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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Thirteenth Meeting
Montreal, 25-27 July 1994

COUNTRY PROGRAMME: UGANDA

This document consists of:

- Comments and recommendations of the Fund Secretariat
- Country Programme Evaluation Sheet (prepared by the Fund Secretariat)
- Country Programme Cover Sheet
- Country Programme

COMMENTS AND RECOMMENDATIONS OF THE FUND SECRETARIAT

COMMENTS

1. The Country Programme conforms to the format of the approved guidelines.
2. Consumption of ODS is almost exclusively CFC-12 which is used to service refrigeration and air-conditioning systems in all the refrigeration and air-conditioning sub-sectors.
3. Although the consumption is low, its phase-out poses some problems due to the unstructured nature of the ODS import business and the substantially large market of second hand refrigerators and freezers and the informal supply links to neighbouring countries.
4. The country programme shows a significant level of voluntary (market-driven) phase-out in both the refrigeration and foam sectors. In the refrigeration and air-conditioning sector there is substantial use of HCFC-22, while CFC-11 is completely phased out in the foam sector.
5. The most challenging aspects of the strategy to phase out ODS by the year 2000 is the plan to replace or retrofit domestic and other refrigeration equipment at the estimated incremental cost of US \$13.44 million, if no drop-in substitute for CFC-12 is found by the year 1997. Since the activity depends on availability of resources, it may not be a feasible strategy.
6. The country programme will be updated in 1996. The present phase of the country programme contains only four activities costing US \$106,515, i.e. institutional strengthening, and three feasibility studies on refrigeration retrofitting, recovery and recycling of CFC-12 and management of banked halons.
7. Given the difficulties regarding ODS supply sources, institutional strengthening to facilitate public awareness would be in order. However, while the feasibility study on retrofits may be premature at this time that on halons may not be necessary due to negligible consumption.

Institutional Strengthening

8. The amount of US \$64,515 was requested in the institutional strengthening project proposal which is annexed to the country programme. Having considered the prospective scope of activities and corresponding equipment needs, the amount requested was recommended for approval.

RECOMMENDATIONS

The Fund Secretariat recommends as follows:

9. To approve the Uganda Country Programme. Approval of the Country Programme does not denote approval of the projects identified therein or their funding levels.
10. In accordance with the Executive Committee decision on implementation of country programmes (UNEP/OzL.Pro/ExCom/10/40, para 135), to request the Government of Uganda to provide information on the progress of implementation of the country programme within one year of its approval, i.e. on 31 July 1995 and annually on 31st day of July of each subsequent year.
11. To approve the amount of US \$64,515 for the institutional strengthening project and US \$8,390 support costs to be included as an amendment to UNEP's 1994 Work Programme.
12. To request UNEP and the Government of Uganda to collaborate to identify an implementing agency to prepare a package of measures to phase-out ODS in the country in the most cost-effective manner possible.

UGANDA COUNTRY PROGRAMME EVALUATION SHEET

National Implementing Agency: Department of Environment, Ministry of Natural Resources

Status of ratification of the Vienna Convention and the Montreal Protocol

	Signature	Ratification	Entry Force
Vienna Convention (1985)		24/Jun/88	23/Sep/88
Montreal Protocol (1987)	15/Sep/88	15/Sep/88	01/Jan/89
London Amendment (1990)			
Copenhagen Amendment (1992)			

Production of controlled substances: 0 metric tonnes (mt)

Consumption of controlled substances (1991): 14.7 metric tonnes
(excluding methyl bromide) 14.6 weighted tonnes (ODP)

Substance (ton)	CFC						Halon			Solvents			M-Br
	11	12	113	114	115	Total	1211	1301	Total	CTC	MCF	Total	
ODS		14.4	0.3			14.7							
ODP		14.4	0.2			14.6							

Source: Country Programme (1994)

Distribution of ODP by substance:

CFC: 100.0% Halon: CTC, MCF:

Distribution of ODP by sector:

Sector:	Aerosol	Foam	Halon	Refrig.	Solvent
Consumption (tonnes):				14.7	
Percent of total:				100.4%	

Country Programme

Duration of country programme: 1993-1996

ODS phase-out target:

Complete phase out by 2000

Phase-out priority area:

Refrigeration sector

Cost of activities in country programme: \$106,515

Strategy:

Mindful of the social and economic impact of the potential scarcity of ODS engendered by the phase-out in non-Article 5 countries, the Government's strategy aims at phasing out ODS as early as possible but not later than the year 2000. The strategy involves creation of public awareness in view of the unstructured nature of ODS supply in the country, adoption of national ODS control policy and enactment of ODS control legislation and scrapping, retrofitting or replacement of domestic refrigeration and freezers from the year 1997. New industries will be expected to be based on substitutes and non-ODS technologies.

COUNTRY PROGRAMME COVER SHEET

Country : Uganda

Lead National Agency : Ozone Office

Participating Implementing Agencies : UNEP

1. Phase-out schedule

substance	Current consumption (1991) (ton x ODP)	Planned cumulative consumption until phase-out (ton x ODP)		Planned year of phase-out
		Article 5 schedule	Accelerated schedule	
CFC 12	14.4	476.3	181.2	2000
CFC 115	0.2	6.8	2.3	2000
Halon 1211	0	-	-	2000
Halon 1301	0	-	-	2000
Total	14.6	483.1	183.5	

2. Gouvernement actions plan :

Projects and elements	Brief Description	Commencement/ Duration	Use sector
GOVERNMENT ACTIONS			
<u>Project G1</u>	<u>Institutional Strengthening</u>		All
1. National Steering Committee for the Protection of the Ozone Layer	Establishment of a National Steering Committee to decide on national policies and laws/ regulations for ozone layer protection. Also to approve projects.	January 1995	All
2. ODS Unit	Establishment of ODS Unit under the Dept. of Env.Prot. to coordinate ODS activities including organization of public awareness, info. exchange and training activities and ODS monitoring.	January 1995	All
3. Refrigeration Association	Establishment of a National Refrig. Association to assist in smooth phase-out of ODSs in the refrig. and a/c sector.	January 1995	Refrig.
INDUSTRY ACTIONS			Refrig.
1. <u>Project R1</u>	<u>Recovery and recycling of refrigerants</u>		
Phase I	Feasibility study	January 1995	
Phase II	Project implementation	November 1995	
2. <u>Project R2</u>	<u>Retrofitting existing indust./ com. refrigeration systems</u>		Refrig.
Phase I	Feasibility/ pre-investment study	During 1995	
Phase II	Project implementation	End 1995	
3. <u>Project H1</u>	<u>Management of banked halons and alternatives for halon fire extinguisher</u>		Halons
	Development of a proposal for management of banked halons and project for substituting existing halon fire exting. systems.	During 1995	

3. Project Summary Table

Project no.	Title	Intended Effect	Sector	Estimated Cost (US \$)			
				1995	1996	1997	Total
1.	Institutional Strengthening/Ozone Office	Co-ordination, control, technical support, monitor	All	27,610	18,205	18,700	64,515
2.	Project R1	Feasibility study	Refrigeration and air-conditioning	21,000			21,000
3.	Project H1	Feasibility study	Halons	21,000			21,000
Total Cost				69,610	18,205	18,700	106,515

TELEGRAMS:
TELEPHONE:
GENERAL LINE:
FAX:
TELEX:

TRANSPCOMM
220243
234733
234732
61008



THE REPUBLIC OF UGANDA

MINISTRY OF NATURAL RESOURCES.
P.O. BOX, 7270/7006
KAMPALA - UGANDA.

11th July, 1994.

The Chief Officer,
Secretariat of the Multilateral Fund,
for the Implementation of the Montreal Protocol,
1800 McGill College,
27th Floor,
MONTREAL, CANADA H3A 3J6
C/O FAX: (33-1) 44371474

RE: THE UGANDA COUNTRY PROGRAMME, REPORT ON THE PHASE-OUT OF
OZONE DEPLETING SUBSTANCES CONTROLLED UNDER THE MONTREAL
PROTOCOL

I have the honour to submit to you the Uganda Country Programme report on the phase-out of Ozone Depleting Substances (ODS) for consideration and approval by the Multilateral Fund for the Implementation of the Montreal Protocol.

I would like to reiterate the appreciation of Government for the assistance extended to it through the United Nations Environment Programme, Industry and Environment Programme Activity Centre (UNEP IE/PAC), which facilitated the preparation of the Programme.

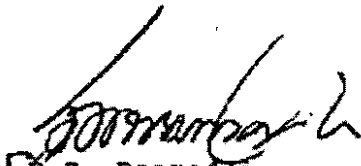
You will note that amendments have been made to allow gradual phase-out of the Ozone Depleting Substances by the year 2010 in accordance with the requirements of the Montreal Protocol for countries operating under paragraph 1 of Article 5.

Government is committed to the implementation of the Montreal Protocol more specifically to the obligations of all developing countries operating under paragraph 1 of Article 5 of the Protocol. Successful implementation of the actions will, to a large extent depend on availability of both financial resources and technological transfer, which the country lacks at present. Therefore, the Action Plan will be implemented in phases depending upon availability of resources.

I should be very grateful if you would submit to the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol the following projects:-

- i) Institutional Strengthening for the Phase-out of Ozone Depleting Substances; and
- ii) Recovery and recycling of refrigerants which are contained in the Country Programme.

Please accept, Sir, the assurances of my highest consideration.


B.Z. Dramadri,
PERMANENT SECRETARY.

c.c. The Permanent Secretary/Secretary to the Treasury,
Ministry of Finance & Economic Planning,
KAMPALA.

c.c. The Permanent Secretary,
Ministry of Foreign Affairs,
P.O.Box 7048,
KAMPALA.

U G A N D A
C O U N T R Y P R O G R A M M E

**FOR THE PHASE-OUT OF OZONE DEPLETING SUBSTANCES
CONTROLLED UNDER THE MONTREAL PROTOCOL**

June 1994

Department of Environment Protection
Ministry of Natural Resources
Government of the Republic of Uganda

United Nations Environment Programme
(Industry and Environment Programme Activity Centre)

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Commissioner for Environment Protection
Department of Environment Protection
Ministry of Natural Resources

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Department of Environment Protection
Ministry of Natural Resources
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Kampala Ice Plant
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Fisheries Department, Mbale
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Uganda National Bureau of Standards
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Makerere University
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Department of Meteorology
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Department of Meteorology
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Department of Environment Protection
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Department of Environment Protection
Ministry of Natural Resources
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Department of Environment Protection
Ministry of Natural Resources
11. Mr. E. Werabe
Department of Environment Protection
Ministry of Natural Resources
12. Mr. K. Mugambe
Ministry of Finance and Economic Planning
13. Mr. J. Tumwebaze
Ministry of Finance and Economic Planning

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EXECUTIVE SUMMARY

1. Introduction

This country programme reflects the commitment of the Government of Uganda to comply with the obligations of the Montreal Protocol on Substances that Deplete the Ozone Layer, to which Uganda is a Party. It provides the framework for activities to be undertaken by Uganda to achieve the required phase out of controlled substances and forms the basis for requesting assistance from the Multilateral fund for those activities.

The Country Programme was prepared between the period February 1992-June 1994 and it should be updated during 1996. The updated Country Programme should be implemented from 1997.

The country Programme contains the following:

- (a) The detailed figures are available for the year 1986, 1989, 1990 and 1991. Estimated figures for 1992 and 1993 are also included where possible.
- (b) Analyses of possible future demands for the controlled substances (unconstrained demand) and an indication of the total incremental cost for the phase out of the controlled substances.
- (c) Information on the existing institutional and policy framework that are relevant to the use of controlled substances and the implementation of the Montreal Protocol.
- (d) Government strategy statement with regard to the implementation of the Montreal Protocol and the phase-out of controlled substances.
- (e) Action Plan of Uganda to phase out the consumption and use of controlled substances, based on the 1991 status of consumption and use of those substances. The Action Plan covers the period from 1995 to 1997 and it consists of projects categorized under Government Actions and Industry Actions. Budget estimates are included for the projects for which assistance is requested from the Multilateral fund. The timetable for the implementation of the Action Plan clearly reflects the prioritization of the programme and projects. The necessary institutional strengthening and improvements in the record keeping and reporting by the industries for future monitoring purposes are included in the Action Plan.

The Country Programme was prepared under the responsibility of the Ministry of Natural Resources with technical assistance of industry and Environment Programme Activity Centre (IE/PAC) of the United Nations Environment Programme (UNEP) and financial support from the Multilateral fund through UNEP IE/PAC. A National Country programme Team was established for the purpose of assisting and advising the Ministry of Natural Resources in preparing the Country Programme.

2. Consumption and use of controlled substances

Uganda is small consumer of controlled substances. it does not produce or export any controlled substance, but import CFC12, CFC 115 (in the mixture R-502) and insignificant quantities of CFC-11. These are used for servicing various refrigeration systems. Small quantities of carbon tetrachloride were found in the imported as laboratory solvent. Only negligible amount of halons were found to be imported as bulk chemicals for refilling halon fire extinguisher. No other controlled substance were found to be imported as bulk chemicals.

(a) The survey

The consumption of the controlled substances and related equipment were determined through a survey of the Customs data on imports and individual industries importing/using the controlled substances. The survey was undertaken by the National Country Programme Team.

The main difficulties encountered during the survey include the following (i) There is one general customs code for registering the controlled substances imported. it is also likely that the controlled substances are registered under codes for spare parts for refrigerators. (ii) Identifying the ODS importing/using industries was difficult due to lack of sufficient information on the existing industries. (iii) Most of the small scale companies do not keep accurate historical data on the importation and use of the controlled substances. (iv) Unlike in many other countries, there are no major importers who distribute the ODSs to users, but here are several small-scale importers of ODSs. (v) There is substantial amount of controlled substances entering the country without official recording. (vi) Some industries were reluctant to report data while others are likely to have not been able to report accurate data due to lack of knowledge and awareness.

(b) Past situation

Consumption of controlled substances as bulk chemicals:

The total consumption, calculated consumption and calculated per capita consumption for the years 1986, 1989, 1990 and 1991 of the controlled substances (Only substances listed under annex a of the Montreal protocol) were as follows:

Year	Consumption (Tonnes)	Calculated Consumption (Tonnes ODP)	Calculated Per capita consumption (kg)
1986	7.1	7.1	0.0005
1989	13.8	13.8	0.001
1990	14.5	14.3	0.001
1991	14.8	14.6	0.001
1992(est.)	15.5	15.5	0.001
1993(est.)	16.3	16.3	0.001

The above consumption of the controlled substances is only CFC-12 for the years 1986 and 1989. The consumption in 1990 and 1991 include 0.4 Tonnes of CFC-115. All the controlled substances imported are use for servicing refrigeration systems and air conditioners (mainly automotive).

The consumption (import) of carbon tetrachloride (Annex 8 of the Protocol) in 1986, 1989, 1990 and 1991 were 0.02, 0.2, 0.1 and 0.3 tonnes, respectively

Products Containing Controlled Substances:

Uganda does not manufacture or export products that contain or made with controlled substances.

Refrigeration and air conditioning equipment: It is estimated that there are approximately 200,000 units of domestic refrigeration equipment that were in operation in Uganda in 1991. Average annual import of new domestic refrigeration equipment during the last five years has been 2000-4000 units and at least the same number of second-hand equipment has been imported annually. The average life time of a domestic refrigeration equipment is 20-30 years. Paraffin or solar energy driven refrigerators are used in the rural areas. These refrigerators use ammonia as refrigerant.

The types of industrial refrigeration systems (using controlled substances as refrigerant) that were in operation in 1991, and estimated numbers of such equipment are as follows:

- cold rooms: approximately 40 cold rooms/stores that operate with R 12, and 20 that operate with CFC and/or HCFC,
- milk coolers: 20 units that use R-12 as refrigerant,
- CO₂ coolers and air driers: soft drink bottling companies use CO₂ coolers (R-502 or R-22) refrigerant and air driers (R-22). A beer bottling company is equipped with a CO₂ plant which requires 400kg of R-502 for maintenance.

There are some industrial refrigeration systems that are currently not in operation but are expected to be reinstalled as the economy improves.

The types and estimated numbers of commercial refrigeration equipment that were in operation in 1991 are as follows:

- commercial freezers - 1000 units
- bottle coolers - 1500-2000 units
- display cases in shops 100-200 units
- ice-cream making machines - 20 units

It is estimated that there are about 10 refrigerated trucks that use R-12 as refrigerant.

Almost all air-conditioning equipment are using R-22 as refrigerant. There are few central air-conditioning systems which use CFC 11 as refrigerant. Nine units of central air-conditioning system that use a mixture of CFC-11 and HCFC-22 as refrigerant (each having 30 kg refrigerant) were found.

Recently, cars are more commonly imported with air-conditioners. There are an estimated number of 2000-3000 units of car air-conditioners that were in operation in 1991.

Foams: There are 6 foam manufacturing companies in Uganda. The foam industry in Uganda is using water as the sole blowing agent to ensure better quality. The local products compete with the less dense but cheaper foam products imported from the neighboring countries.

Aerosols: All the aerosol sprays are imported. Most of the products are hydrocarbons in most cases.

Halon fire extinguisher: Although only negligible amount of halons are imported as bulk chemicals there are considerable amounts of halons contained in fire extinguisher systems (both fixed and portable) that exist in the country. Estimated total quantities of halons in the existing equipment are:

1 Tonne of halon-1211 and 1.8 tonnes of halon-1301.

(c) Analyses of Future Demand for the Controlled Substances

Unconstrained Demand:

Uganda's political stability has been growing steadily since the present Government took office in 1986. Uganda's economy is dominated by the agricultural sector which in 1991 constituted 51.4% of GDP. Agriculture (including forestry and fishing) account for almost 100% of the exports and 90% of the employment, much of which is subsistence farming. Exports account for less than 10% of GDP. Uganda depends heavily on one main traditional export crop, coffee. In 1991, 64% of the export earnings was from coffee. recently, world's tendency to over production led to drop in prices of coffee.

The percentage annual GDP growth rates from 1983 to 1991 were as follows:

1993:	6.4 (estimated)
1992:	4.1 (estimated)
1991:	4.1
1990:	4.0
1989:	7.3
1988:	7.6
1987:	6.7
1986:	0.6
1985:	2.0
1984:	6.5
1983:	7.5

The average annual growth rate for the years 1986 to 1991 is 5.16%.

The population of Uganda in 1991 was 16,700,000 (1991 population census). The average annual population growth rate from 1980 to 1993 was 2.6%.

Uganda consumes CFC-12, CFC-115, and very small quantity of carbon tetrachloride as well as negligible quantities of CFC 11 and halon 1301. Unconstrained demand was estimated for only CFC-12 and CFC-115 although potential for growth in consumption of other substances exist. The projection of future demand assumes that any new foam or aerosol manufacturing industries would not use controlled substances.

The demand for CFC-12 and CFC-115 was projected to grow at an average rate of 6% for the period 1992 to 2000. The relevant data underlying this estimated growth rate are:

- Average annual GDP growth rate for the period 1986, 1993 was 5.16%.
- Average annual growth rate for the consumption of CFCs for the period 1986-1993 was 15%.
- Average annual population growth rate between 1980 and 1991 was 2.6%.
- currently, only about 5% of the households own domestic refrigeration equipment. With improvement in the economy and the standard of living,
- the demand for refrigeration equipment can be expected to rise rapidly.

- There are also near future plans to expand the supply of electricity
 - to rural areas. With increasing political stability and incentive for investments, industrial activities are also expected to increase.
- Average annual growth of 6% is assumed for the demand for refrigerants.

The total unconstrained demand for CFC-12 in the years 2000 and 2010 are calculated to be 22.3 and 36.4 tonnes, respectively. The total unconstrained demand for CFC 115 for the same years is calculated to be 0.6 and 1.0 Tonnes respectively.

Estimation of incremental cost:

Incremental costs are estimated for two phase out scenarios:

- Accelerated phase-out through the implementation of this Country Programme which targets the phase -out at year 2000.
- Phase-out in the year 2010 in accordance with the requirements of the Montreal Protocol for countries operating under para.1 of Article 5.

The method used in the attempt to estimate the incremental cost for Uganda is a simple one, based on several simplistic assumptions. The estimation of the incremental costs are only roughly indicative and would not be comparable to the estimates for other countries due to the wide differences in the assumptions made and the methodologies for the estimation. The estimated incremental costs do not indicate the costs of the Action Plan.

The incremental cost have been estimated for the forced early retirement of domestic refrigeration equipment, retrofit of industrial/commercial refrigeration systems (early forced retirement is not included), recovery and recycling of refrigerants and institutional strengthening. The total incremental costs estimated for the two scenarios using 10% discount rate are as follows:

Cost Comparison for the two Phase-out Scenarios of Estimated Incremental Costs.

	ACCELERATED COST (US\$)	MONTREAL PROTOCOL COST (US\$).
Refrigeration:		
- forced early retirement of domestic refrigeration equipment	11,500,000	8,300,000
- retrofit of ind/comm equipment	1,939,000	1,862,000
- recovery and recycling	52,000	45,000
Institutional strengthening	79,000	90,000
TOTAL	13,570,000	10,297,000

The incremental cost figures above indicate that costs are lower for Uganda to phase out the CFCs in accordance with the Montreal protocol phase out schedule rather than the accelerated phase out schedule. It should be kept in mind that the results are highly dependent upon the assumptions chosen. There are several important factors that have not been taken into consideration in the analysis. The factor that justify the implementation of accelerated phase out include the following:

- (a) In reality the controlled substances will soon become unavailable and the prices of the substances are already rising. the price rise has not been incorporated into the analysis. prolonged use of the controlled substances will result in difficulties and considerable cost increase to the consuming countries, in particular the countries that do not produce controlled substances, to meet the demand for the substances.
- (b) Furthermore, and most important, the environmental benefits of less consumption, hence emission of controlled substances would outweigh the extra costs as that may be incurred in accelerating the phase-out.

