annex 4**TABLE 9.****SECTORS IN THE MANUFACTURING INDUSTRY AND THEIR SHARES OF MANUFACTURING GROSS OUTPUT 1992-1993**

Sub-sector Number	Name of Sub-sector	Share of gross output as %	
		1992	1993
1	Foodstuffs	21	23
2	Beverages & Tobacco	11	11
3	Textiles	10	11
4	Clothing and Furniture	7	6
5	Wood & Footwear	4	3
6	Paper	7	5
7	Chemicals	14	14
8	Non-Ferrous Minerals manufacturing	3	3
9	Metal & Metal Products	20	18
10	Transport & Equipment	5	6
11	Other Manufacturing Industry	1	1

Source :