The indicative list of Categories of Incremental costs adopted by the Parties to the Montreal Protocol at their second meeting in London states that the most cost-effective and efficient options for phase-out projects should be chosen to be financed through the Multilateral Fund. It is important that the evaluation of the cost effectiveness takes into consideration all the benefits and the costs (such) as difficulties in obtaining controlled substances and increased prices of controlled substances that the developing countries would have to pay (or) that could not be accounted for in the calculations.

3. Implementing phase-out

Government of Uganda is committed to comply with the Montreal Protocol and is prepared to go faster than the Protocol requires for phasing out the consumption of controlled substances for Article 5 countries. The Action Plan in the country programme should enable Uganda to phase out the consumption of controlled substances by the year 2000.

For the phase out schedule to be met, it is essential that the projects, including feasibility/pre-investment studies be carried out in an effective and timely manner, with the necessary financial and technical support from the Multilateral fund and its Implementing Agencies under the Montreal Protocol.

The Action Plan consists of two parts: the government Action comprising one project for Institutional Strengthening and Industry Action comprising three phase out projects:

1. Recovery and recycling of refrigerants;
2. Retrofitting industrial and commercial refrigeration systems; and
3. Management of banked halons and alternatives to halon fire extinguisher.

All the three industrial projects begin with a feasibility-preinvestment study to enable the development of the phase out projects.

Brief description of the programmes, projects and elements under the Action Plan are contained in Table A below.

The implementation of the is Country programme is essential in enabling early change to ozone friendly substitutes, products and technology. the Institutional strengthening project, is critical in preventing rapid increase in demand for the controlled substances and averting from the difficulties arising from possible unavailability of controlled substances in the international market in the near future.

The total budget for Institutional Strengthening Project is US\$ 64,515. The Government requests UNEP to be the Implementing Agency for the implementation of Institutional Strengthening Project.

The budget for "Recovery and Recycling of Refrigerants" project is US\$ 21,000 for which UNEP is requested to be the Implementing Agency. The Government of Uganda with assistance of UNEP would designate other Implementing Agencies to develop other projects.

1. INTRODUCTION

1.1. Purposes

This country programme reflects the commitment of the Government of Uganda to comply with the obligations of the Montreal Protocol on Substances that Deplete the Ozone Layer, to which Uganda is a Party. It provides the framework for activities to be undertaken by Uganda to achieve the required phase out of ozone depleting substances controlled under the Montreal Protocol and its London Amendment (controlled substances) and forms the basis for requesting assistance from the Multilateral Fund for those activities.

1.2 Status of the Country Programme

The Country Programme was prepared between the period February 1992-June 1994, and contains data and information on the consumption and use of ozone depleting substances controlled under the Montreal Protocol and its London Amendment for the years 1986, 1989, 1990, 1991, 1992 and 1993. It is the first country programme prepared. No country study for Uganda has been carried out previously by any international organizations.

The survey of the consumption and use pattern of controlled substances was carried out by the National Country Programme Team. Various Governmental bodies and individual industries were surveyed. The difficulties encountered in conducting the survey is explained under section 2.1. Plans for improving the record keeping by the Customs for the importation of controlled substances and recording of industries that import/use controlled substances are included in the Action Plan for future monitoring purposes.

The possible future demands for the controlled substances have been analyzed through which an indication of the total incremental cost for the phase-out of the controlled substances was derived.

The Action Plan of Uganda to phase out the consumption and use of controlled substances is based on the 1993 estimation of consumption and use of those substances. The Action Plan covers the period from 1995 to 1997 and it consists of various projects categorized under Government Actions (one project) and Industry Actions (three projects). Framework plan for the various projects have been developed for which financial and technical assistance is being requested from the Multilateral Fund and the Implementing Agencies for implementation. The budget for feasibility/pre-investment studies have been included in the Institutional Strengthening Project, and the budgets for the industrial projects will be developed through those studies. Assistance of appropriate Implementing Agency would be required for developing the project proposals.

The timetable for the implementation of the Action Plan reflects the prioritization of the projects.

The existing institutional framework for dealing with the issues under the Montreal Protocol is recorded. The Action Plan includes plans for strengthening this framework in order to:

- (i) coordinate the implementation of the country programme;
- (ii) monitor the consumption of the controlled substances and the execution of the various projects for reduction and phase-out of the controlled substances; and
- (iii) evaluate the effectiveness of the projects in achieving the reduction and phase-out.

This Country Programme should be updated during 1996 and the updated Country Programme would be implemented from 1997.

1.2.1 Preparation and Adoption of the Country Programme

The country programme was prepared under the responsibility of the Department of Environment Protection, Ministry of Natural Resources with technical assistance of Industry and Environment Programme Activity Centre (IE/PAC) of the United Nations Environment Programme (UNEP) and financial support from the Interim Multilateral Fund through IE/PAC.

The Country Programme was prepared in two phases:

- Phase I: A survey of the consumption and use of the controlled substances and gathering of information relevant to the consumption and use of controlled substances in Uganda;
- Phase II: Analyses of data and information collected through the survey; development of strategy and action plan; and preparation, review and adoption of the country programme report.

A National Country Programme Team was established for the purpose of assisting the Department of Environment Protection in preparing the Country Programme. The Team conducted the survey, drew up the Action Plan and reviewed the Country Programme. The Team consisted of representatives of the following bodies: the Department of Environment Protection and the Department of Meteorology (Ministry of Natural Resources); Ministry of Finance and Economic Planning; Department of Customs (Uganda Revenue Authority); Fisheries Department (Mbale), and Kampala Ice Plant (Ministry of Agriculture, Animal Industries and Fisheries); and Departments of Physics and Chemistry (Makerere University).

1.2.2 Participation in the Preparation of the Country Programme: Responsibilities and Roles

Short description of the bodies involved in the preparation of this Country Programme and their responsibilities and roles in the preparation are given below:

- (a) Department of Environment Protection, Ministry of Natural Resources:
Took the leadership in the preparation of the Country Programme. Directed and coordinated the survey; the process of developing the strategy and Action Plan; and the process of review and adoption of the Country Programme.
- (b) National Country Programme Team:
Conducted the survey of the consumption, use, imports and exports of the controlled substances and the products that contain controlled substances; reviewed the results of the analyses of data; developed the strategy and the Action Plan for phasing out the consumption of the controlled substances; and reviewed and approved the Country Programme.
- (c) Industry and Environment Programme Activity Centre of UNEP (UNEP IE/PAC) -Implementing Agency:
Provided the financial support and technical assistance including assistance in: (i) drawing up the overall strategy and plans for the preparation of the country programme; (ii) conducting the survey; (iii) carrying out the necessary analyses of the data and information collected through the survey; (iv) developing the strategy and the Action Plan for phase-out of the controlled substances; and (v) the preparation of the Country Programme report.

1.2.3 Sources of Data and Information

Both governmental bodies and private industries/companies cooperated and supported the survey by providing the necessary data and information for the survey. The various bodies provided the data and information as follows:

Governmental bodies:

- (a) *Department of Customs, Uganda Revenue Authority:* provided data on bulk CFC imports and exports; and import data for refrigeration equipment;
- (b) *Ministry of Trade and Industry:* provided information on the industries and companies in Uganda;
- (c) *Ministry of Agriculture:* provided information and data on the chemicals used as fumigants as well as information on pesticides and other agrochemicals;
- (d) *Ministry of Health:* provided information on the imports and use of sterilants as well as oral inhalers and other drug products;
- (e) *Civil Aviation Authority:* provided information on the use of fire extinguishing equipment within Entebbe Airport;
- (f) *Makerere University:* provided information on imports and use of various solvents used at the University.

Industries:

- (a) *Uganda Manufacturers Association:* provided the list of its various member organizations and industries.
- (b) *Individual industries and companies:* provided data on the consumption and use of the controlled substances in their own companies, as well as information about the general situations in Uganda with regard to those uses. (A full list of the relevant industries and companies surveyed is attached as Annex I.)

2. CONSUMPTION AND USE OF CONTROLLED SUBSTANCES

2.1 The Survey

The required data and information on ODSs and their use in Uganda were obtained from the Department of Customs and through individual industries and companies.

Department of Customs: The coding system used by the Customs is the Harmonized Systems of the Customs Cooperation Council. With regard to the data on imports of controlled substances, the present coding system used does not have a separate code for each controlled substance. The Customs register the controlled substances under the category of 'Derivatives of Halogenated Hydrocarbons'. It is also likely that the controlled substances are not registered under this code but is incorporated into the code for spare parts for refrigerators.

Individual industries/companies: From the available list of industries and companies, those that are likely to be importing/using controlled substances were selected. Various questionnaires were distributed to the selected industries/companies. The main difficulties encountered were as follows:

- (a) Identifying the small scale industries that are likely to be importing/using controlled substances was a difficult task. There are several small-scale industries that are registered under Ministry of Trade and Industry but without accompanying information on their function and operation. The list is also cumulative where any companies that have stopped their businesses are not deregistered.
- (b) Most of the small-scale companies do not keep accurate historical data on the importation and use of the controlled substances.
- (c) Unlike in many other countries, there are no major importers who distribute the ODSs to users, but there are several small-scale importers of ODSs.
- (d) There is substantial amount of controlled substances entering the country without official recording, especially prior to 1990 when Uganda Revenue Authority was established and Customs check points were strengthened.
- (e) Some industries showed reluctance to report data and information while others are likely to have not been able to report accurate data due to lack of knowledge regarding the ODSs and ozone layer issues.

In order to facilitate future collection of data on the consumption of controlled substances and for monitoring of the activities under the Action Plan, improvements in record keeping by the relevant Governmental bodies and industries are included under the Action Plan.

2.2 The Consumption of the Controlled Substances in 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate)

Uganda does not produce any controlled substances, but imports CFCs (12, 115 and negligible amounts of CFC-11) for servicing various refrigeration and air-conditioning equipment.

HCFC-22 is also imported for servicing refrigeration and air-conditioning equipment. HCFC-22 is controlled under the Copenhagen Amendment to the Montreal Protocol, which is yet to enter into force. This Country Programme does not include comprehensive data on consumption/use of HCFC-22.

Small quantities of carbon tetrachloride is imported and used as solvents. This solvent is used mainly as laboratory solvents. No methyl chloroform was found through the survey.

Only a negligible amount of halons were found to be imported as bulk chemicals for refilling halon fire extinguisher.

In addition, attempt was made to collect information on the use of methyl bromide. The Ministry of Agriculture, Agrochemicals Board, Agricultural Secretariat under the Bank of Uganda and Kawanda Agricultural Research Station were surveyed. The preliminary findings show that methyl bromide is not used in Uganda.

2.2.1 The Consumption of Each Controlled Substance (as bulk chemicals)

The consumption of each of the controlled substances (substances under Annex A of the Montreal Protocol and Annex B of the London Amendment), calculated level of consumption as well as calculated per capita consumption for the years 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate) are shown in Table 1.

Tables A.1 - A.4 in Annex I of this Country Programme report show the production, imports, exports and consumption of each of the controlled substances for the four years. The Tables are in the form that is ready for submission to the Ozone Secretariat to fulfill the reporting requirements of Article 7 of the Protocol.

2.2.2 Consumption of Each Controlled Substance by Use Sectors

Figures 1.1 - 1.4 below show, for the years 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate) respectively, the percentages of total consumption of the controlled substances consumed under each use sector.

The 1993 Estimated consumption of the controlled substances under each use sector are further explained below:

Refrigeration and air-conditioning sector:

All the CFC-12 imported are used under the refrigeration and air-conditioning sector. Negligible quantities of CFC-11 is used for servicing some central air-conditioning systems. All the CFC-115 imported is a part of refrigerant R-502 which is used for some industrial refrigeration systems.

About 15 of the estimated 50-60 maintenance workshops existing in Uganda are importing the controlled substances for their own use and to sell to other users. A number of end-users of refrigeration and air-conditioning equipment import their own refrigerants.

Foams sector:

There are six foam industries that manufacture polyurethane flexible foam. All these industries use water as the sole blowing agent and no auxiliary blowing agents.

Solvents sector:

Small quantities of carbon tetrachloride were found to be imported for use as solvents, mainly in laboratories. The users of carbon tetrachloride identified through the survey are University laboratories, school laboratories, and textile industries. The total import is less than 1 Tonne a year.

There are about ten dry cleaning companies in Uganda. None of them use controlled substances. Common dry cleaning agent used is the perchloroethylene.

Table 1.0 Consumption, calculated consumption (ODP tonnes) and calculated per capita consumption of controlled substances in 1986, 1989, 1990 and 1991, 1992 (est.), 1993 (est.)

Substances	1986		1989		1990		1991 (Est.)		1992 (Est.)		1993	
ANNEX A	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc
<u>Group I</u>												
CFC 11	-	-	-	-	-	-	-	-	-	-	-	-
CFC 12	7.1	7.1	13.8	13.8	14.1	14.1	14.4	14.4	15.1	15.1	15.9	15.90
CFC 113	0	0	0	0	0	0	0	0	0	0	0	0
CFC 114	0	0	0	0	0	0	0	0	0	0	0	0
CFC 115	-	-	-	-	0.4	0.24	0.4	0.24	0.4	0.24	0.4	0.24
<u>Sub-total</u>	7.1	7.1	13.8	13.8	14.5	14.34	14.8	14.64	15.5	15.34	16.3	16.14
<u>Group II</u>												
Halon 1211	0	0	0	0	0	0	0	0	0	0	0	0
Halon 1301	0	0	0	0	0	0	0	0	0	0	0	0
Halon 2402	0	0	0	0	0	0	0	0	0	0	0	0
<u>Sub-total</u>	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7.1	7.1	13.8	13.8	14.5	14.34	14.8	14.64	15.5	15.34	16.3	16.14

Substances	1986		1989		1990		1991 (Est.)		1992 (Est.)		1993	
ANNEX B	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc
<u>Group I</u>												
CFC 13	0	0	0	0	0	0	0	0	0	0	0	0
CFC 111	0	0	0	0	0	0	0	0	0	0	0	0
CFC 112	0	0	0	0	0	0	0	0	0	0	0	0
CFC 211	0	0	0	0	0	0	0	0	0	0	0	0
CFC 212	0	0	0	0	0	0	0	0	0	0	0	0
CFC 213	0	0	0	0	0	0	0	0	0	0	0	0
CFC 214	0	0	0	0	0	0	0	0	0	0	0	0
CFC 215	0	0	0	0	0	0	0	0	0	0	0	0
CFC 216	0	0	0	0	0	0	0	0	0	0	0	0
CFC 217	0	0	0	0	0	0	0	0	0	0	0	0
<u>Sub-total</u>	0	0	0	0	0	0	0	0	0	0	0	0
<u>Group II</u>												
Carbon tet	0.02	0.02	0.2	0.22	0.1	0.11	0.3	0.33	0.30	0.33	0.3	0.33
<u>Group III</u>												
Methyl chl	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0.02	0.02	0.2	0.22	0.1	0.11	0.3	0.33	0.30	0.33	0.3	0.33
Population	14,700,000		15,900,000		16,300,000		16,700,000		17,134,200		17,579,689	
per capita consmp. (calcul.)	Annex A: 0.0005 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -	

NOTES: (a)

cns = consumption in Tonnes

calc = calculated consumption (Tonnes x Ozone Depleting Potential (ODP))

(b) Annex A/B = Annexes in the Montreal Protocol listing the controlled substances

(c) 1991 population data have been taken from the results of the 1991 Population and Housing Census, Statistics Department, Ministry of Finance and Economic Planning. The population of the other years are estimated using the average population growth rate since the population census carried out in 1980.

Figure 1.1: 1986 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 7.12 Tonnes

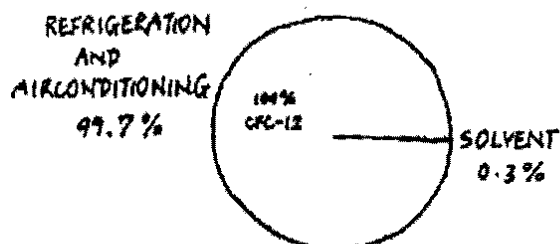


Figure 1.2: 1989 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 14.0 Tonnes

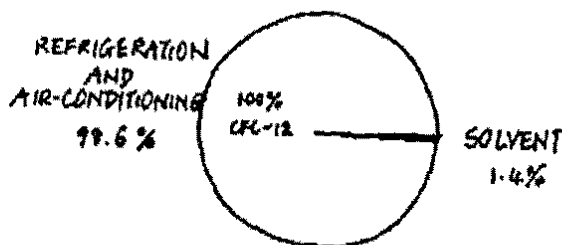


Figure 1.3: 1990 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 14.6 Tonnes

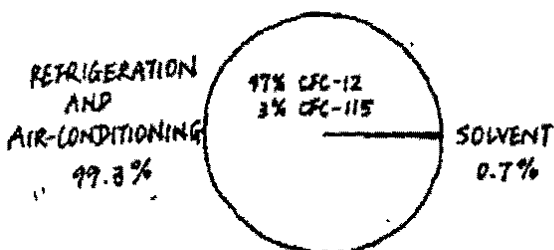
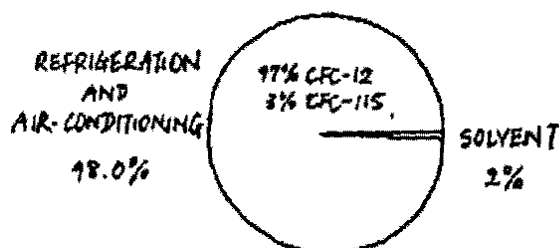


Figure 1.4: 1991 consumption of controlled substances by end use

TOTAL CONSUMPTION = 15.1 Tonnes



2.2.3 Products Containing Controlled Substances

All the refrigeration and air-conditioning equipment, aerosols and fire extinguisher are imported into Uganda. There is also substantial importation of flexible foam products from neighbouring countries.

Estimates of the numbers of various equipment containing controlled substances that were in operation in Uganda in 1993 have been made. These estimates are shown in Table 2.1 which also shows the type of controlled substances contained in each category of equipment and approximation of the total quantity of the controlled substances contained in each category of products.

The general situation with regard to each type of product containing controlled substances is further explained below.

Refrigeration equipment:

Domestic refrigerators and freezers: There is a large market for second-hand, reconditioned domestic refrigeration equipment. Average annual import of new domestic refrigeration equipment during the last five years has been 2000-4000 units and at least the same number of second-hand equipment has been imported annually. There is also importation of new and second-hand compressors for domestic refrigeration equipment. In Uganda, the average life times of new and second-hand compressors are 8 and 3 years respectively, while the average life time of a domestic refrigeration equipment is 20-30 years. Use of paraffin or solar energy driven refrigerators is common in the rural areas. These refrigerators use ammonia as refrigerant.

Industrial refrigeration systems: The types of industrial refrigeration systems that were found to be in operation (in 1993) and estimated numbers of such equipment are as follows:

- cold rooms: Approximately 80 cold rooms/stores in operation in the country. Out of these, approximately 50% operate with R-12, 25% operate with R-22 and 25% with R-502.
- milk coolers: 45 units are in operation. 25 units use R-22 and 20 units use R-12.
- various ice plants: there are soft drink/beer bottling companies and fisheries having various types of ice makers, ice banks and ice water plants. All the equipment use R-22 or ammonia as refrigerant.
- CO₂ coolers and air driers: soft drink bottling companies use CO₂ coolers (R-502 or R-22) refrigerant and air driers (R-22). A beer bottling company is equipped with a CO₂ plant which require 400kg of R-502 for maintenance.
- chillers: there are about 15 chillers used in the country. Most use R-22.

There are a number of cold rooms, fish freezing plant, milk coolers (about 25 units), as well as some large central air-conditioning systems that are currently not in operation but are expected to be reinstalled as economy improves.

Commercial refrigeration equipment: The types and estimated numbers of commercial refrigeration equipment that were found to be in operation are as follows:

- commercial freezers - 1000 units
- bottle coolers - 1500-2000 units
- display cases in shops - 100-200 units
- ice-cream making machines - 20 units

Refrigerated trucks: It is estimated that there are about 20 refrigerated trucks operating in the country. Half of the trucks use R-12 as refrigerant and the other half use R-22 as refrigerant. In Uganda, insulated trucks are also common, where flaked ice is used in insulated compartments to keep various foods frozen while transporting.

Air-conditioning equipment:

Almost all air-conditioning equipment are using R-22 as refrigerant. There are a few central air-conditioning systems which use CFC-11 as refrigerant. The largest of the CFC-11-using system (400kg refrigerant content) has not been in operation for the past several years. Nine units of central air-conditioning system that use a mixture of CFC-11 and HCFC-22 as refrigerant (each having 30 kg refrigerant) were also found.

Recently, cars are more commonly imported with air-conditioners. There are 2000-3000 units of car air-conditioners that were estimated to be in operation. In Uganda it is common that the car owners either do not bother to service the air conditioners or remove them in order to save on fuel consumption.

Some car dealers are already importing automotive air-conditioners that use HFC-134a as refrigerant. The car air-conditioners are commonly serviced by refrigeration and air-conditioning equipment maintenance workshops. Some motor garages also undertake some repair work on car air-conditioners.

Foams:

There are 6 foams manufacturing companies in Uganda. The foam industry in Uganda are using water as the sole blowing agent to ensure better quality. The local products compete with the less dense but cheaper foam products imported from the neighbouring countries. Apparently the imported products collapse and disintegrate fast, but are popular in the rural areas.

Aerosols:

All the aerosol sprays are imported. Most of the products are marked 'ozone friendly'. The propellant in the ozone friendly sprays are hydrocarbons in most cases.

Halon fire extinguisher:

Although only negligible amount of halons are imported as bulk chemicals there is considerable amounts of halons contained in fire extinguisher that exist in the country. The main users of halon fire extinguisher identified through the survey are:

- The Mpoma Satellite Earth Station of the Uganda Posts and Tele-communications use both fixed halon fire extinguisher systems containing 1.7 Tonnes of halon 1301 in total and portable ones containing 50kg of halon 1211 in total. The systems were installed in 1985.
- Entebbe Airport: six fire fighting trucks with halon fire extinguishant (1050 kg) were acquired in 1992. They do not plan to continue the use of the halon fire extinguisher.
- Uganda Commercial Bank has halon 1211 fire extinguisher for protecting their computer systems and the electrical systems. These are automatic extinguisher containing 2 kg or 15 kg halon 1211 per cylinder, and are fixed on the ceilings with heat detectors. (In Tables 2.1 and 2.2 below these are categorized under portable fire extinguisher.) The total quantity of halon 1211 contained is 290kg. The equipment has not been serviced since installation in 1989, and they are considering discontinuing the use of the halon.
- One leather and tanning industry has 10 units of 13kg halon fire extinguisher.
- One large hotel uses two fixed systems of halon fire extinguisher containing 64kg of halon 1301. One other hotel uses some portable units.
- Uganda Airline uses halon fire extinguisher in their aircraft.

Five companies are known to have used halon fire extinguisher in the past but have discontinued the use during 1980s.

There is one main company that deals with servicing of halon fire extinguisher. The company takes the equipment to Kenya for refilling. Four other companies were found to be importing and selling portable halon fire extinguisher. The import data for halon fire extinguisher that were collected through the survey are shown in Table 2.2 below.

Table 2.1 Estimation of the numbers of equipment containing controlled substances that were in operation in the country in 1993 (equipment containing R-22 or ammonia are not included)

TYPE OF EQUIPMENT	ESTIMATED QUANTITY IN OPERATION	CONTROLLED SUBSTANCE CONTAINED	APPROXIMATE TOTAL CONTENT OF CONTROLLED SUBSTANCES
-------------------	---------------------------------	--------------------------------	--

(A) REFRIGERATION AND AIR-CONDITIONING

domestic refrigerators and freezers	200,000	CFC-12	50 Tonnes
cold rooms	40	CFC-12	4 Tonnes
	20	R-502	2 Tonnes
Milk coolers	20	CFC-12	0.1 Tonnes
CO ₂ coolers	3	R-22/R-502	0.02 Tonnes
CO ₂ plant	1	R-502	0.4 Tonnes
commercial freezers	1,000	CFC-12/R-502	6 Tonnes
bottle coolers	1,500-2,000	CFC-12	0.4 Tonnes
display cases	100-200	CFC-12	0.04 Tonnes
refrigerated trucks	10	CFC-12	0.05 Tonnes
automotive a/c	2,000-3,000	CFC-12	2-3 Tonnes

(B) FIRE EXTINGUISHERS (HALONS)

portable (cylinders of 1.5, 2, 5 or 15 kg)	160	H-1211	1 Tonne
fixed systems	35	H-1301	1.8 Tonnes

Table 2.2 Importation of halon fire extinguishers

TYPE OF PRODUCT	QUANTITY IMPORTED					
	1986	1989	1990	1991	1992	1993
portable (cylinders of 1.5, 2, 5 or 15 kg)	10	38	10	50	50	50
fixed systems	2	0	0	0	0	0
	(in 1987)					

2.3 Analyses of Future Demands for the Controlled Substances

2.3.1 The Economy

Uganda's political stability has been growing steadily since the present Government took office in 1986. Uganda's economy is dominated by the agricultural sector which in 1993 constituted 51.4% of GDP.

Agriculture (including forestry and fishing) account for almost 100% of the exports and 90% of the employment, much of which is subsistence farming. Exports account for less than 10% of GDP. Uganda depends heavily on one main traditional export crop, coffee. In 1991, 64% of the export earnings was from coffee. Recently, world's tendency to over production led to drop in prices of coffee.

Uganda's situation in the 1970's and most of 1980's resulted in a shift from a wage-earning economy to a more subsistence and shadow economy, the result of which was a significant decrease in the monetary GDP. The long term objective of the Government's macroeconomic strategy is to create an independent, integrated, self-sustaining economy. The macroeconomic strategy being implemented aims to ensure sustainable development through mobilization of resources for investment. The two main components of the strategy are stabilizing the currency through controlling inflation and promoting and diversifying exports.

The policy measures of the Government include prudent budgeting with measures to increase taxable economic activity; strengthening of the currency with measures to promote and liberalize marketing of crops; and sectoral investment strategy.

Some of the actions being taken by the Government include:

- Creation of incentives, removal of bureaucratic bottlenecks and provision of assistance to facilitate and encourage investments in the private sector as well as privatization of public enterprises;
- Improvement of the transport network to support the opening up of productive areas;
- Acceleration of urban and rural electrification;
- Promotion of tourism through measures that include establishment of strong legal and institutional framework and strengthening of environmental planning techniques; and
- Encouragement of private sector involvement in mining to establish and exploit mineral potential.

The percentage annual GDP growth rates from 1983 to 1991 were as follows:

1993:	6.4 (Est.)
1992:	4.1 (Est.)
1991:	4.1
1990:	4.0
1989:	7.3
1988:	7.6
1987:	6.7
1986:	0.6
1985:	2.0
1984:	-6.5
1983:	7.5

The average annual growth rate for the years 1996 to 1993 is 5.16%.

The population of Uganda in 1991 was 16,700,000 (1993 population census). The average annual population growth rate from 1980 to 1991 was 2.6%.

2.3.2 Projection of Future Demand for Controlled Substances: Unconstrained Demand

Basic Assumptions:

The future demand for the controlled substances is estimated assuming that the Montreal Protocol did not exist. Between 1986 and 1993, the import of CFC-12 grew at an average annual growth rate of about 21%. The market for the domestic refrigeration equipment is far from being saturated. With various Government incentives and opportunity for investment and businesses in various sectors of economy, it is assumed that the percentage annual growth rate of GDP for the period 1992-2010 will be an average of 6%. For that same period, the population growth rate is assumed to follow the average 1980-1993 rate of 2.6%. On the basis of these figures,

the number of equipment in operation under all categories of refrigeration equipment and the demand for refrigerants CFC-12 and CFC-115 are assumed to grow at an average annual rate of 5% for the period 1992-2010.

Under the foam and aerosol sectors, two factories are planned to be established in the near future. Other manufacturing factories are likely to be established in the coming years but it is assumed that no controlled substances will be used by the industries, since cheaper ozone friendly technology are available.

Although halons are not imported as bulk chemicals, the annual consumption of halons has been estimated. It is assumed that the stocked halons will increase at an average annual rate of 2%. Annual consumption is estimated on the basis of an assumption that an average of 2% of the stocked halons will be replaced per year through discharge/service.

Projection of demand of each controlled substance:

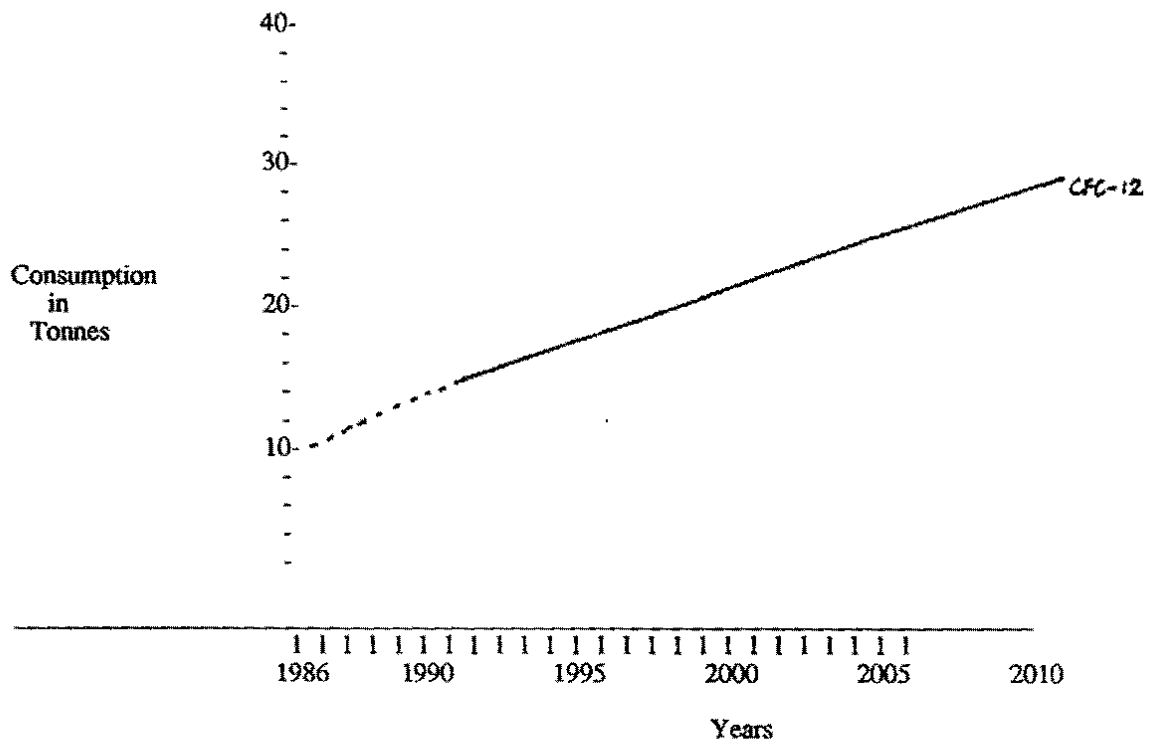
The projected demand for each year (1992-2010) for each controlled substance is shown in Table 2.3 below:

Table 2.3 Summary of the yearly predicted consumption of controlled substances following the unconstrained demand

Year	Estimated GDP Growth Rate	CFC-12 Tonnes	CFC-115 Tonnes	H-1211 kg	H-1301 kg	Total Consump. (CFCs only)
1991	actual - 4.1	14.4	0.4			14.8
1992	4.1	15.1	0.4	20	36	15.5
1993	6.4	15.9	0.4	21	37	16.3
1994	6.0	16.7	0.5	21	37	17.3
1995	"	17.5	0.5	22	38	18.0
1996	"	18.4	0.5	22	39	18.9
1997	"	19.3	0.5	23	40	19.8
1998	"	20.3	0.6	23	41	20.9
1999	"	21.3	0.6	23	41	21.9
2000	"	22.3	0.6	24	42	22.9
2001	"	23.5	0.7	24	43	24.2
2002	"	24.6	0.7	25	44	25.3
2003	"	25.9	0.7	25	45	26.6
2004	"	27.2	0.8	26	46	28.0
2005	"	28.5	0.8	26	47	29.3
2006	"	29.9	0.8	27	48	30.7
2007	"	31.4	0.9	27	48	32.3
2008	"	33.0	0.9	28	49	33.9
2009	"	34.7	1.0	28	50	35.7
2010	"	36.4	1.0	29	51	37.4

Figure 2.1

Graph showing the unconstrained demand for each controlled substance (CFCs only) up to year 2010



2.3.3 Estimation of Incremental Costs for Phase-out of Controlled Substances

Incremental costs are estimated for two different scenarios:

- (a) Accelerated phase-out through the implementation of this Country Programme which targets the phase-out at year 2000. The incremental costs are estimated based on the planned activities under the Action Plan.
- (b) Phase-out in the year 2010 in accordance with the requirements of the Montreal Protocol for countries operating under paragraph 1 of Article 5. (Freeze at 1995-1997 level by 1999; 50% reduction by 2005; 85% reduction by 2007; Complete phase-out by 2010). The consumption of the controlled substances is assumed to follow the maximum allowable consumption.

Several simplified assumptions have been made in estimating the incremental costs for Uganda. The costs include early forced retirement of domestic refrigerators, retrofitting industrial/commercial refrigeration equipment and for institutional strengthening. The estimated incremental costs are only roughly indicative and would not be comparable to the estimates for other countries due to the wide differences in the assumptions made and the methodologies for the estimation. The estimated incremental costs do not indicate the costs of the Action Plan.

Basic assumptions in the analyses are as follows:

- The incremental cost is the difference in cost to the economy between 'business as usual' using controlled substances and phasing out the controlled substances because of the existence of the Montreal Protocol.
- The consumption of the controlled substances will increase according to the predicted unconstrained demand until control is effected according to the Action Plan or the Montreal Protocol control measures.
- The controlled substances will be available in sufficient quantities at constant prices.
- The estimates of the incremental costs are based on 1992-1993 prices.
- A real discount rate of 10% has been used to calculate the present 1993 value of the costs.
- Energy efficiency has not been considered under the analyses.
- Since the Parties have not yet taken a decision on the period during which incremental recurring costs will be met by the Multilateral Fund, this analysis includes the recurrent costs up to the phase out year.

The expected consumption of the controlled substances under each of the scenarios is shown graphically below:

Figure 2.2 Graph showing the expected consumption of the controlled substances (Annex A, Group I substances only) under the accelerated phase out scenario (likely consumption under the Action Plan)

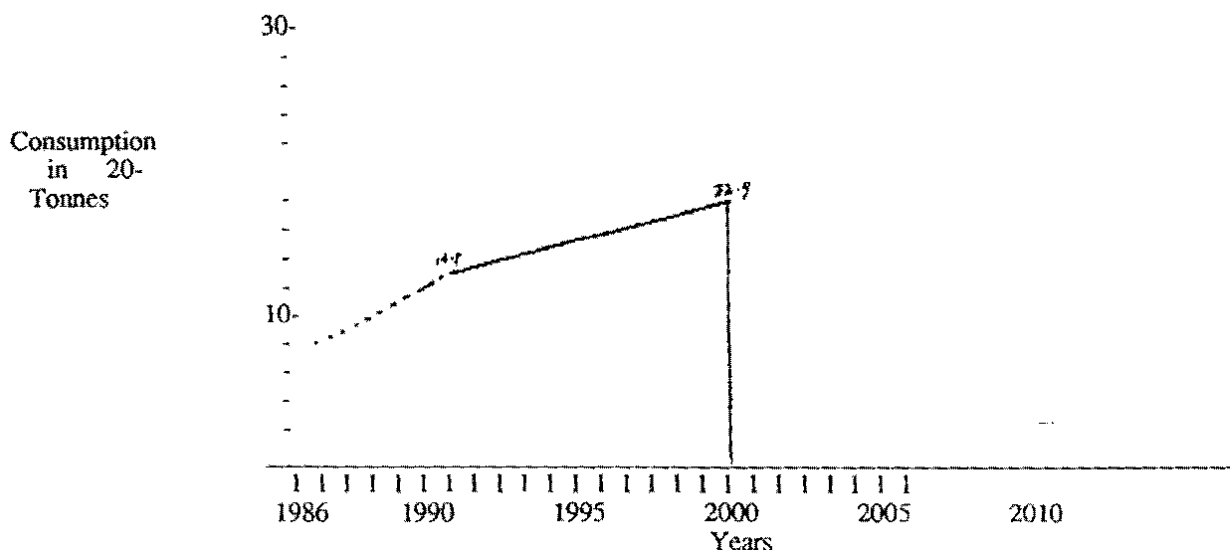
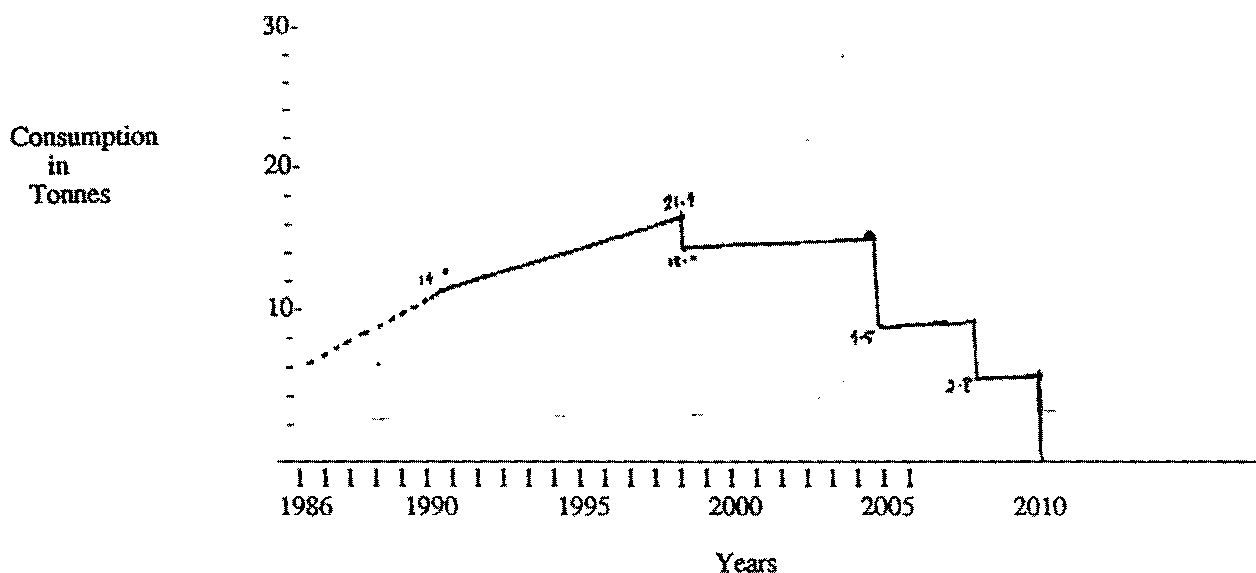


Figure 2.3

Graph showing the expected consumption of the controlled substances (Annex A substances) under the Montreal Protocol phase-out scenario (maximum allowable consumption)



The likely substitution and the assumptions for each sector are as below:

Foams sector:

At present no controlled substances are used by the foam industry in the manufacture of flexible foam. Water blowing is used. Any new foam manufacturing factories could use methylene chloride as an auxiliary blowing agent which is an alternative to using CFC-11. Methylene chloride is cheaper than CFC-11 and the capital costs required for the equipment to use methylene chloride would be similar to that for using CFC-11.

Assumptions:

- Incremental cost is zero.

Solvent sector:

Through the current survey, only a small quantity (less than 1 Tonne) of carbon tetrachloride was found to be used as laboratory solvent. No other controlled substances were found to be used as solvent. Possible substitutes for laboratory applications for analytical standards and extraction has not yet been developed.

Assumption:

- Incremental cost is zero.

Aerosol Sector:

LPG is the most commonly used substitute propellant in aerosol sprays, particularly for insecticide sprays and other household aerosols. For cosmetic aerosols there is no universal alternative for CFCs as each type of cosmetics has its own specific requirements, but deodorized LPG can be used. Dimethylether is also used as substitute propellant.

LPG are cheaper than CFCs, but since LPG are flammable safety measures are required. Conversion to LPG will result in cost savings in the aerosol industries in the long run. Any new aerosol factories could use LPG as aerosol propellant.

Assumptions:

- The incremental cost is zero

Refrigeration and air-conditioning sector:

Likely substitution:

HFC-134a refrigerant is currently about 5 times as expensive as CFC-12 (HFC-134a: approximately US \$ 20 per kg as compared with CFC-12: approximately US \$ 4 per kg), but approximately 10% less of it is necessary for the new equipment using HFC-134a. The price of the HFC-134a refrigerant should decrease gradually.

Domestic refrigerators with HFC-134a refrigerant have begun to appear in market (e.g. Denmark) at prices that are only slightly higher than those with CFC-12 refrigerant. In many cases, the energy efficiency of the HFC-134a equipment is at least as good as the CFC using equipment.

The costs of retrofitting industrial/commercial refrigeration equipment is dependant upon the substitute refrigerant, size, age and type of the equipment hence difficult to estimate. In new industrial refrigeration systems, CFCs can be replaced by HCFC-22, ammonia, hydrocarbons or HFCs. Many companies consider that conversion to ammonia and hydrocarbons are the best available options. Existing industrial refrigeration systems (including cold rooms) may be retrofitted to use ammonia or HCFC-22.

Assumptions:

- The average cost of early forced retirement of any domestic refrigeration equipment is assumed to be US \$ 200. Life time of a refrigeration equipment is taken to be 12 years.
- Under the accelerated phase-out, early forced retirement will begin in the year 2000 at the rate of 10%. (No of CFC-12 equipment to undergo forced early retirement is 255,256 units (estimated 1996 stock).)
- Under the Montreal Protocol phase-out following percentages of retirement is assumed at each control step: 12% in 1999, 10% in 2005, 14% in 2007 and 10% for 2010. (No of CFC-12 equipment to undergo forced early retirement is 295,491 units (estimated 1999 stock).)
- Average cost for retrofitting industrial or commercial refrigeration equipment is taken to be US \$ 1000.
- It is assumed that all the stock of equipment containing controlled substances (industrial and commercial equipment combined) will be retrofitted, hence no early forced retirement costs are included.
- It is assumed that the retrofit under the accelerated phase out will start to take place in the year 1997 and under the Montreal Protocol phase out in the year 2000.
- For recovery and recycling of refrigerants, incremental cost is assumed to be the cost of recovery and recycling machines, each costing US \$ 4,000.
- For the accelerated phase out it is assumed that the machines will be purchased during 1997 and under the Montreal Protocol phase out in the year 2000. The number of units of recovery and recycling equipment purchase will be equal to the tonnes of consumption of refrigerants in those years.

Institutional strengthening

Assumptions:

- Cost of the required institutional strengthening is assumed to be US \$ 30,000 for the first year and US \$ 15,000 per year thereafter.
- For the accelerated phase out the costs will be incurred from 1994 to 1999 and for the Montreal Protocol phase out from 1997 to 2009.

Conclusions:

The estimated incremental costs (in US \$) for each sector as follows:

	ACCELERATED	MONTREAL PROTOCOL
Refrigeration:		
- forced early retirement of domestic refrigeration equipment	11,500,000	8,300,000
- retrofit of ind/comm equipment	1,939,000	1,862,000
- recovery and recycling	52,000	45,000
Institutional strengthening	79,000	90,000
TOTAL	13,570,000	10,297,000

The estimated incremental costs are only indicative, based on the particular assumptions made for the estimation.

The comparison of the discounted costs (10% discount rate) of phase-out under the two scenarios indicates that the incremental costs are lower when the phase out schedule under the Montreal Protocol is followed. It should be kept in mind that the magnitude of seeming cost advantage in delaying the phase out is highly dependant upon the discount rate chosen. The discounted costs will change significantly with the discount rates.

The incremental cost figures above should not lead to a conclusion that Uganda should follow the Montreal Protocol phase-out schedule rather than an accelerated one. In reality the controlled substances are becoming increasingly difficult to obtain and the prices of the substances are already rising. Prolonged use of the controlled substances is likely to result in difficulties and considerable cost increase to the country in meeting the demand for the substances.

Furthermore, and most importantly, the environmental benefits of less consumption, hence emission of controlled substances would outweigh the extra costs that may be incurred in accelerating the phase-out. The estimated cumulative consumption shows that approximately 120 Tonnes less of controlled substances will be consumed by Uganda if accelerated phase out is followed as compared with the Montreal Protocol phase out schedule.

The Indicative List of Categories of Incremental Costs adopted by the Parties to the Montreal Protocol at their Second Meeting in London states that the most cost-effective and efficient options for phase-out projects should be chosen to be financed through the Multilateral Fund. It is important that the evaluation of the cost effectiveness takes into consideration all the benefits and the costs that could not be accounted for in the analyses, for example, the increased cost of controlled substances that the developing countries would have to pay for and the environmental benefits of reduced ODS consumption.

2.4 Industry Structure

Most of the industries in Uganda are small scale.

Unlike in several other countries, Uganda does not have chemical suppliers that deal with controlled substances on a regular basis. Uganda Oxygen Ltd. has, this year (1993), started the importation of refrigerant gases, but the company may not continue the business on regular basis. About 15 refrigeration and air-conditioning maintenance workshops are importing controlled substances for their own use and also to sell to other users. Several industries that use refrigerants import their own refrigerants when needs arise.

All the refrigeration and air-conditioning equipment and aerosols are imported and some foam products are also imported although there are six companies manufacturing flexible polyurethane foams. Equipment and products are imported by retail shops. Some end-users of such products (e.g. large hotels) also import the equipment and products for their own use.

The estimated numbers of industries and companies dealing with ODSs and their products in Uganda are as follows:

Refrigeration and air conditioning sector:

- (i) 50-60 workshops that maintain refrigeration and air-conditioning equipment. There are many small-scale industries that repair about 100 units of equipment or less a year.
- (ii) 10-15 of the workshops import the refrigerants for their own use as well as for supplying other users.
- (iii) 10-15 importers of refrigeration and air-conditioning equipment. Many of these importers are dealing with second-hand equipment.
- (iv) Several retail shops importing compressors (both new and second-hand).

Foams sector:

- (v) 6 firms manufacturing flexible polyurethane foams.
- (vi) 1 new foam manufacturing factory to be established.
- (vii) A number of retail shops import foam products.

Users of carbon tetrachloride:

- (viii) 5 main laboratories were found to be using carbon tetrachloride in small quantities.
- (ix) 2 textile companies using negligible quantities of carbon tetrachloride as solvent.

Aerosols sector:

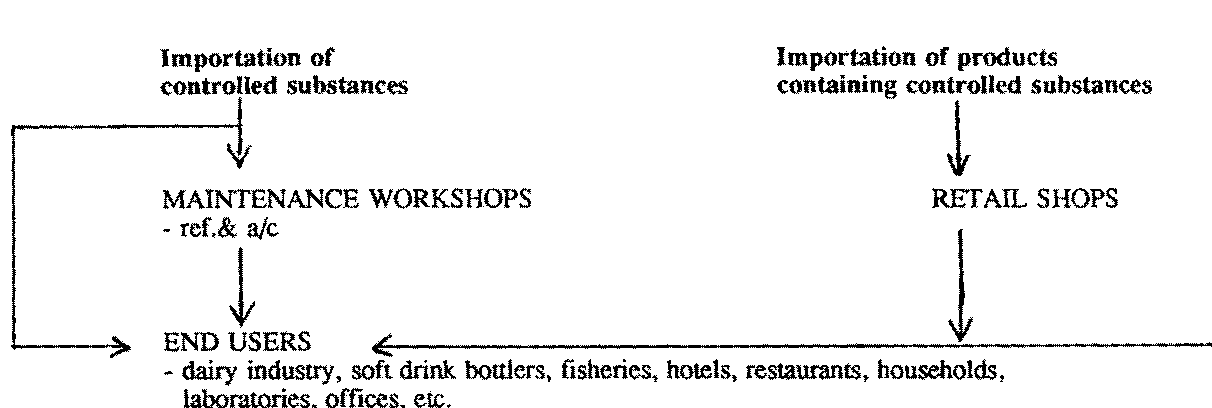
- (x) Various retail shops import aerosols, much of which are marked 'ozone friendly'.

Fire extinguishers:

- (xi) 15 dealers for fire extinguishers, 5 of which are dealing in halon fire extinguisher systems.

The structure of the industries that deal with controlled substances are shown in the Figure 2.4 below:

Figure 2.4: Flow chart showing the structure of the industries that deal with controlled substances and products that contain controlled substances.



2.5 The Status of Response to the Montreal Protocol

2.5.1 The Government Response

Uganda acceded to the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on 24 June 1988 and 15 September 1988, respectively. The Convention and the Protocol entered into force for Uganda on 29 September 1988 and 1 January 1989, respectively.

The Government of Uganda assigned the responsibility of implementation of the Vienna Convention and the Montreal Protocol to the Ministry of Environment Protection. Since then the Ministry has been renamed twice. Currently the Ministry is called the Ministry of Natural Resources. The Department of Environment Protection is responsible for the implementation of the Vienna Convention and the Montreal Protocol.

The Department of Environment Protection is the national focal point on environmental issues and is also the focal point to UNEP.

Uganda has participated with interest in the various meetings convened under the Vienna Convention and the Montreal Protocol. Uganda has been elected a member to the Implementation Committee for consecutive terms, the first term as the Vice-Chair.

In Uganda, there is a weekly Television programme focusing on the environment. The Department of Environment Protection provides inputs to the programme. Attempts are being made to focus on the issue of protection of the ozone layer. Attempts are also being made to produce a special thirty-minute programme on the protection of the ozone layer and ODS issues.

Currently the Government is considering strengthening the teaching of environmental issues under the school curriculum. The problem of ozone layer depletion is to be incorporated.

The Government of Uganda is committed to phase out the consumption of controlled substances in Uganda as soon as possible but not later than the year 2000. The Government is fully committed to successfully implement the Country Programme for the phase out of substances controlled under the Montreal Protocol. Although Uganda as a developing country operating under paragraph 1 of Article 5, is entitled to delay the phase out by 10 years, it will not await the elapse of this grace period before embarking on action and phasing out its consumption of the controlled substances. With timely and efficient provision of the necessary financial and technical support from the Multilateral Fund, effective technology transfer and implementation of the Country Programme, Uganda could meet its goal to phase out the consumption of the controlled substances in the year 2000.

The records on industries are kept by the Ministry of Trade and Industry on the basis of licenses issued for the operation of the industries. Uganda Revenue Authority issues the licenses for establishment of industries (investment licenses). The Investment Authority promotes and facilitates investments in Uganda and provides various assistance to the investors.

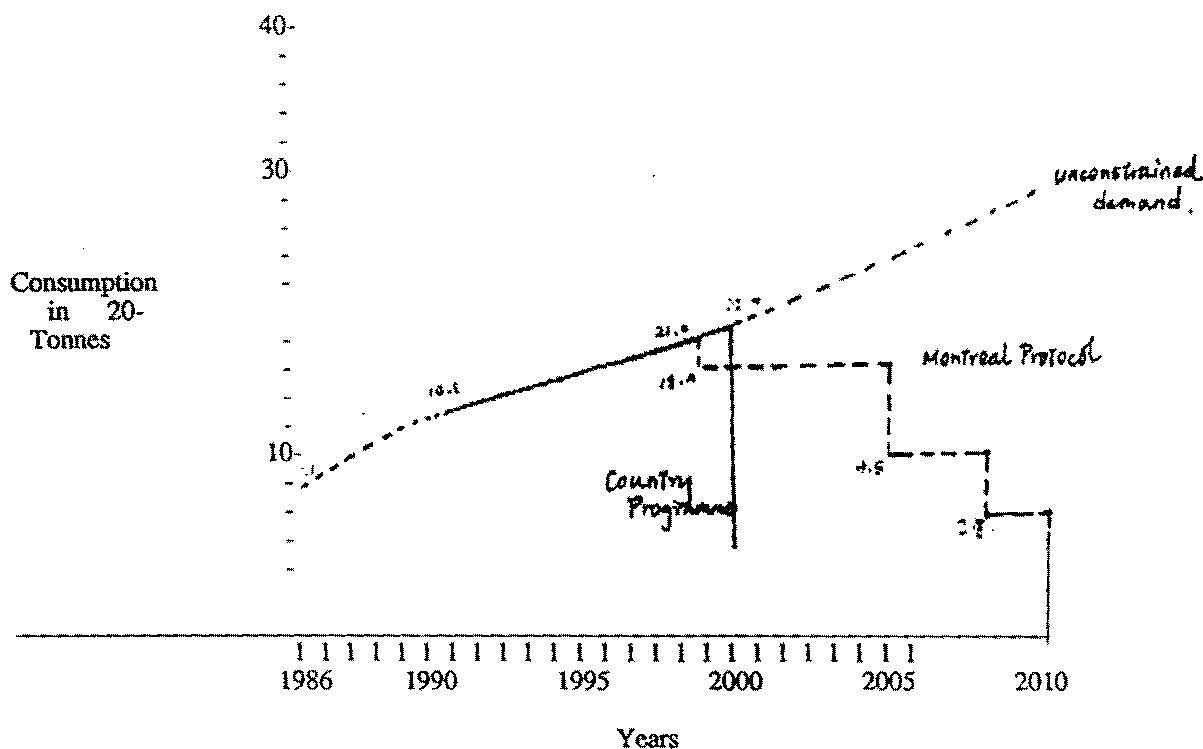
3. IMPLEMENTING PHASE OUT

3.1 Strategy Statement by Government

Uganda is a Party operating under paragraph 1 of Article 5, hence is required to phase out the consumption of CFCs, halons and carbon tetrachloride controlled under the Montreal Protocol by the year 2010 and methyl chloroform by the year 2015. These phase out years have been brought forward under the adjustments adopted by the Parties at their Fourth Meeting in Copenhagen (November 1992), but how these provisions will be applied to Article 5 countries will depend upon a review in 1995. The Government of Uganda is committed to phase out the consumption of the controlled substances as soon as possible, even before the phase out years of 2010 and 2015.

Through the implementation of the Country Programme the Government of Uganda will phase out the consumption of all the controlled substances by the year 2000. The steps for reduction up to complete phase out of consumption for each group of substances are presented graphically in Figure 3.1 below.

Figure 3.1 Graph showing the expected consumption of the controlled substances following the Government strategy for the phase-out as compared with the phase-out in accordance with the requirements of the Montreal Protocol for Article 5 countries



2.5.2 The Industry Response

The industries' awareness on the problem of ozone layer depletion is generally low. One of the main companies that deal with fire extinguishing systems were advised by the supplier companies in Europe against the use of halons. Hence during the mid 1980's this company has stopped the supply of halons to any local consumers. No other actions have so far been taken by industries to reduce the use of controlled substances.

2.6 Institutional Framework

The Governmental and other institutions that are responsible for activities that affect the consumption of ODSs in Uganda are as follows:

Department of Environment Protection, Ministry of Natural Resources:

Under the existing institutional framework, all environmental issues, both national and international which includes global environmental issues such as the protection of the ozone layer, falls under the responsibility of the Department of Environment Protection of the Ministry of Natural Resources. The Department is the national and international focal point for environmental matters including UNEP matters.

The Department plays a coordinating role with other Governmental bodies as well as private enterprises regarding environmental matters. Its main activities include:

- Pollution control: Developing and recommending policies and legislation to control pollution through Ad Hoc Committees comprising representatives of appropriate Ministries and other Governmental bodies. Monitoring of pollution is also undertaken through the Department. Monitoring and Control Division checks that the industries operate safely, taking into account environmental considerations, but currently with no legislative back-up for enforcement.
- Monitoring of natural resources: Developing policies and legislation for sustainable use of the natural resources and to monitor these resources in the country.
- Environmental awareness: Organizing and developing programmes and articles through mass media and preparing and disseminating information publications. The Department also provides assistance in both formal and informal education.
- Environmental Impact Assessment: Carrying out Environmental Impact Assessments for all major projects before the projects are approved for implementation. (This is, however, not enforced by legislation.)
- Geographical Information Systems: Collecting data and information on and making inventories of utilization of natural resources in the country as well as developing a database for the data and information and disseminating them to the resource users and policy makers.

The National Environment Action Plan under the Department of Environment Protection is currently developing an umbrella environment legislation.

Ministry of Finance and Economic Planning

The Ministry is responsible for preparation of overall development plans (short, intermediate and long-term) and provides guidelines on priorities for development initiatives. It also ensures prudent management of public finances. The Ministry approves most projects that are implemented in the country.

Ministry of Trade and Industry:

This Ministry controls both public and private industrial activities through promoting industrial establishments and investments through provision of various assistance for facilitating businesses. Recently, Uganda Investment Authority was established under the Ministry for issuing of licenses for trade and operation of industries.

The National Bureau of Standards under the Ministry is responsible for standardization and quality control. It monitors the operation and activities in industries and trade to ensure product quality and to safeguard consumer health and safety.

Uganda Manufacturers Association:

Provides information and guidance to the industrialists on investments, market opportunities, and use of appropriate technologies. UMA organizes annual trade fairs through which information on newly available technologies and products is disseminated. It also actively seeks new information and provides a forum for discussion of various issues of interest to the member industries and companies.

Uganda National Chamber of Commerce and Industry:

This is an association of traders. It protects the interest of the traders and negotiates trade terms with the Government. The Chamber also advises its members on legal requirements for trade and on market situations.

Training Institutes:

Institutions and organizations in Uganda that offer various opportunities for training are as below. These institutions could play an important role in training and educating the relevant technicians as well as the public in matters related to the ozone depleting substances, and their use.

(a) Vocational Training Centre (under the Ministry of Labour and Social Affairs):

The Centre conducts courses for technicians to acquire extra skills and to update their knowledge. All the courses are short term (less than two months). No certificates are issued.

(b) Makerere University:

Faculty of Technology conducts various technical courses including training on heating, refrigeration and air-conditioning. Institute of Environment and Natural Resources under the University runs courses on Environmental Science.

(c) Uganda Polytechnic:

Technical courses on refrigeration and air-conditioning equipment are conducted at the Polytechnic. Facilities are available for organizing extra technical courses and demonstration projects.

(d) Fisheries Training Institute Entebbe:

The Institute offers technical training up to diploma level. Maintenance of refrigeration equipment is an important part of the courses.

2.7 Existing Policy and Operational Framework in Uganda that Govern Trade and Industries

There are no specific laws and regulations that have yet been enacted in Uganda for the reduction and phase out of the consumption of controlled substances.

The general policy and operational framework and regulations relevant to trade and industries are explained below:

2.7.1 Trade

The Division of External Trade in the Ministry of Trade and Industry is responsible for issuing trade licenses. Some chemical imports must be approved by appropriate Ministries.

The Department of Customs is under the Uganda Revenue Authority of the Ministry of Finance and Economic Planning is responsible for checking the imported commodities at entry points, against import licenses and invoices, and for record keeping

The Cabinet adopts the import duties and taxes which are announce with the Annual Budget.

The records on industries are kept by the Ministry of Trade and Industry on the basis of licenses issued for the operation of the industries. Uganda Revenue Authority issues the licenses for establishment of industries (investment licenses). The Investment Authority promotes and facilitates investments in Uganda and provides various assistance to the investors.

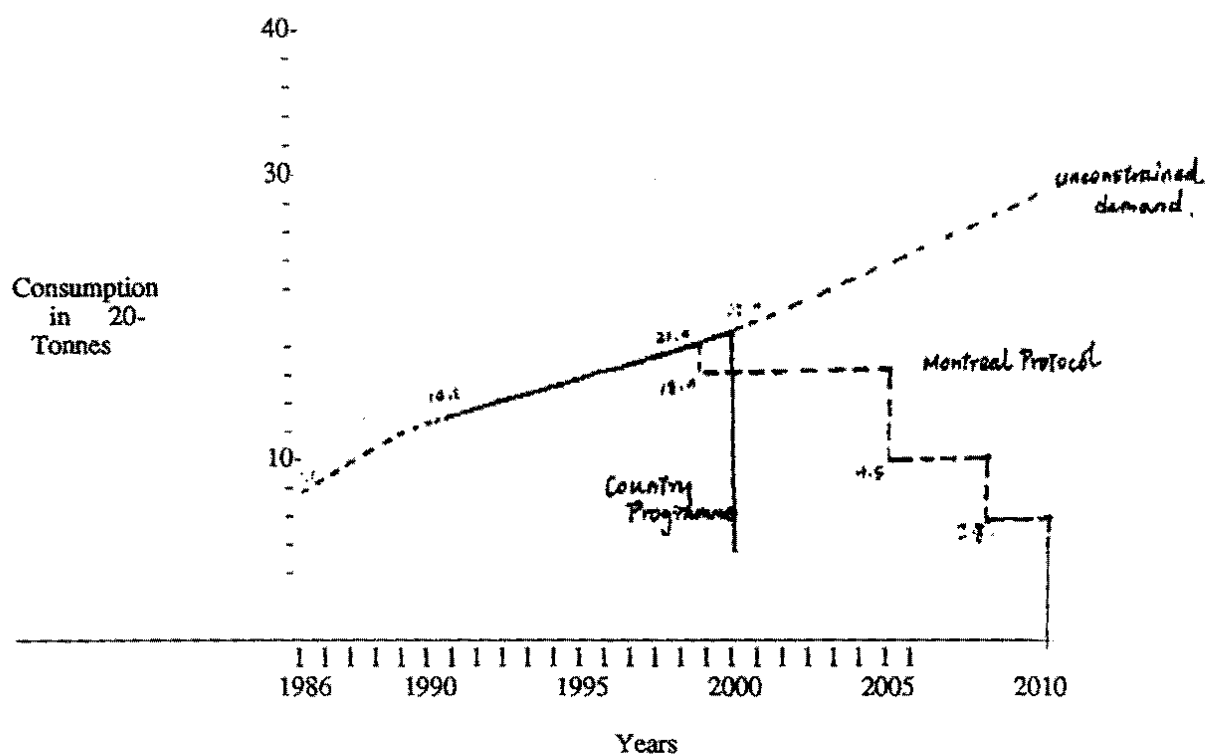
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Through the implementation of the Country Programme the Government of Uganda will phase out the consumption of all the controlled substances by the year 2000. The steps for reduction up to complete phase out of consumption for each group of substances are presented graphically in Figure 3.1 below.

Figure 3.1 Graph showing the expected consumption of the controlled substances following the Government strategy for the phase-out as compared with the phase-out in accordance with the requirements of the Montreal Protocol for Article 5 countries



The actions to be taken by the Government will include development and adoption of appropriate policies and legislation to control the consumption of controlled substances; preparation, coordination and organization of phase-out projects under the Country Programme; ensuring the necessary dissemination and exchange of information both nationally and internationally; provision of necessary assistance to the industries and the public to successfully and smoothly phase-out the controlled substances. These actions constitute the project for institutional strengthening.

In Uganda, the consumption of the controlled substances is currently very small. The total consumption of the controlled substances in 1993 was about 16 Tonnes. However, the consumption of the controlled substances will certainly increase as the economy of the country improves and if the controlled substances continues to be available without constraints. The Government believes that raising public awareness and sensitizing industries would be the key to enabling the early phase out of controlled substances in the country. Early change to ozone friendly substitutes and related technology is of paramount importance as controlled substances are expected to rapidly become scarce and unavailable. Through effective public awareness raising and sensitization of industries, unwanted disruptions of the economy and lives of people could be minimized.

Financial and technical assistance of the Multilateral Fund, its Secretariat and the Implementing Agencies is fundamental for Uganda in order for Uganda to be able to implement the Country Programme, especially in light of the difficult economic situation that the country is faced with at present. Institutional strengthening project would form the basis for the effective and timely phase out of controlled substances.

The Government requests that UNEP be the Implementing Agency for the implementation of this Country Programme.

3.2 Action Plan.

The Action Plan for the Phase-out of controlled substances consists of two parts:-

- (i) Government Actions Comprising of one project; and
- (ii) Industry Actions Comprising of three phase-out projects

3.2.1 Government Actions

Institutional Strengthening Project

Project Description.

Please refer to annex A

3.2.2 Industry Actions

The Industry Actions will consist of three projects - two for the refrigeration and air-conditioning sector and one for the halon fire extinguisher.

SECTOR: REFRIGERATION AND AIR-CONDITIONING

Project R1: Recovery and recycling of refrigerants

Uganda has several small-scale refrigeration and air-conditioning equipment maintenance workshops (larger ones repairing 1000-2000 units a year and smaller ones repairing less than 100 units a year). The workshops are interested in recycling the refrigerants but many cannot afford to acquire a recovery and recycling machine.

A feasibility study will be conducted early 1995 to develop a project for recovery and recycling of refrigerants.

Phase I: Feasibility study

An international expert in the field of recovery and recycling of refrigerants will be contracted to conduct a feasibility study together with a local consultant and the ODS Unit to determine the best means to recover and recycle refrigerants in Uganda. The study could also determine whether or not a business for manufacturing recycling equipment could be established in Uganda. The feasibility study will include development of a project proposal for recovery and recycling of refrigerants. The project will be submitted to the Fund Secretariat/ Executive Committee for consideration for funding during 1995.

The international expert will be also requested to advise on how to improve the existing refrigeration and air-conditioning courses in Uganda.

Budget for the feasibility study :

International expert : fee : US \$ 7,000
travel : US \$ 10,000

Local experts (2) : fee : US \$ 4,000

Phase II: Project Implementation

The project implementation should begin in 1995.

Project R2: Feasibility/pre-investment study for retrofitting existing industrial and commercial refrigeration systems

By end 1995, an international expert on industrial and commercial refrigeration systems will be contracted to conduct a feasibility study together with a local consultant and ODS Unit to assess the possibilities of retrofitting the industrial and commercial refrigeration systems in the country. The feasibility/pre-investment study will identify suitable substitute refrigerants for the equipment that can be retrofitted to use the substitutes.

The feasibility study will lead to developing projects for retrofitting existing industrial and commercial refrigeration systems to use substitute refrigerants. The project will be incorporated into the Country Programme update.

A detailed feasibility study budget would be submitted to the Executive Committee during 1994.

SECTOR: HALONS

Project H1 Management of banked halons and alternatives for halon fire extinguisher

In early 1995, an international expert on halon fire extinguisher will be contracted to work together with a local expert and the ODS Unit on a study on the halon fire extinguisher systems in Uganda. The objective of the study will be to develop a strategy for management of banked halons in the country and to propose best alternatives for the various halon fire extinguisher systems existing in the country.

Any project that may emerge from the study will be submitted to the Fund Secretariat/Executive Committee for consideration for funding during 1995.

Budget for feasibility study :

International expert : fee : US \$ 7,000
travel : US \$ 10,000

Local experts (2) : fee : US \$ 4,000

3.2.3 Future Developments in the Action Plan

In the future, projects to deal with existing domestic refrigeration equipment will be considered. Under the Country Programme update, a feasibility study will be included for deciding on the best option to deal with the existing domestic refrigeration equipment.

Retrofit technology for domestic refrigeration equipment to use substitute refrigerants is currently not technically feasible. However, such technology may emerge in the future. Due to the fact that the energy efficiency of the current CFC-using equipment is up to four times greater than the older models, retrofitting refrigerators manufactured prior to 1990 may not be economical.

The two foreseeable options of domestic refrigeration project are briefly described below:

(a) *Replacing old domestic refrigerators and freezers*

If technology for retrofitting domestic refrigerators are not sufficiently developed in the world for introduction into Uganda by 1997, the domestic refrigerators and freezers that need compressor replacement from 1997 onwards will be scrapped.

A project may be developed to request coverage of the incremental cost to the consumers of forced replacement of refrigeration equipment.

Some means of disposal of the scrapped refrigerators may also be included in the project. A part of the cost for this may also be requested from the Multilateral Fund.

(b) *Retrofitting domestic refrigerators and freezers*

If the technology for retrofitting CFC-using refrigerators and freezers are developed in the world for introduction into Uganda by 1997, the domestic refrigerators and the freezers will be retrofitted. The necessary training activities will then be included in the Country Programme update.

A project may be developed to request coverage of the incremental costs for retrofitting the refrigerators.

3.3 Timetable for the Implementation of the Action Plan

The planned time schedule for the activities under the Action Plan is shown in Table 3.2.

3.4 Summary and Budget for the Action Plan

3.4.1 Implications of the Action Plan on the Consumption of Controlled Substances

The projects and elements under the Action Plan are summarized under Table 3.2. Under this Country Programme the only project that may have a direct effect on the consumption of controlled substances is the project for Recovery and Recycling of Refrigerants. However, the actual reduction in consumption would depend on the project to be implemented as a result of the feasibility study.

The implementation of this Country Programme is essential in enabling early change to ozone friendly substitutes, products and technology. The indirect impact of the projects, especially the Institutional Strengthening Project, is crucial in preventing rapid increase in demand for the controlled substances and averting from the difficulties arising from possible unavailability of controlled substances in the international market in the near future.

The expected total cumulative consumption of the controlled substances under the Country Programme (until complete phase-out) is 117 Tonnes. The expected cumulative consumption under the Montreal Protocol phase-out schedule and unconstrained demand are compared below:

Cumulative consumption (Tonnes)

Country Programme (1994-1999, inclusive):	117 Tonnes
Montreal Protocol (1994-2009, inclusive):	236 Tonnes
Unconstrained demand (1994-2009, inclusive):	406 Tonnes

3.4.2 Budget for the Action Plan

The budget for the Action Plan is shown in the table 3.1. below.

The budget for the Industry Actions consists of costs for international and local consultants that are required for conducting feasibility/pre-investment studies that will result in development of phase-out projects. Projects proposals will be submitted separately after feasibility/pre-investment studies have been conducted.

It is requested that the Executive Committee approves the budget for the Government and Industry Actions as shown in the table 3.1.

Table 3.1.

Projects	1995	1996	1997
Government			
I.S.	27,160	18,205	18,700
Industry Actions			
1. project R1	21,000		
2. Project R2	-		
2. Project H1	21,000		
Total	59,160	18,205	18,700

The Ministry of Natural Resources will annually submit an account of the expenditures to the Implementing Agency (UNEP). Any surplus would be accounted for in the Country Programme update and shortage would have to be re-requested from the Multilateral Fund.

Table 3.2. Planned time schedule for the implementation of the Action Plan

ACTIVITIES	1995	1996	1997
GOVERNMENT ACTIONS			
<u>Project G1:</u>			
- Establishment of the National Steering Committee	JANUARY		
(a) National Policy	JANUARY -Begin preparation JUNE -Adoption	Implementation	Implementation
(b) Legislation	JANUARY -Begin preparation		
- Establishment of ODS Unit	JANUARY		
(a) Public awareness	Plan	Implementation	Implementation
(b) Information exchange	Plan	Implementation	Implementation
(c) ODS monitoring	JANUARY -Plan	JANUARY - request 1995 data	JANUARY - request 1996 data
Industry reporting			
Customs coding system	JANUARY -Preparation JUNE -Training of Customs Officer	JANUARY -Use of amended coding system	
- Establishment of a Refrigeration Association	JANUARY		
INDUSTRY ACTIONS			
<u>Project R1:</u>			
- Feasibility study	JANUARY MAY/JUNE -project proposal submission		
- Project implementation			
<u>Project R2:</u>			
- Feasibility study	NOVEMBER		
<u>Project H1:</u>	During 1995		
- Study to develop strategy	JANUARY		
- Project implementation	JUNE		

Table 3.3

Summary of the projects and elements under the Action Plan

Projects and elements	Brief Description	Commencement/ Duration	Use sector
GOVERNMENT ACTIONS			
<u>Project G1</u>	<u>Institutional Strengthening</u>		All
1. National Steering Committee for the Protection of the Ozone Layer	Establishment of a National Steering Committee to decide on national policies and laws/regulations for ozone layer protection. Also to approve projects.	January 1995	All
2. ODS Unit	Establishment of ODS Unit under the Dept. of Env.Prot. to coordinate ODS activities including organization of public awareness, info. exchange and training activities and ODS monitoring.	January 1995	All
3. Refrigeration Association	Establishment of a National Refrig. Association to assist in smooth phase-out of ODSs in the refrig. and a/c sector.	January 1995	Refrig.
INDUSTRY ACTIONS	<u>Recovery and recycling of refrigerants</u>		Refrig.
1. <u>Project R1</u>	Feasibility study		
Phase I	Project implementation	January 1995	
Phase II	<u>Retrofitting existing indust./com. refrigeration systems</u>	November 1995	Refrig.
2. <u>Project R2</u>	Feasibility/ pre-investment study		
Phase I	Project implementation	During 1995	
Phase II	<u>Management of banked halons and alternatives for halon fire extinguisher</u>	End 1995	Halons
3. <u>Project H1</u>	Development of a proposal for management of banked halons and project for substituting existing halon fire exting. systems.	During 1995	

ANNEX I

INDUSTRIES/COMPANIES THAT WERE SURVEYED

REFRIGERATION AND AIR-CONDITIONING SECTOR

1. Uganda Hotels Ltd
Crested Crane Hotel,
P.o Box 444, JINJA.
Tel: 043-21513/4/5
Contact Person: Mr. P. Bamugaya - Manager.
2. Kakira Sugar Works
JINJA
Tel: 043-20286 or 20153
Contact Person: Mr. Peter Baulay General Manager.
3. Libyan Arab Uganda Bank,
P.o Box 7292, KAMPALA.
Tel: 041-232295
Contact Person: Mr. J.E. Otim - Manager, Personnel and Administration.
4. Katatumba Properties Ltd.
P.O. Box 6968, KAMPALA.
Tel: 041-255288, 254240
Contact person: Ms Angel Rwanjagarara - Manager.
5. Department of Meteorology,
P.o Box 499, SOROTI.
Tel: 284-335
Contact Person: Mr. D.Y. Okoth, Senior Meteorological Officer.
6. Uganda Hotels Ltd,
Soroti Hotel
P.o Box 397, SOROTI
Tel: 269
Contact Person: Mr. Atocon Otim William - Accountant.
7. Uganda Grain Milling Company Bread Ltd,
P.o Box 895, JINJA.
Tel: 043-20171,
Contact Person: Bakery Manager.
8. Fred Masaba and Sons,
P.O Box 345, MBALE.
Tel: 3347,3447
Contact Person:
9. Sheraton Kampala Hotel,
P.O Box 7041, KAMPALA.
Tel: 41-244590
Contact Person: Mr. Geoffrey Luh - Chief Engineer
10. Bank of Uganda,
P.O Box 7120, KAMPALA.
Tel: 41- 258090/9, 258060/9, 258441/5
Contact Person: Engineer Moses Munghono Deputy Director(Estates)
11. Gomba Fishing Industries Ltd.,
P.O Box 633, JINJA.
Tel: 21352, 21029
Contact person: Mr. Yusuf Karmali - Managing Director

12. Lake Victoria Hotel
P.O Box 15, ENTEBBE.
Tel: 042- 20644/5, 20153
Contact Person: Mr. A. Mambo - Hotel Engineer
13. Akwata Mpola Refrigeration,
P.O Box 744, KAMPALA.
Tel:
Contact Person: Mr. Lowarance Tulinye
14. Katwe Sound Centre
P.O. Box 4156, KAMPALA.
Tel:
Contact Person:
15. Mr. George Nakhokho,
P.O. Box 2393, MBALE.
Tel: 3718
Contact Person - Mr. George Nakhokho - Owner
16. Dairy Corporation
P.O. Box 557, MBALE.
Tel: 2183.
Contact Person: Mr. Moses Okiror - Maintenance Technician.
17. Ministry of Lands and Housing
P.O. Box 890, MBALE.
Tel: 3216/7
Contact Person: Mr. Laurence Ojara-Mogi - Refrig. and A/C Technician
18. Habuga General Supplier,
P.O. Box 54, KASESE.
Tel:
Contact Person: Mr. Hassan Nsubuga.
19. Ministry of Animal Industries and Fisheries
Fisheries Department, Gulu.
Tel: 32.
Contact Person: Mr. Mark Ocen - Mechanical Technician
20. Nyanza Textiles Industries Ltd (NYTIL),
Jinja.
Tel:
Contact Person:
21. Rwenzori Electrical Services,
P.O. Box 34, KILEMBE
Tel:
Contact Person: Mr. Mukasa Kibuka
22. Kilembe Mines Ltd.
KILEMBE
23. Uganda Fisheries Enterprises Ltd.
P.O. Box 1981, JINJA.
Tel: 20538.
Contact Person: Mr. Bidasala - Igaga - Production Engineer.
24. Uganda Fisheries Enterprises Ltd,
P.O.Box 87, MBALE.
Tel: 045 - 3308
Contact Person: Mr. Pidson G. Burengyero - Fish Technologist.

25. Uganda Fish Packers Ltd,
P.O. Box 7409, KAMPALA.
Tel: 041 - 285373
Contact Person: Mr. Riyaz Kurji - Managing Director
26. Musicraft Manufacturing (U) Ltd,
P.O. Box 197, KAMPALA.
Tel: 041 - 258301/4
Contact Person: Mr. S. A. Khan - Technical Manager
27. C.R. Properties Ltd,
P.O. Box 6446, KAMPALA.
Tel:
Contact Person: Mr. Caanaan S.K. Mukasa - Director
28. Century Bottling Company Ltd,
P.O. Box 3990, KAMPALA.
Tel: 041 - 285680, 220372
Contact Person: Mr. Mugweri-Refrigeration Technician.
29. Kampala Bottlers Ltd,
P.O. Box 8537, KAMPALA
Tel: 041 - 230386, 235141
30. Kakooze Electronics and Refrigeration
P.O. Box 15038, KAMPALA.
Tel:
Contact Person: Mr. Nswemu James Kibuuka.
31. Uganda Oxygen Ltd, KAMPALA
32. Jubilee Investment Company (U) Ltd,
P.O. Box 10234, KAMPALA
Tel: 243743, 236029, 244949
Contact Person: Mr. Zebiiha Abbas - Assistant Property Manager
33. Crown Bottlers Ltd,
P.O. Box 20021, KAMPALA
Tel. 041 - 220382
Contact Person: Mr. Patrick Kyoyetera - Bottling Manager.
34. Uganda Breweries Ltd,
P.O. Box 7130, KAMPALA.
Tel: 041 - 220224/5
Contact Person: Mr. Vincent Ochwo - Services Engineer
35. Ngege Ltd,
P.O. Box 20028, KAMPALA
Tel: 041 - 220793, 220761, 220413
Contact Person: Mr. Paaddy Blick - Project Manager.
36. Uganda Posts and Telecommunications Corporation,
P.O. Box 7171, KAMPALA.
Tel: 041 - 246366
Contact Person: Mr. Barnabas Byaruhanga - Senior Executive Engineer (Power and A/C).

37. Kilembe Mines Ltd,
P.O. Box 1, KILEMBE
Tel:
Contact Person: Mr. Y. Ngarama

38. Dairy Corporation,
P.O. Box 7078, KAMPALA.
Tel: 041 - 258751.
Contact Person: Mr. J.W.E. Okwalinga - Acting Maintenance Engineer.

39. Equatoria Hotel
KAMPALA
Tel: 250780 - 9
Contact Person: Eng. Shakeel Tahir L.M.E

40. Star Importers Enterprize Ltd.
KAMPALA
Contact Person: Mr. Nasir Jaffer - Refrigeration technician

41. Kitasiimbwa Refrigeration and General Repairs
P.O. Box 8870, KAMPALA
Tel: 255819
Contact Person: M.D. Elias Musoke

42. Wilson Quick Service Garage
P.O. Box 8789, KAMPALA
Tel: 244529
Contact Person: Mr. James Kigundu - Engineer; Mr. Aruna Kirui - owner

43. Simplex Electric Co.
(Just behind Electrowatt)
Contact Person: Mr. Paul Kasangaki - Workshop Manager

44. M. K. Electrowatt Ltd.
KAMPALA
Tel: 250289
Contact Person: Mr. Francis Kaima - Technician; Mr. M. Katongole - Director

FOAMS SECTOR

45. Crest Foam Ltd,
P.o Box 6475, KAMPALA.
Tel:
Contact Persons: Mr. S.Byarugaba - Factory Manager; Mr. Ndaula - Chief Chemist.

46. African Textile Mill Ltd,
P.o Box 242, MBALE.
Tel:
Contact Person: Mr. Frank Ariyo - Mechanic Engeneer.

47. NECFOAM Products Ltd.
P.o Box 11031, KAMPALA
Tel: 041-220113
Contact Person: Mr. Vicent Iwany - Production Manager.

48. VITAFOAM (Uganda) Ltd,
P.o Box 846, JINJA
Tel:
Contact person: Mr. Justine Okeny - Managing Director.

49. K.M.K. Industries,
P.o Box 10218, KAMPALA
Tel:
Contact Person: Mr A.B.Gupta - Manager
50. RECO - Kasese
P.o Box 257, KAMPALA.
Tel: 041-232183
Contact Person: Mr. Rwabogo - Managing Director.

SOLVENTS SECTOR

51. Uganda Leather and Tanning Industry Ltd.
P.o Box 388, JINJA
Tel: 043-22045/6/7
Contact Person: Mrs Mary Gumisiriza - Manager; Mr. Seddu Matovu - Sales/Quality Officer.
52. Universal Dry Cleaners Ltd.
P.o Box 2580, KAMPALA.
Tel: 041-255390, 243660
Contact Person:
53. Uganda Garments Industries Ltd.
P.o Box 4378, KAMPALA
Tel: 041-241656
Contact Person: Mr. Julius Ojok - Processing Manager.
54. Oscar Industries Ltd.
P.o Box 1229, KAMPALA.
Tel: 041-244481
Contact Person: Mr. M.K. Ssebatindira - Director.
55. TOTAL (Uganda) Ltd,
P.o Box 3079, KAMPALA.
Tel: 041-231331/2/3
Contact Person: Mr. Andrew Tadhuba - Operations Engineer.
56. Medipharm Industries (East Africa) Ltd.
P.o Box 6218, KAMPALA.
Tel:
Contact Persons: Mr. Roger S.Collings - Manager; Mr. Peter Ssali Mukasa - Plant Manager
57. Coffee Marketing Board Ltd,
Tel: 041-233687/9
Contact Person:
58. TOTAL (Uganda) Ltd,
Tel: 041-231331/2/3
Contact Person: OPS Engineer.
59. Shell Chemicals
Tel:
60. Spear Motors Ltd,
P.o Box 1350, KAMPALA
Tel: 041-233743
Contact Person: Mr. E. Harris - Workshop Manager.
61. Sadolin Paints (Uganda) Ltd.
P.O. Box 4627, KAMPALA.
Tel: 041-233448
Contact Person: Nugent - General Manager.

- 62. Fire Marshalls Ltd,
P.o Box 2198, KAMPALA
Tel: 041-232169
Contact Person: Mr. Peter Johnson - Managing Director.
- 63. B.M.K. Industries
P.o Box 10218, KAMPALA
Tel: 041-230703
Contact Person: Mr. A.B. Gupta - Manager.
- 64. Midland Supermarket
P.o Box 10218, KAMPALA.
Tel:
Contact Persons: Mr. David S. Omagor - Manager; Mr. Abubaker Mubiru - Purchasing Manager.
- 65. TOTAL (Uganda) Ltd,
P.o Box 3079, KAMPALA.
Tel: 041-231331/2/3
Fax: 041-231338
Contact Person: Mr. Andrew Tadhuma - Operations Engineer.
- 66. Sabah Enterprises,
Tel: 041-236388
Contact Person: Miss Nalukwago.

HALONS SECTOR

- 67. Fire Marshalls Ltd.,
P.O Box 2198, KAMPALA.
Tel: 041- 232169
Contact Person: Mr. Bonney Johnson.
- 68. Technofire Appliances,
Plot 56/58 Kampala Road,
P.O Box 1592, KAMPALA.
Tel: 041- 234539
Fax: 041- 245208
Contact Persons: Mr. Bennet G. Sserunkuma; Mr. George Ssali.
- 69. Kalenge Fire Armour,
P.O Box 389, JINJA or P.O Box 6442, KAMPALA.
Tel: 041- 236885, 251636
Contact Person: Mr. Sam Mubiru - General Manager.
- 70. National Housing and Construction Corporation,
KAMPALA.
Tel: 041- 257462
Fax: 041- 258708
Contact Persons: Mr. M.S. Kasekende - General Manager; Mr. Fred Julius Mukasa
- 71. Booth Fire Services Ltd.,
P.O Box 30509, KAMPALA.
- 72. M.B. Fire Equipment,
Plot 19A Nasser Road,
P.O Box 31306, KAMPALA.
- 73. Technical Services and General Agencies,
Plot 4-6 Kampala Road,
P.O Box 4010, KAMPALA.
- 74. Ms.Kalenge Developments, JINJA.

- 75. Mukate Fire Service,
P.O Box 15163, KAMPALA.
- 76. E.B.M. Fire Fighting,
P.O Box 1534, KAMPALA.
- 77. Fire Merchant Ltd.,
Plot 73 Jinja Road,
KAMPALA.
- 78. Mukubira and Companies,
P.O box 304, KAMPALA.
Tel: 041- 241046
Contact Persons: Mr. D. Ronnie; Mr. D. Sessanga
- 79. Kakira Sugar Works (1985) Ltd.,
P.o Box 3001, KAKIRA.
Tel: 043- 20253, 21286

ANNEX II

Table A.1 Production, imports, exports and consumption of controlled substances in 1986

Tonnes Substances	Prod.	Imports	Exports	Consump.	ODP	Calcul. Consump.
ANNEX A						
<u>Group I</u>						
CFC 11	0	-	0	-	1.0	-
CFC 12	0	7.1	0	7.1	1.0	7.1
CFC 113	0	0	0	0	0.8	0
CFC 114	0	0	0	0	1.0	0
CFC 115	0	-	0	-	0.6	-
<u>Sub-total</u>	0	7.1	0	7.1		7.1
<u>Group II</u>						
Halon 1211	0	0	0	0	3.0	0
Halon 1301	0	0	0	0	10.0	0
Halon 2402	0	0	0	0	6.0	0
<u>Sub-total</u>	0	0	0	0		0
TOTAL	0	7.1	0	7.1		7.1
ANNEX B						
<u>Group I</u>						
CFC 13	0	0	0	0	1.0	0
CFC 111	0	0	0	0	1.0	0
CFC 112	0	0	0	0	1.0	0
CFC 211	0	0	0	0	1.0	0
CFC 212	0	0	0	0	1.0	0
CFC 213	0	0	0	0	1.0	0
CFC 214	0	0	0	0	1.0	0
CFC 215	0	0	0	0	1.0	0
CFC 216	0	0	0	0	1.0	0
CFC 217	0	0	0	0	1.0	0
<u>Sub-total</u>	0	0	0	0		0
<u>Group II</u>						
Carbon tet	0	0.02	0	0.02	1.1	0.02
<u>Group III</u>						
Methyl chl	0	-	0	-	1.0	-
TOTAL	0	0.02	0	0.02		0.02

Table A.2

Production, imports, exports and consumption of controlled substances in 1989

Tonnes Substances	Prod.	Imports	Exports	Consump.	ODP	Calcul. Consump.
ANNEX A						
<u>Group I</u>						
CFC 11	0	-	0	-	1.0	-
CFC 12	0	13.8	0	13.8	1.0	13.8
CFC 113	0	0	0	0	0.8	0
CFC 114	0	0	0	0	1.0	0
CFC 115	0	-	0	-	0.6	-
<u>Sub-total</u>	0	13.8	0	13.8		13.8
<u>Group II</u>						
Halon 1211	0	0	0	0	3.0	0
Halon 1301	0	0	0	0	10.0	0
Halon 2402	0	0	0	0	6.0	0
<u>Sub-total</u>	0	0	0	0		0
TOTAL	0	13.8	0	13.8		13.8
ANNEX B						
<u>Group I</u>						
CFC 13	0	0	0	0	1.0	0
CFC 111	0	0	0	0	1.0	0
CFC 112	0	0	0	0	1.0	0
CFC 211	0	0	0	0	1.0	0
CFC 212	0	0	0	0	1.0	0
CFC 213	0	0	0	0	1.0	0
CFC 214	0	0	0	0	1.0	0
CFC 215	0	0	0	0	1.0	0
CFC 216	0	0	0	0	1.0	0
CFC 217	0	0	0	0	1.0	0
<u>Sub-total</u>	0	0	0	0		0
<u>Group II</u>						
Carbon tet	0	0.2	0	0.2	1.1	0.22
<u>Group III</u>						
Methyl chl	0	-	0	-	1.0	-
TOTAL	0	0.2	0	0.2		0.22

Table A.3

Production, imports, exports and consumption of controlled substances in 1990

Tonnes Substances	Prod.	Imports	Exports	Consump.	ODP	Calcul. Consump.
ANNEX A						
<u>Group I</u>						
CFC 11	0	-	0	-	1.0	-
CFC 12	0	14.1	0	14.1	1.0	14.1
CFC 113	0	0	0	0	0.8	0
CFC 114	0	0	0	0	1.0	0
CFC 115	0	0.4	0	0.4	0.6	0.24
<u>Sub-total</u>	0	14.5	0	14.5		14.34
<u>Group II</u>						
Halon 1211	0	0	0	0	3.0	0
Halon 1301	0	0	0	0	10.0	0
Halon 2402	0	0	0	0	6.0	0
<u>Sub-total</u>	0	0	0	0		0
TOTAL	0	14.5	0	14.5		14.34
ANNEX B						
<u>Group I</u>						
CFC 13	0	0	0	0	1.0	0
CFC 111	0	0	0	0	1.0	0
CFC 112	0	0	0	0	1.0	0
CFC 211	0	0	0	0	1.0	0
CFC 212	0	0	0	0	1.0	0
CFC 213	0	0	0	0	1.0	0
CFC 214	0	0	0	0	1.0	0
CFC 215	0	0	0	0	1.0	0
CFC 216	0	0	0	0	1.0	0
CFC 217	0	0	0	0	1.0	0
<u>Sub-total</u>	0	0	0	0		0
<u>Group II</u>						
Carbon tet	0	0.1	0	0.1	1.1	0.11
<u>Group III</u>						
Methyl chl	0	-	0	-	1.0	-
TOTAL	0	0.1	0	0.1		0.11

Table A.4

Production, imports, exports and consumption of controlled substances in 1991

Tonnes Substances	Prod.	Imports	Exports	Consump.	ODP	Calcul. Consump.
ANNEX A						
<u>Group I</u>						
CFC 11	0	-	0	-	1.0	-
CFC 12	0	14.4	0	14.4	1.0	14.4
CFC 113	0	0	0	0	0.8	0
CFC 114	0	0	0	0	1.0	0
CFC 115	0	0.4	0	0.4	0.6	0.24
<u>Sub-total</u>	0	14.8	0	14.8		14.64
<u>Group II</u>						
Halon 1211	0	0	0	0	3.0	0
Halon 1301	0	0	0	0	10.0	0
Halon 2402	0	0	0	0	6.0	0
<u>Sub-total</u>	0	0	0	0		0
TOTAL	0	14.8	0	14.8		14.64
ANNEX B						
<u>Group I</u>						
CFC 13	0	0	0	0	1.0	0
CFC 111	0	0	0	0	1.0	0
CFC 112	0	0	0	0	1.0	0
CFC 211	0	0	0	0	1.0	0
CFC 212	0	0	0	0	1.0	0
CFC 213	0	0	0	0	1.0	0
CFC 214	0	0	0	0	1.0	0
CFC 215	0	0	0	0	1.0	0
CFC 216	0	0	0	0	1.0	0
CFC 217	0	0	0	0	1.0	0
<u>Sub-total</u>	0	0	0	0		0
<u>Group II</u>						
Carbon tet	0	0.3	0	0.3	1.1	1.33
<u>Group III</u>						
Methyl chl	0	-	0	-	1.0	-
TOTAL	0	0.3	0	0.3		1.33

INSTITUTIONAL STRENGTHENING PROJECT COVER SHEET

COUNTRY	:	UGANDA
PROJECT TITLE	:	INSTITUTIONAL STRENGTHENING FOR THE PHASE-OUT OZONE DEPLETING SUBSTANCES
SECTOR COVERED	:	ALL SECTORS
ODP CONSUMPTION	:	16.3 Tonnes ODP
PROJECT DURATION	:	3 YEARS
PROJECT IMPACT	:	CAPACITY BUILDING FOR UGANDA TO PHASE-OUT ODS PER YEAR AS COUNTRY PROGRAMME.
TOTAL BUDGET (Incremental Cost)	:	US\$ 64,515
IMPLEMENTING AGENCY	:	UNEP
NATIONAL IMPLEMENTING AGENCY	:	DEPARTMENT OF ENVIRONMENT, MINISTRY OF NATURAL RESOURCES

Project Description

The existing institutional framework needs to be strengthened in order to ensure that the Country Programme is implemented effectively. The Institutional Strengthening Project will consist of three elements i.e

1. Establishment of a National Ozone Office (ODS-Unit)
2. Establishment of National Steering Committee
3. Public Awareness and Information Exchange Campaigns

Element 1: Establishment of National Ozone Office (ODS-Unit)

Purpose of the Project:

The ODS Unit will ensure and monitor the implementation of the Country Programme through coordination with Governmental and other bodies as well as with the Implementing Agencies, and the Fund Secretariat in implementing the various projects and elements under the country programme. ODS Unit will also act as the Secretariat to the National Steering Committee for the Protection of the Ozone Layer (see Element 2).

Project Organization and Management.

- The ODS Unit will function under the supervision of the Commissioner for Environment Protection.
- Personnel requirement for the ODS Unit is one professional officer. Incentive for this officer is requested to be covered by the Multilateral Fund. The officers are expected to be recruited by August 1994.
- The necessary equipment for the ODS Unit in order for it to be able to efficiently and effectively carry out its tasks are as follows:
 - (a) A personal computer and a printer (with computer software for word processing, data base and graphics and the necessary equipment to enable connections to the OzonAction database) for information gathering (e.g. through OzonAction Data Base being developed by IE/PAC), production of information pamphlets and newsletters as well as for record keeping and monitoring of relevant industries and the consumption of the controlled substances;
 - (b) A fax machine; and
 - (c) A heavy duty photocopier.
- Other necessary administrative support for the ODS Unit will be provided by the Ministry of Natural Resources.
- The specific functions and responsibilities of the ODS Unit will include:
 - (a) assisting the National Steering Committee for the Protection of the Ozone Layer in formulating the necessary policy and legislation/laws and regulations for the protection of the ozone layer and controlling the ODS consumption;

- (b) monitoring and recording (as database) the consumption and use of the controlled substances, monitoring and evaluating the implementation of the Country Programme, and reporting data and information as necessary to the Ozone Secretariat, Fund Secretariat and the Implementing Agency;
- (c) organizing and coordinating the various information exchange, public awareness and training activities;
- (d) operating as information focal point to help industries, companies and the public on ODS issues;
- (e) preparing phase-out projects for submission to the Fund Secretariat with necessary assistance of the Implementing Agencies, international consultants and local consultants.

ODS Phase out Monitoring

ODS Unit will monitor Uganda's consumption and use of ODSs through industries and the Customs. The ODS Unit will establish a database on the industries dealing with controlled substances and ODS imports to record all the relevant data. The following monitoring arrangements will be implemented:

(a) **Monitoring of industries and their ODS consumption**

Every industry/company dealing with controlled substances will be required to report data on the ODS annually to the ODS Unit. A reporting format will be designed by the ODS Unit.

(b) **Customs data**

The Customs code will be amended so that importation of individual controlled substance will be recorded by the Customs. Customs will report the relevant importation data to the ODS Unit on a half yearly basis.

ODS Unit will recommend ways of modification according to its needs for monitoring. Training of Customs officers may be conducted as part of the training activities under the Institutional Strengthening Project.

Element 2: Establishment of a National Steering Committee for Protection of the Ozone Layer

A National Steering Committee for the Protection of the Ozone Layer will be established under the Ministry of Natural Resources to assist the Ministry in implementing the Vienna Convention, the Montreal Protocol and the Country Programme. The Committee will assist the Ministry in formulating policies and legislation for recommendation to the Cabinet. The Committee will approve the project proposals prepared by the ODS Unit before submission to the Fund Secretariat.

(a) Government Policies for the Protection of the Ozone Layer

An overall policy strategy, 'Government Policies for the Protection of the Ozone Layer' will be developed for adoption by the Government.

(b) Legislation

Formulation of a new legislation for ozone layer protection and/or amendments to appropriate existing laws and regulations will be considered.

Element 3: Public awareness raising

- TV, radio and newspaper announcements/advertisements on Ozone Science and Implementation Phase-out.

Information exchange

- ODS Unit will establish a link to the UNEP IE/PAC's OzonAction Database which contains up-to-date information on substitutes, new technologies, new products, contacts to producer industries, and other activities in the field of protection of the ozone layer. The ODS Unit will gather information through the Database as well as other sources such as through direct contacts with manufacturing industries abroad.
- The ODS Unit will function as information service office for the industries and the public. The TV, radio and newspaper announcements will include an introduction of the ODS Unit and its information service role.
- Disseminate information to the industries and public through issuing of newsletters and pamphlets on the substitutes and new products:

Technical assistance and training

Training Programmes, through separate funding will be undertaken in the field of refrigeration and air-conditioning, customs-control and project preparation.

BUDGET FOR THE INSTITUTIONAL STRENGTHENING PROJECT (in US \$):

Assistance of the Implementing Agency is requested in contracting appropriate international experts as consultants for the feasibility/pre-investment studies. It is also requested that the Implementing Agency (UNEP) administers the Budget lines for international consultants and engage them (with the concurrence of the Government) under UNEP contracts. This would facilitate the administrative process for the international consultants and maximize the value of the US dollars.

Budget for the Government (local component):

	1995	1996	1997	Total
Personnel cost				
1 officer	3,000	3,150	3,300	9,450
1 focal point (Ref.Assoc.)	2,000	2,100	2,200	6,300
Consultants-Local (6 m/m)	2,100	2,200	2,300	6,600
sub-total				
Equipment	9,000	-	-	9,000
Travel-Local	2,000	2,100	2,200	6,300
Public awareness, information exchange, etc.	5,000	5,000	5,000	15,000
Meetings of the Steering Committee	1,000	1,000	1,000	3,000
Miscellaneous (stationary, commun., equipmt. maintenance, etc.)	1,000	1,000	1,000	3,000
SUB-TOTAL	25,100	16,550	17,000	58,650
contingency (10%)	2,510	1,655	1,700	5,865
GRAND TOTAL	27,610	18,205	18,700	64,515

RECOVERY AND RECYCLING OF REFRIGERANTS

COVER SHEET

COUNTRY	:	UGANDA
PROJECT TITLE	:	RECOVERY AND RECYCLING OF REFRIGERANTS
SECTOR COVERED	:	REFRIGERATION AND AIR CONDITIONING
ODP CONSUMPTION	:	16.3 Tonnes ODP
PROJECT DURATION	:	6 MONTHS
PROJECT IMPACT	:	RECOVERY AND RECYCLING OF CFC12
TOTAL BUDGET (Incremental Cost)	:	US\$ 21,000
IMPLEMENTING AGENCY	:	UNEP
NATIONAL IMPLEMENTING	:	DEPARTMENT OF ENVIRONMENT, AGENCY MINISTRY OF NATURAL RESOURCES

Uganda has several small-scale refrigeration and air-conditioning equipment maintenance workshops (larger ones repairing 1000-2000 units a year and smaller ones repairing less than 100 units a year). The workshops are interested in recycling the refrigerants but many cannot afford to acquire a recovery and recycling machine.

A feasibility study will be conducted **early 1995** to develop a project for recovery and recycling of refrigerants.

Phase I: Feasibility study

An international expert in the field of recovery and recycling of refrigerants will be contracted to conduct a feasibility study together with a local consultant and the ODS Unit to determine the best means to recover and recycle refrigerants in Uganda. The study could also determine whether or not a business for manufacturing recycling equipment could be established in Uganda. The feasibility study will include development of a project proposal for recovery and recycling of refrigerants. The project will be submitted to the Fund Secretariat/ Executive Committee for consideration for funding during 1995.

The international expert will be also requested to advise on how to improve the existing refrigeration and air-conditioning courses in Uganda.

(Budget for the international and local experts is included under the Institutional Strengthening Project.)

Phase II: Project Implementation

The project implementation should begin in 1996

COUNTRY PROGRAMME COVER SHEET

Country : Uganda

Lead National Agency : Ozone Office

Participating Implementing Agencies : UNEP

1. Phase-out schedule

substance	Current consumption (1991) (ton x ODP)	Planned cumulative consumption until phase-out (ton x ODP)		Planned year of phase-out
		Article 5 schedule	Accelerated schedule	
CFC 12	14.4	476.3	181.2	2000
CFC 115	0.2	6.8	2.3	2000
Halon 1211	0	1392	597	2000
Halon 1301	0	8220	3510	2000
Total	14.6	1095.1	4290.5	

2. Government actions plan :

Projects and elements	Brief Description	Commencement/ Duration	Use sector
GOVERNMENT ACTIONS			
<u>Project G1</u>	<u>Institutional Strengthening</u>		All
1. National Steering Committee for the Protection of the Ozone Layer	Establishment of a National Steering Committee to decide on national policies and laws/ regulations for ozone layer protection. Also to approve projects.	January 1995	All
2. ODS Unit	Establishment of ODS Unit under the Dept. of Env.Prot. to coordinate ODS activities including organization of public awareness, info. exchange and training activities and ODS monitoring.	January 1995	All
3. Refrigeration Association	Establishment of a National Refrig. Association to assist in smooth phase-out of ODSs in the refrig. and a/c sector.	January 1995	Refrig.
INDUSTRY ACTIONS			
1. <u>Project R1</u>	<u>Recovery and recycling of refrigerants</u>		Refrig.
Phase I	Feasibility study	January 1995	
Phase II	Project implementation	November 1995	
2. <u>Project R2</u>	<u>Retrofitting existing indust./ com. refrigeration systems</u>		Refrig.
Phase I	Feasibility/ pre-investment study	During 1995	
Phase II	Project implementation	End 1995	
3. <u>Project H1</u>	<u>Management of banked halons and alternatives for halon fire extinguisher</u>		Halons
	Development of a proposal for management of banked halons and project for substituting existing halon fire exting. systems.	During 1995	

3. Project Summary Table

Project no.	Title	Intended Effect	Sector	Estimated Cost (US \$)			
				1995	1996	1997	Total
1.	Institutional Strengthening/Ozone Office	Co-ordination, control, technical support, monitor	All	27,610	18,205	18,700	64,515
2.	Project R1	Feasibility study	Refrigeration and air-conditioning	21,000			21,000
3.	Project H1	Feasibility study	Halons	21,000			21,000
Total Cost				69,610	18,205	18,700	106,515

U G A N D A
C O U N T R Y P R O G R A M M E

**FOR THE PHASE-OUT OF OZONE DEPLETING SUBSTANCES
CONTROLLED UNDER THE MONTREAL PROTOCOL**

June 1994

Department of Environment Protection
Ministry of Natural Resources
Government of the Republic of Uganda

United Nations Environment Programme
(Industry and Environment Programme Activity Centre)

MEMBERS OF THE NATIONAL COUNTRY PROGRAMME TEAM

Chairman:

Mr. T. O. Acere,
Commissioner for Environment Protection
Department of Environment Protection
Ministry of Natural Resources

Members:

1. Mr. R. Thomiko
Department of Environment Protection
Ministry of Natural Resources
2. Mr. Otim B. Hobich
Kampala Ice Plant
3. Mr. S. Kyabire
Fisheries Department, Mbale
4. Mr. Achandere Owori
Uganda National Bureau of Standards
5. Mr. T. O. Okurut
Chemistry Department
Makerere University
6. Mr. M. S. Z. Nkalubo
Department of Meteorology
7. Mr. A. W. Majugu
Department of Meteorology
8. Mr. F. W. Kiwazi
Department of Environment Protection
Ministry of Natural Resources
9. Mr. P. I. Kamanda
Department of Environment Protection
Ministry of Natural Resources
10. Mr. J. Okot-Okumu
Department of Environment Protection
Ministry of Natural Resources
11. Mr. E. Werabe
Department of Environment Protection
Ministry of Natural Resources
12. Mr. K. Mugambe
Ministry of Finance and Economic Planning
13. Mr. J. Tumwebaze
Ministry of Finance and Economic Planning

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EXECUTIVE SUMMARY

1. Introduction

This country programme reflects the commitment of the Government of Uganda to comply with the obligations of the Montreal Protocol on Substances that Deplete the Ozone Layer, to which Uganda is a Party. It provides the framework for activities to be undertaken by Uganda to achieve the required phase out of controlled substances and forms the basis for requesting assistance from the Multilateral fund for those activities.

The Country Programme was prepared between the period February 1992-June 1994 and it should be updated during 1996. The updated Country Programme should be implemented from 1997.

The country Programme contains the following:

- (a) The detailed figures are available for the year 1986, 1989, 1990 and 1991. Estimated figures for 1992 and 1993 are also included where possible.
- (b) Analyses of possible future demands for the controlled substances (unconstrained demand) and an indication of the total incremental cost for the phase out of the controlled substances.
- (c) Information on the existing institutional and policy framework that are relevant to the use of controlled substances and the implementation of the Montreal Protocol.
- (d) Government strategy statement with regard to the implementation of the Montreal Protocol and the phase-out of controlled substances.
- (e) Action Plan of Uganda to phase out the consumption and use of controlled substances, based on the 1991 status of consumption and use of those substances. The Action Plan covers the period from 1995 to 1997 and it consists of projects categorized under Government Actions and Industry Actions. Budget estimates are included for the projects for which assistance is requested from the Multilateral fund. The timetable for the implementation of the Action Plan clearly reflects the prioritization of the programme and projects. The necessary institutional strengthening and improvements in the record keeping and reporting by the industries for future monitoring purposes are included in the Action Plan.

The Country Programme was prepared under the responsibility of the Ministry of Natural Resources with technical assistance of industry and Environment Programme Activity Centre (IE/PAC) of the United Nations Environment Programme (UNEP) and financial support from the Multilateral fund through UNEP IE/PAC. A National Country programme Team was established for the purpose of assisting and advising the Ministry of Natural Resources in preparing the Country Programme.

2. Consumption and use of controlled substances

Uganda is small consumer of controlled substances. it does not produce or export any controlled substance, but import CFC12, CFC 115 (in the mixture R-502) and insignificant quantities of CFC-11. These are used for servicing various refrigeration systems. Small quantities of carbon tetrachloride were found in the imported as laboratory solvent. Only negligible amount of halons were found to be imported as bulk chemicals for refilling halon fire extinguisher. No other controlled substance were found to be imported as bulk chemicals.

(a) The survey

The consumption of the controlled substances and related equipment were determined through a survey of the Customs data on imports and individual industries importing/using the controlled substances. The survey was undertaken by the National Country Programme Team.

The main difficulties encountered during the survey include the following (i) There is one general customs code for registering the controlled substances imported. it is also likely that the controlled substances are registered under codes for spare parts for refrigerators. (ii) Identifying the ODS importing/using industries was difficult due to lack of sufficient information on the existing industries. (iii) Most of the small scale companies do not keep accurate historical data on the importation and use of the controlled substances. (iv) Unlike in many other countries, there are no major importers who distribute the ODSs to users, but here are several small-scale importers of ODSs. (v) There is substantial amount of controlled substances entering the country without official recording. (vi) Some industries were reluctant to report data while others are likely to have not been able to report accurate data due to lack of knowledge and awareness.

(b) Past situation

Consumption of controlled substances as bulk chemicals:

The total consumption, calculated consumption and calculated per capita consumption for the years 1986, 1989, 1990 and 1991 of the controlled substances (Only substances listed under annex a of the Montreal protocol) were as follows:

Year	Consumption (Tonnes)	Calculated Consumption (Tonnes ODP)	Calculated Per capita consumption (kg)
1986	7.1	7.1	0.0005
1989	13.8	13.8	0.001
1990	14.5	14.3	0.001
1991	14.8	14.6	0.001
1992(est.)	15.5	15.5	0.001
1993(est.)	16.3	16.3	0.001

The above consumption of the controlled substances is only CFC-12 for the years 1986 and 1989. The consumption in 1990 and 1991 include 0.4 Tonnes of CFC-115. All the controlled substances imported are use for servicing refrigeration systems and air conditioners (mainly automotive).

The consumption (import) of carbon tetrachloride (Annex 8 of the Protocol) in 1986, 1989, 1990 and 1991 were 0.02, 0.2, 0.1 and 0.3 tonnes, respectively

Products Containing Controlled Substances:

Uganda does not manufacture or export products that contain or made with controlled substances.

Refrigeration and air conditioning equipment: It is estimated that there are approximately 200,000 units of domestic refrigeration equipment that were in operation in Uganda in 1991. Average annual import of new domestic refrigeration equipment during the last 1 five years has been 2000-4000 units and at least the same number of second-hand equipment has been imported annually. The average life time of a domestic refrigeration equipment is 20-30 years. Paraffin or solar energy driven refrigerators are used in the rural areas. These refrigerators use ammonia as refrigerant.

The types of industrial refrigeration systems (using controlled substances as refrigerant) that were in operation in 1991, and estimated numbers of such equipment are as follows:

- cold rooms: approximately 40 cold rooms/stores that operate with R 12, and 20 that operate with CFC and/or HCFC,
- milk coolers: 20 units that use R-12 as refrigerant,
- CO₂ coolers and air driers: soft drink bottling companies use CO₂ coolers (R-502 or R-22) refrigerant and air driers (R-22). A beer bottling company is equipped with a CO₂ plant which requires 400kg of R-502 for maintenance.

There are some industrial refrigeration systems that are currently not in operation but are expected to be reinstalled as economy improves.

The types and estimated numbers of commercial refrigeration equipment that were in operation in 1991 are as follows:

- commercial freezers - 1000 units
- bottle coolers - 1500-2000 units
- display cases in shops 100-200 units
- ice-cream making machines - 20 units

It is estimated that there are about 10 refrigerated trucks that use R-12 as refrigerant.

Almost all air-conditioning equipment are using R-22 as refrigerant. There are few central air-conditioning systems which use CFC 11 as refrigerant. Nine units of central air-conditioning system that use a mixture of CFC-11 and HCFC-22 as refrigerant (each having 30 kg refrigerant) were found.

Recently, cars are more commonly imported with air-conditioners. There are an estimated number of 2000-3000 units of car air-conditioners that were in operation in 1991.

Foams: There are 6 foam manufacturing companies in Uganda. The foam industry in Uganda is using water as the sole blowing agent to ensure better quality. The local products compete with the less dense but cheaper foam products imported from the neighboring countries.

Aerosols: All the aerosol sprays are imported. Most of the products are hydrocarbons in most cases.

Halon fire extinguisher: Although only negligible amount of halons are imported as bulk chemicals there are considerable amounts of halons contained in fire extinguisher systems (both fixed and portable) that exist in the country. Estimated total quantities of halons in the existing equipment are: 1 Tonne of halon-1211 and 1.8 tonnes of halon-1301.

(c) Analyses of Future Demand for the Controlled Substances

Unconstrained Demand:

Uganda's political stability has been growing steadily since the present Government took office in 1986. Uganda's economy is dominated by the agricultural sector which in 1991 constituted 51.4% of GDP. Agriculture (including forestry and fishing) account for almost 100% of the exports and 90% of the employment, much of which is subsistence farming. Exports account for less than 10% of GDP. Uganda depends heavily on one main traditional export crop, coffee. In 1991, 64% of the export earnings was from coffee. recently, world's tendency to over production led to drop in prices of coffee.

The percentage annual GDP growth rates from 1983 to 1991 were as follows:

1993:	6.4 (estimated)
1992:	4.1 (estimated)
1991:	4.1
1990:	4.0
1989:	7.3
1988:	7.6
1987:	6.7
1986:	0.6
1985:	2.0
1984:	6.5
1983:	7.5

The average annual growth rate for the years 1986 to 1991 is 5.16%.

The population of Uganda in 1991 was 16,700,000 (1991 population census). The average annual population growth rate from 1980 to 1993 was 2.6%.

Uganda consumes CFC-12, CFC-115, and very small quantity of carbon tetrachloride as well as negligible quantities of CFC 11 and halon 1301. Unconstrained demand was estimated for only CFC-12 and CFC-115 although potential for growth in consumption of other substances exist. The projection of future demand assumes that any new foam or aerosol manufacturing industries would not use controlled substances.

The demand for CFC-12 and CFC-115 was projected to grow at an average rate of 6% for the period 1992 to 2000. The relevant data underlying this estimated growth rate are:

- Average annual GDP growth rate for the period 1986, 1993 was 5.16%.
 - Average annual growth rate for the consumption of CFCs for the period 1986-1993 was 15%.
 - Average annual population growth rate between 1980 and 1991 was 2.6%.
 - currently, only about 5% of the households own domestic refrigeration equipment. With improvement in the economy and the standard of living, the demand for refrigeration equipment can be expected to rise rapidly.
 - There are also near future plans to expand the supply of electricity to rural areas. With increasing political stability and incentive for investments, industrial activities are also expected to increase.
- Average annual growth of 6% is assumed for the demand for refrigerants.

The total unconstrained demand for CFC-12 in the years 2000 and 2010 are calculated to be 22.3 and 36.4 tonnes, respectively. The total unconstrained demand for CFC 115 for the same years is calculated to be 0.6 and 1.0 Tonnes respectively.

Estimation of incremental cost:

Incremental costs are estimated for two phase out scenarios:

(a) Accelerated phase-out through the implementation of this Country Programme which targets the phase -out at year 2000.

(b) Phase-out in the year 2010 in accordance with the requirements of the Montreal Protocol for countries operating under para.1 of Article 5.

The method used in the attempt to estimate the incremental cost for Uganda is a simple one, based on several simplistic assumptions. The estimation of the incremental costs are only roughly indicative and would not be comparable to the estimates for other countries due to the wide differences in the assumptions made and the methodologies for the estimation. The estimated incremental costs do not indicate the costs of the Action Plan.

The incremental cost have been estimated for the forced early retirement of domestic refrigeration equipment, retrofit of industrial/commercial refrigeration systems (early forced retirement is not included), recovery and recycling of refrigerants and institutional strengthening. The total incremental costs estimated for the two scenarios using 10% discount rate area as follows:

Cost Comparison for the two Phase-out Scenarios of Estimated Incremental Costs.

	ACCELERATED COST (US\$)	MONTREAL PROTOCOL COST (US\$).
Refrigeration:		
- forced early retirement of domestic refrigeration equipment	11,500,000	8,300,000
- retrofit of ind/comm equipment	1,939,000	1,862,000
- recovery and recycling	52,000	45,000
Institutional strengthening	79,000	90,000
TOTAL	13,570,000	10,297,000

The incremental cost figures above indicate that costs are lower for Uganda to phase out the CFCs in accordance with the Montreal protocol phase out schedule rather than the accelerated phase out schedule. It should be kept in mind that the results are highly dependent upon the assumptions chosen. There are several important factors that have not been taken into consideration in the analysis. The factor that justify the implementation of accelerated phase out include the following:

- (a) In reality the controlled substances will soon become unavailable and the prices of the substances are already rising. the price rise has not been incorporated into the analysis. prolonged use of the controlled substances will result in difficulties and considerable cost increase to the consuming countries, in particular the countries that do not produce controlled substances, to meet the demand for the substances.
- (b) Furthermore, and most important, the environmental benefits of less consumption, hence emission of controlled substances would outweigh the extra costs as that may be incurred in accelerating the phase-out.

The indicative list of Categories of Incremental costs adopted by the Parties to the Montreal Protocol at their second meeting in London states that the most cost-effective and efficient options for phase-out projects should be chosen to be financed through the Multilateral Fund. It is important that the evaluation of the cost effectiveness takes into consideration all the benefits and the costs (such) as difficulties in obtaining controlled substances and increased prices of controlled substances that the developing countries would have to pay (or) that could not be accounted for in the calculations.

3. Implementing phase-out

Government of Uganda is committed to comply with the Montreal Protocol and is prepared to go faster than the Protocol requires for phasing out the consumption of controlled substances for Article 5 countries. The Action Plan in the country programme should enable Uganda to phase out the consumption of controlled substances by the year 2000.

For the phase out schedule to be met, it is essential that the projects, including feasibility/pre-investment studies be carried out in an effective and timely manner, with the necessary financial and technical support from the Multilateral fund and its Implementing Agencies under the Montreal Protocol.

The Action Plan consists of two parts: the government Action comprising one project for Institutional Strengthening and Industry Action comprising three phase out projects:

- 1. Recovery and recycling of refrigerants;
- 2. Retrofitting industrial and commercial refrigeration systems; and
- 3. Management of banked halons and alternatives to halon fire extinguisher.

All the three industrial projects begin with a feasibility-preinvestment study to enable the development of the phase out projects.

Brief description of the programmes, projects and elements under the Action Plan are contained in Table A below.

The implementation of the is Country programme is essential in enabling early change to ozone friendly substitutes, products and technology. the Institutional strengthening project, is critical in preventing rapid increase in demand for the controlled substances and averting from the difficulties arising from possible unavailability of controlled substances in the international market in the near future.

The total budget for Institutional Strengthening Project is US\$ 64.515. The Government requests UNEP to be the Implementing Agency for the implementation of Institutional Strengthening Project.

The budget for "Recovery and Recycling of Refrigerants" project is US\$ 21,000 for which UNEP is requested to be the Implementing Agency. The Government of Uganda with assistance of UNEP would designate other Implementing Agencies to develop other projects.

1. INTRODUCTION

1.1. Purposes

This country programme reflects the commitment of the Government of Uganda to comply with the obligations of the Montreal Protocol on Substances that Deplete the Ozone Layer, to which Uganda is a Party. It provides the framework for activities to be undertaken by Uganda to achieve the required phase out of ozone depleting substances controlled under the Montreal Protocol and its London Amendment (controlled substances) and forms the basis for requesting assistance from the Multilateral Fund for those activities.

1.2 Status of the Country Programme

The Country Programme was prepared between the period February 1992-June 1994, and contains data and information on the consumption and use of ozone depleting substances controlled under the Montreal Protocol and its London Amendment for the years 1986, 1989, 1990, 1991, 1992 and 1993. It is the first country programme prepared. No country study for Uganda has been carried out previously by any international organizations.

The survey of the consumption and use pattern of controlled substances was carried out by the National Country Programme Team. Various Governmental bodies and individual industries were surveyed. The difficulties encountered in conducting the survey is explained under section 2.1. Plans for improving the record keeping by the Customs for the importation of controlled substances and recording of industries that import/use controlled substances are included in the Action Plan for future monitoring purposes.

The possible future demands for the controlled substances have been analyzed through which an indication of the total incremental cost for the phase-out of the controlled substances was derived.

The Action Plan of Uganda to phase out the consumption and use of controlled substances is based on the 1993 estimation of consumption and use of those substances. The Action Plan covers the period from 1995 to 1997 and it consists of various projects categorized under Government Actions (one project) and Industry Actions (three projects). Framework plan for the various projects have been developed for which financial and technical assistance is being requested from the Multilateral Fund and the Implementing Agencies for implementation. The budget for feasibility/pre-investment studies have been included in the Institutional Strengthening Project, and the budgets for the industrial projects will be developed through those studies. Assistance of appropriate Implementing Agency would be required for developing the project proposals.

The timetable for the implementation of the Action Plan reflects the prioritization of the projects.

The existing institutional framework for dealing with the issues under the Montreal Protocol is recorded. The Action Plan includes plans for strengthening this framework in order to:

- (i) coordinate the implementation of the country programme;
- (ii) monitor the consumption of the controlled substances and the execution of the various projects for reduction and phase-out of the controlled substances; and
- (iii) evaluate the effectiveness of the projects in achieving the reduction and phase-out.

This Country Programme should be updated during 1996 and the updated Country Programme would be implemented from 1997.

1.2.1 Preparation and Adoption of the Country Programme

The country programme was prepared under the responsibility of the Department of Environment Protection, Ministry of Natural Resources with technical assistance of Industry and Environment Programme Activity Centre (IE/PAC) of the United Nations Environment Programme (UNEP) and financial support from the Interim Multilateral Fund through IE/PAC.

The Country Programme was prepared in two phases:

- Phase I: A survey of the consumption and use of the controlled substances and gathering of information relevant to the consumption and use of controlled substances in Uganda;
- Phase II: Analyses of data and information collected through the survey; development of strategy and action plan; and preparation, review and adoption of the country programme report.

A National Country Programme Team was established for the purpose of assisting the Department of Environment Protection in preparing the Country Programme. The Team conducted the survey, drew up the Action Plan and reviewed the Country Programme. The Team consisted of representatives of the following bodies: the Department of Environment Protection and the Department of Meteorology (Ministry of Natural Resources); Ministry of Finance and Economic Planning; Department of Customs (Uganda Revenue Authority); Fisheries Department (Mbale), and Kampala Ice Plant (Ministry of Agriculture, Animal Industries and Fisheries); and Departments of Physics and Chemistry (Makerere University).

1.2.2 Participation in the Preparation of the Country Programme: Responsibilities and Roles

Short description of the bodies involved in the preparation of this Country Programme and their responsibilities and roles in the preparation are given below:

- (a) Department of Environment Protection, Ministry of Natural Resources:
Took the leadership in the preparation of the Country Programme. Directed and coordinated the survey; the process of developing the strategy and Action Plan; and the process of review and adoption of the Country Programme.
- (b) National Country Programme Team:
Conducted the survey of the consumption, use, imports and exports of the controlled substances and the products that contain controlled substances; reviewed the results of the analyses of data; developed the strategy and the Action Plan for phasing out the consumption of the controlled substances; and reviewed and approved the Country Programme.
- (c) Industry and Environment Programme Activity Centre of UNEP (UNEP IE/PAC) - Implementing Agency:
Provided the financial support and technical assistance including assistance in: (i) drawing up the overall strategy and plans for the preparation of the country programme; (ii) conducting the survey; (iii) carrying out the necessary analyses of the data and information collected through the survey; (iv) developing the strategy and the Action Plan for phase-out of the controlled substances; and (v) the preparation of the Country Programme report.

1.2.3 Sources of Data and Information

Both governmental bodies and private industries/companies cooperated and supported the survey by providing the necessary data and information for the survey. The various bodies provided the data and information as follows:

Governmental bodies:

- (a) *Department of Customs, Uganda Revenue Authority:* provided data on bulk CFC imports and exports; and import data for refrigeration equipment;
- (b) *Ministry of Trade and Industry:* provided information on the industries and companies in Uganda;
- (c) *Ministry of Agriculture:* provided information and data on the chemicals used as fumigants as well as information on pesticides and other agrochemicals;
- (d) *Ministry of Health:* provided information on the imports and use of sterilants as well as oral inhalers and other drug products;
- (e) *Civil Aviation Authority:* provided information on the use of fire extinguishing equipment within Entebbe Airport;
- (f) *Makerere University:* provided information on imports and use of various solvents used at the University.

Industries:

- (a) *Uganda Manufacturers Association:* provided the list of its various member organizations and industries.
- (b) *Individual industries and companies:* provided data on the consumption and use of the controlled substances in their own companies, as well as information about the general situations in Uganda with regard to those uses. (A full list of the relevant industries and companies surveyed is attached as Annex I.)

2. CONSUMPTION AND USE OF CONTROLLED SUBSTANCES

2.1 The Survey

The required data and information on ODSs and their use in Uganda were obtained from the Department of Customs and through individual industries and companies.

Department of Customs: The coding system used by the Customs is the Harmonized Systems of the Customs Cooperation Council. With regard to the data on imports of controlled substances, the present coding system used does not have a separate code for each controlled substance. The Customs register the controlled substances under the category of 'Derivatives of Halogenated Hydrocarbons'. It is also likely that the controlled substances are not registered under this code but is incorporated into the code for spare parts for refrigerators.

Individual industries/companies: From the available list of industries and companies, those that are likely to be importing/using controlled substances were selected. Various questionnaires were distributed to the selected industries/companies. The main difficulties encountered were as follows:

- (a) Identifying the small scale industries that are likely to be importing/using controlled substances was a difficult task. There are several small-scale industries that are registered under Ministry of Trade and Industry but without accompanying information on their function and operation. The list is also cumulative where any companies that have stopped their businesses are not deregistered.
- (b) Most of the small-scale companies do not keep accurate historical data on the importation and use of the controlled substances.
- (c) Unlike in many other countries, there are no major importers who distribute the ODSs to users, but there are several small-scale importers of ODSs.
- (d) There is substantial amount of controlled substances entering the country without official recording, especially prior to 1990 when Uganda Revenue Authority was established and Customs check points were strengthened.
- (e) Some industries showed reluctance to report data and information while others are likely to have not been able to report accurate data due to lack of knowledge regarding the ODSs and ozone layer issues.

In order to facilitate future collection of data on the consumption of controlled substances and for monitoring of the activities under the Action Plan, improvements in record keeping by the relevant Governmental bodies and industries are included under the Action Plan.

2.2 The Consumption of the Controlled Substances in 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate)

Uganda does not produce any controlled substances, but imports CFCs (12, 115 and negligible amounts of CFC-11) for servicing various refrigeration and air-conditioning equipment.

HCFC-22 is also imported for servicing refrigeration and air-conditioning equipment. HCFC-22 is controlled under the Copenhagen Amendment to the Montreal Protocol, which is yet to enter into force. This Country Programme does not include comprehensive data on consumption/use of HCFC-22.

Small quantities of carbon tetrachloride is imported and used as solvents. This solvent is used mainly as laboratory solvents. No methyl chloroform was found through the survey.

Only a negligible amount of halons were found to be imported as bulk chemicals for refilling halon fire extinguisher.

In addition, attempt was made to collect information on the use of methyl bromide. The Ministry of Agriculture, Agrochemicals Board, Agricultural Secretariat under the Bank of Uganda and Kawanda Agricultural Research Station were surveyed. The preliminary findings show that methyl bromide is not used in Uganda.

2.2.1 The Consumption of Each Controlled Substance (as bulk chemicals)

The consumption of each of the controlled substances (substances under Annex A of the Montreal Protocol and Annex B of the London Amendment), calculated level of consumption as well as calculated per capita consumption for the years 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate) are shown in Table 1.

Tables A.1 - A.4 in Annex I of this Country Programme report show the production, imports, exports and consumption of each of the controlled substances for the four years. The Tables are in the form that is ready for submission to the Ozone Secretariat to fulfill the reporting requirements of Article 7 of the Protocol.

2.2.2 Consumption of Each Controlled Substance by Use Sectors

Figures 1.1 - 1.4 below show, for the years 1986, 1989, 1990, 1991, 1992 (Estimate) and 1993 (Estimate) respectively, the percentages of total consumption of the controlled substances consumed under each use sector.

The 1993 Estimated consumption of the controlled substances under each use sector are further explained below:

Refrigeration and air-conditioning sector:

All the CFC-12 imported are used under the refrigeration and air-conditioning sector. Negligible quantities of CFC-11 is used for servicing some central air-conditioning systems. All the CFC-115 imported is a part of refrigerant R-502 which is used for some industrial refrigeration systems.

About 15 of the estimated 50-60 maintenance workshops existing in Uganda are importing the controlled substances for their own use and to sell to other users. A number of end-users of refrigeration and air-conditioning equipment import their own refrigerants.

Foams sector:

There are six foam industries that manufacture polyurethane flexible foam. All these industries use water as the sole blowing agent and no auxiliary blowing agents.

Solvents sector:

Small quantities of carbon tetrachloride were found to be imported for use as solvents, mainly in laboratories. The users of carbon tetrachloride identified through the survey are University laboratories, school laboratories, and textile industries. The total import is less than 1 Tonne a year.

There are about ten dry cleaning companies in Uganda. None of them use controlled substances. Common dry cleaning agent used is the perchloroethylene.

Table 1.0

Consumption, calculated consumption (ODP tonnes) and calculated per capita consumption of controlled substances in 1986, 1989, 1990 and 1991, 1992 (est.), 1993 (est.)

Substances	1986		1989		1990		1991 (Est.)		1992 (Est.)		1993	
	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc
ANNEX A												
<u>Group I</u>												
CFC 11	-	-	-	-	-	-	-	-	-	-	-	-
CFC 12	7.1	7.1	13.8	13.8	14.1	14.1	14.4	14.4	15.1	15.1	15.9	15.90
CFC 113	0	0	0	0	0	0	0	0	0	0	0	0
CFC 114	0	0	0	0	0	0	0	0	0	0	0	0
CFC 115	-	-	-	-	0.4	0.24	0.4	0.24	0.4	0.24	0.4	0.24
<u>Sub-total</u>	7.1	7.1	13.8	13.8	14.5	14.34	14.8	14.64	15.5	15.34	16.3	16.14
<u>Group II</u>												
Halon 1211	0	0	0	0	0	0	0	0	0	0	0	0
Halon 1301	0	0	0	0	0	0	0	0	0	0	0	0
Halon 2402	0	0	0	0	0	0	0	0	0	0	0	0
<u>Sub-total</u>	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7.1	7.1	13.8	13.8	14.5	14.34	14.8	14.64	15.5	15.34	16.3	16.14

Substance	1986		1989		1990		1991		1992		1993	
ANNEX B	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc	cns	calc
<u>Group I</u>												
CFC 13	0	0	0	0	0	0	0	0	0	0	0	0
CFC 111	0	0	0	0	0	0	0	0	0	0	0	0
CFC 112	0	0	0	0	0	0	0	0	0	0	0	0
CFC 211	0	0	0	0	0	0	0	0	0	0	0	0
CFC 212	0	0	0	0	0	0	0	0	0	0	0	0
CFC 213	0	0	0	0	0	0	0	0	0	0	0	0
CFC 214	0	0	0	0	0	0	0	0	0	0	0	0
CFC 215	0	0	0	0	0	0	0	0	0	0	0	0
CFC 216	0	0	0	0	0	0	0	0	0	0	0	0
CFC 217	0	0	0	0	0	0	0	0	0	0	0	0
<u>Sub-total</u>	0	0	0	0	0	0	0	0	0	0	0	0
<u>Group II</u>												
Carbon tet	0.02	0.02	0.2	0.22	0.1	0.11	0.3	0.33	0.30	0.33	0.3	0.33
<u>Group III</u>												
Methyl chl	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	0.02	0.02	0.2	0.22	0.1	0.11	0.3	0.33	0.30	0.33	0.3	0.33
Population	14,700,000		15,900,000		16,300,000		16,700,000		17,134,200		17,579,689	
per capita consp. (calcul.)	Annex A: 0.0005 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -		Annex A: 0.001 Annex B: -	

NOTES: (a) cns = consumption in Tonnes
calc = calculated consumption (Tonnes x Ozone Depleting Potential (ODP))
(b) Annex A/B = Annexes in the Montreal Protocol listing the controlled substances
(c) 1991 population data have been taken from the results of the 1991 Population and Housing Census, Statistics Department, Ministry of Finance and Economic Planning. The population of the other years are estimated using the average population growth rate since the population census carried out in 1980.

Figure 1.1: 1988 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 7.12 Tonnes

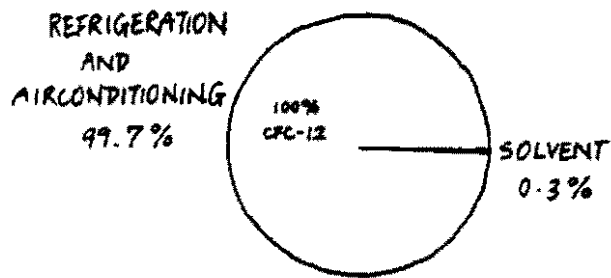


Figure 1.2: 1989 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 14.0 Tonnes

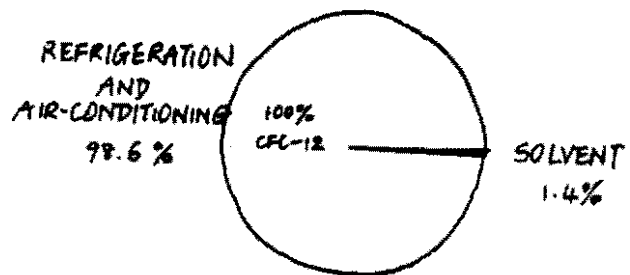


Figure 1.3: 1990 consumption of controlled substances by end-use

TOTAL CONSUMPTION = 14.6 Tonnes

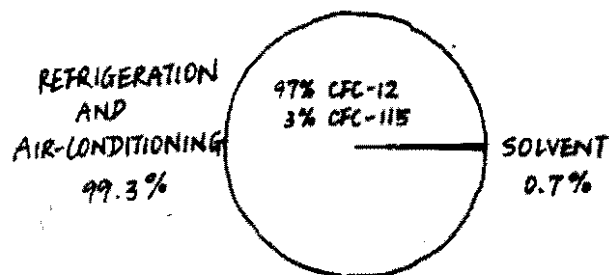
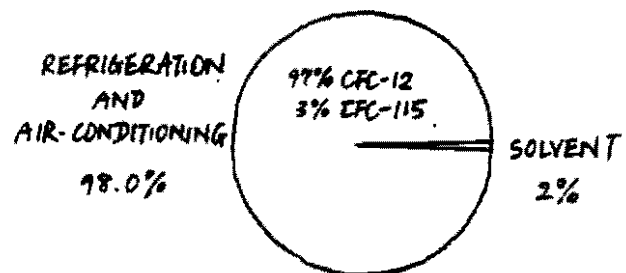


Figure 1.4: 1991 consumption of controlled substances by end use

TOTAL CONSUMPTION = 15.1 Tonnes



2.2.3 Products Containing Controlled Substances

All the refrigeration and air-conditioning equipment, aerosols and fire extinguisher are imported into Uganda. There is also substantial importation of flexible foam products from neighbouring countries.

Estimates of the numbers of various equipment containing controlled substances that were in operation in Uganda in 1993 have been made. These estimates are shown in Table 2.1 which also shows the type of controlled substances contained in each category of equipment and approximation of the total quantity of the controlled substances contained in each category of products.

The general situation with regard to each type of product containing controlled substances is further explained below.

Refrigeration equipment:

Domestic refrigerators and freezers: There is a large market for second-hand, reconditioned domestic refrigeration equipment. Average annual import of new domestic refrigeration equipment during the last five years has been 2000-4000 units and at least the same number of second-hand equipment has been imported annually. There is also importation of new and second-hand compressors for domestic refrigeration equipment. In Uganda, the average life times of new and second-hand compressors are 8 and 3 years respectively, while the average life time of a domestic refrigeration equipment is 20-30 years. Use of paraffin or solar energy driven refrigerators is common in the rural areas. These refrigerators use ammonia as refrigerant.

Industrial refrigeration systems: The types of industrial refrigeration systems that were found to be in operation (in 1993) and estimated numbers of such equipment are as follows:

- cold rooms: Approximately 80 cold rooms/stores in operation in the country. Out of these, approximately 50% operate with R-12, 25% operate with R-22 and 25% with R-502.
- milk coolers: 45 units are in operation. 25 units use R-22 and 20 units use R-12.
- various ice plants: there are soft drink/beer bottling companies and fisheries having various types of ice makers, ice banks and ice water plants. All the equipment use R-22 or ammonia as refrigerant.
- CO₂ coolers and air driers: soft drink bottling companies use CO₂ coolers (R-502 or R-22) refrigerant and air driers (R-22). A beer bottling company is equipped with a CO₂ plant which require 400kg of R-502 for maintenance.
- chillers: there are about 15 chillers used in the country. Most use R-22.

There are a number of cold rooms, fish freezing plant, milk coolers (about 25 units), as well as some large central air-conditioning systems that are currently not in operation but are expected to be reinstalled as economy improves.

Commercial refrigeration equipment: The types and estimated numbers of commercial refrigeration equipment that were found to be in operation are as follows:

- commercial freezers - 1000 units
- bottle coolers - 1500-2000 units
- display cases in shops - 100-200 units
- ice-cream making machines - 20 units

Refrigerated trucks: It is estimated that there are about 20 refrigerated trucks operating in the country. Half of the trucks use R-12 as refrigerant and the other half use R-22 as refrigerant. In Uganda, insulated trucks are also common, where flaked ice is used in insulated compartments to keep various foods frozen while transporting.

Air-conditioning equipment:

Almost all air-conditioning equipment are using R-22 as refrigerant. There are a few central air-conditioning systems which use CFC-11 as refrigerant. The largest of the CFC-11-using system (400kg refrigerant content) has not been in operation for the past several years. Nine units of central air-conditioning system that use a mixture of CFC-11 and HCFC-22 as refrigerant (each having 30 kg refrigerant) were also found.

Recently, cars are more commonly imported with air-conditioners. There are 2000-3000 units of car air-conditioners that were estimated to be in operation. In Uganda it is common that the car owners either do not bother to service the air conditioners or remove them in order to save on fuel consumption.

Some car dealers are already importing automotive air-conditioners that use HFC-134a as refrigerant. The car air-conditioners are commonly serviced by refrigeration and air-conditioning equipment maintenance workshops. Some motor garages also undertake some repair work on car air-conditioners.

Foams:

There are 6 foams manufacturing companies in Uganda. The foam industry in Uganda are using water as the sole blowing agent to ensure better quality. The locals products compete with the less dense but cheaper foam products imported from the neighbouring countries. Apparently the imported products collapse and disintegrate fast, but are popular in the rural areas.

Aerosols:

All the aerosol sprays are imported. Most of the products are marked 'ozone friendly'. The propellant in the ozone friendly sprays are hydrocarbons in most cases.

Halon fire extinguisher:

Although only negligible amount of halons are imported as bulk chemicals there is considerable amounts of halons contained in fire extinguisher that exist in the country. The main users of halon fire extinguisher identified through the survey are:

- The Mpoma Satellite Earth Station of the Uganda Posts and Telecommunications use both fixed halon fire extinguisher systems containing 1.7 Tonnes of halon 1301 in total and portable ones containing 50kg of halon 1211 in total. The systems were installed in 1985.
- Entebbe Airport: six fire fighting trucks with halon fire extinguishant (1050 kg) were acquired in 1992. They do not plan to continue the use of the halon fire extinguisher.
- Uganda Commercial Bank has halon 1211 fire extinguisher for protecting their computer systems and the electrical systems. These are automatic extinguisher containing 2 kg or 15 kg halon 1211 per cylinder, and are fixed on the ceilings with heat detectors. (In Tables 2.1 and 2.2 below these are categorized under portable fire extinguisher.) The total quantity of halon 1211 contained is 290kg. The equipment has not been serviced since installation in 1989, and they are considering discontinuing the use of the halon.
- One leather and tanning industry has 10 units of 13kg halon fire extinguisher.
- One large hotel uses two fixed systems of halon fire extinguisher containing 64kg of halon 1301. One other hotel uses some portable units.
- Uganda Airline uses halon fire extinguisher in their aircraft.

Five companies are known to have used halon fire extinguisher in the past but have discontinued the use during 1980s.

There is one main company that deals with servicing of halon fire extinguisher. The company takes the equipment to Kenya for refilling. Four other companies were found to be importing and selling portable halon fire extinguisher. The import data for halon fire extinguisher that were collected through the survey are shown in Table 2.2 below.

Table 2.1

Estimation of the numbers of equipment containing controlled substances that were in operation in the country in 1993 (equipment containing R-22 or ammonia are not included)

TYPE OF EQUIPMENT	ESTIMATED QUANTITY IN OPERATION	CONTROLLED SUBSTANCE CONTAINED	APPROXIMATE TOTAL CONTENT OF CONTROLLED SUBSTANCES
-------------------	---------------------------------	--------------------------------	--

(A) REFRIGERATION AND AIR-CONDITIONING

domestic refrigerators and freezers	200,000	CFC-12	50 Tonnes
cold rooms	40	CFC-12	4 Tonnes
	20	R-502	2 Tonnes
Milk coolers	20	CFC-12	0.1 Tonnes
CO ₂ coolers	3	R-22/R-502	0.02 Tonnes
CO ₂ plant	1	R-502	0.4 Tonnes
commercial freezers	1,000	CFC-12/R-502	6 Tonnes
bottle coolers	1,500-2,000	CFC-12	0.4 Tonnes
display cases	100-200	CFC-12	0.04 Tonnes
refrigerated trucks	10	CFC-12	0.05 Tonnes
automotive a/c	2,000-3,000	CFC-12	2-3 Tonnes

(B) FIRE EXTINGUISHERS (HALONS)

portable (cylinders of 1.5, 2, 5 or 15 kg)	160	H-1211	1 Tonne
fixed systems	35	H-1301	1.8 Tonnes

Table 2.2

Importation of halon fire extinguishers

TYPE OF PRODUCT	QUANTITY IMPORTED					
	1986	1989	1990	1991	1992	1993
portable (cylinders of 1.5, 2, 5 or 15 kg)	10	38	10	50	50	50
fixed systems	2 (in 1987)	0	0	0	0	0

2.3 Analyses of Future Demands for the Controlled Substances2.3.1 The Economy

Uganda's political stability has been growing steadily since the present Government took office in 1986. Uganda's economy is dominated by the agricultural sector which in 1993 constituted 51.4% of GDP.

Agriculture (including forestry and fishing) account for almost 100% of the exports and 90% of the employment, much of which is subsistence farming. Exports account for less than 10% of GDP. Uganda depends heavily on one main traditional export crop, coffee. In 1991, 64% of the export earnings was from coffee. Recently, world's tendency to over production led to drop in prices of coffee.

Uganda's situation in the 1970's and most of 1980's resulted in a shift from a wage-earning economy to a more subsistence and shadow economy, the result of which was a significant decrease in the monetary GDP. The long term objective of the Government's macroeconomic strategy is to create an independent, integrated, self-sustaining economy. The macroeconomic strategy being implemented aims to ensure sustainable development through mobilization of resources for investment. The two main components of the strategy are stabilizing the currency through controlling inflation and promoting and diversifying exports.

The policy measures of the Government include prudent budgeting with measures to increase taxable economic activity; strengthening of the currency with measures to promote and liberalize marketing of crops; and sectoral investment strategy.

Some of the actions being taken by the Government include:

- Creation of incentives, removal of bureaucratic bottlenecks and provision of assistance to facilitate and encourage investments in the private sector as well as privatization of public enterprises;
- Improvement of the transport network to support the opening up of productive areas;
- Acceleration of urban and rural electrification;
- Promotion of tourism through measures that include establishment of strong legal and institutional framework and strengthening of environmental planning techniques; and
- Encouragement of private sector involvement in mining to establish and exploit mineral potential.

The percentage annual GDP growth rates from 1983 to 1991 were as follows:

1993:	6.4 (Est.)
1992:	4.1 (Est.)
1991:	4.1
1990:	4.0
1989:	7.3
1988:	7.6
1987:	6.7
1986:	0.6
1985:	2.0
1984:	-6.5
1983:	7.5

The average annual growth rate for the years 1986 to 1993 is 5.16%.

The population of Uganda in 1991 was 16,700,000 (1993 population census). The average annual population growth rate from 1980 to 1991 was 2.6%.

2.3.2 Projection of Future Demand for Controlled Substances: Unconstrained Demand

Basic Assumptions:

The future demand for the controlled substances is estimated assuming that the Montreal Protocol did not exist. Between 1986 and 1993, the import of CFC-12 grew at an average annual growth rate of about 21%. The market for the domestic refrigeration equipment is far from being saturated. With various Government incentives and opportunity for investment and businesses in various sectors of economy, it is assumed that the percentage annual growth rate of GDP for the period 1992-2010 will be an average of 6%. For that same period, the population growth rate is assumed to follow the average 1980-1993 rate of 2.6%. On the basis of these figures, the number of equipment in operation under all categories of refrigeration equipment and the demand for refrigerants CFC-12 and CFC-115 are assumed to grow at an average annual rate of 5% for the period 1992-2010.

Under the foam and aerosol sectors, two factories are planned to be established in the near future. Other manufacturing factories are likely to be established in the coming years but it is assumed that no controlled substances will be used by the industries, since cheaper ozone friendly technology are available.

Although halons are not imported as bulk chemicals, the annual consumption of halons has been estimated. It is assumed that the stocked halons will increase at an average annual rate of 2%. Annual consumption is estimated on the basis of an assumption that an average of 2% of the stocked halons will be replaced per year through discharge/service.

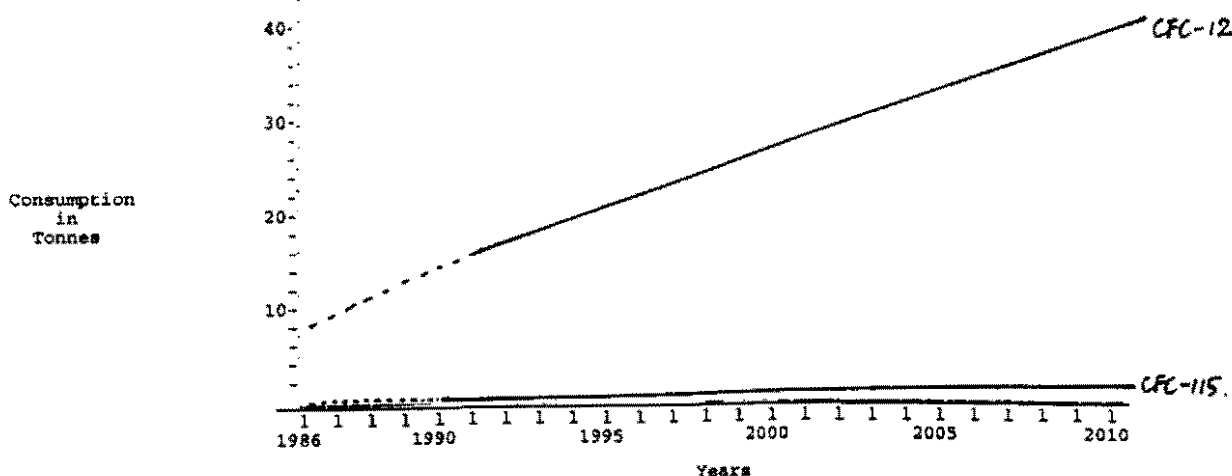
Projection of demand of each controlled substance:

The projected demand for each year (1992-2010) for each controlled substance is shown in Table 2.3 below:

Table 2.3 Summary of the yearly predicted consumption of controlled substances following the unconstrained demand

Year	Estimated GDP Growth Rate	CFC-12 Tonnes	CFC-115 Tonnes	H-1211 kg	H-1301 kg	Total Consump. (CFCs only)
1991	actual - 4.1	14.4	0.4			14.8
1992	4.1	15.1	0.4	20	36	15.5
1993	6.4	15.9	0.4	21	37	16.3
1994	6.0	16.7	0.5	21	37	17.3
1995	*	17.5	0.5	22	38	18.0
1996	*	18.4	0.5	22	39	18.9
1997	*	19.3	0.5	23	40	19.8
1998	*	20.3	0.6	23	41	20.9
1999	*	21.3	0.6	23	41	21.9
2000	*	22.3	0.6	24	42	22.9
2001	*	23.5	0.7	24	43	24.2
2002	*	24.6	0.7	25	44	25.3
2003	*	25.9	0.7	25	45	26.6
2004	*	27.2	0.8	26	46	28.0
2005	*	28.5	0.8	26	47	29.3
2006	*	29.9	0.8	27	48	30.7
2007	*	31.4	0.9	27	48	32.3
2008	*	33.0	0.9	28	49	33.9
2009	*	34.7	1.0	28	50	35.7
2010	*	36.4	1.0	29	51	37.4

Figure 2.1 Graph showing the unconstrained demand for each controlled substance (CFCs only) up to year 2010



2.3.3 Estimation of Incremental Costs for Phase-out of Controlled Substances

Incremental costs are estimated for two different scenarios:

- (a) Accelerated phase-out through the implementation of this Country Programme which targets the phase-out at year 2000. The incremental costs are estimated based on the planned activities under the Action Plan.
- (b) Phase-out in the year 2010 in accordance with the requirements of the Montreal Protocol for countries operating under paragraph 1 of Article 5. (Freeze at 1995-1997 level by 1999; 50% reduction by 2005; 85% reduction by 2007; Complete phase-out by 2010). The consumption of the controlled substances is assumed to follow the maximum allowable consumption.

Several simplified assumptions have been made in estimating the incremental costs for Uganda. The costs include early forced retirement of domestic refrigerators, retrofitting industrial/commercial refrigeration equipment and for institutional strengthening. The estimated incremental costs are only roughly indicative and would not be comparable to the estimates for other countries due to the wide differences in the assumptions made and the methodologies for the estimation. The estimated incremental costs do not indicate the costs of the Action Plan.

Basic assumptions in the analyses are as follows:

- The incremental cost is the difference in cost to the economy between 'business as usual' using controlled substances and phasing out the controlled substances because of the existence of the Montreal Protocol.
- The consumption of the controlled substances will increase according to the predicted unconstrained demand until control is effected according to the Action Plan or the Montreal Protocol control measures.
- The controlled substances will be available in sufficient quantities at constant prices.
- The estimates of the incremental costs are based on 1992-1993 prices.
- A real discount rate of 10% has been used to calculate the present 1993 value of the costs.
- Energy efficiency has not been considered under the analyses.
- Since the Parties have not yet taken a decision on the period during which incremental recurring costs will be met by the Multilateral Fund, this analysis includes the recurrent costs up to the phase out year.

The expected consumption of the controlled substances under each of the scenarios is shown graphically below:

Figure 2.2

Graph showing the expected consumption of the controlled substances (Annex A, Group I substances only) under the accelerated phase out scenario (likely consumption under the Action Plan)

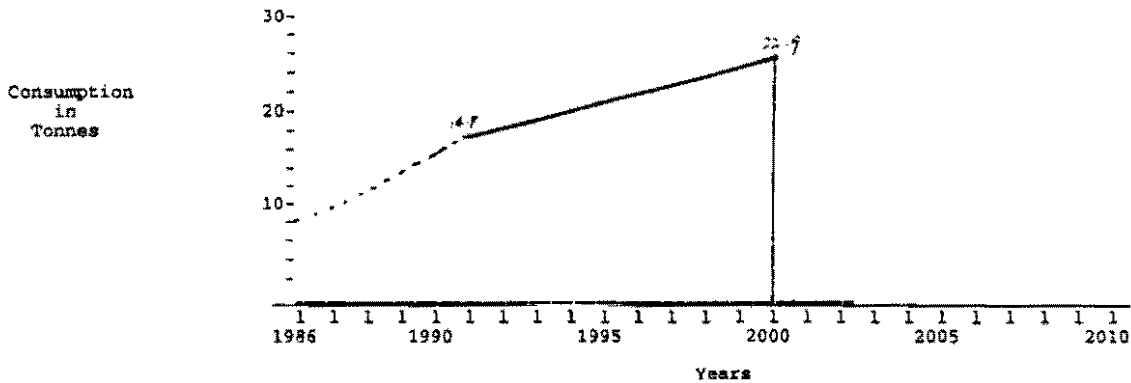
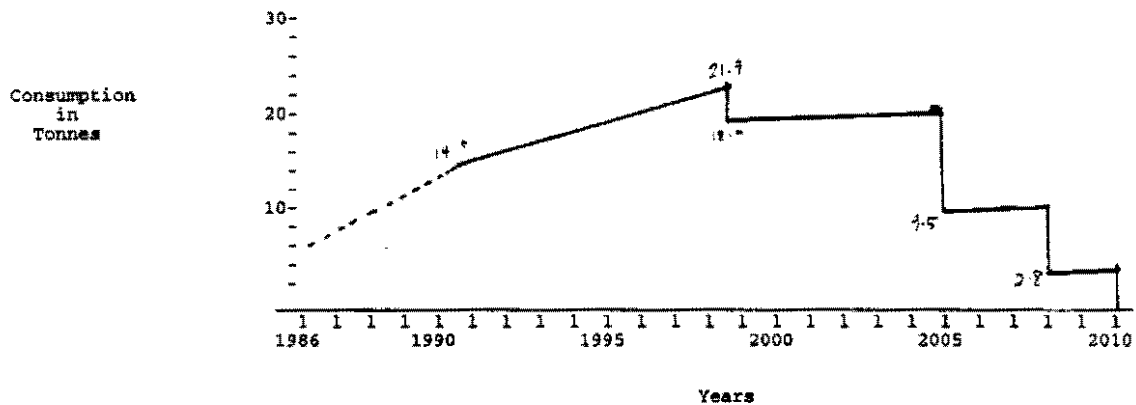


Figure 2.3

Graph showing the expected consumption of the controlled substances (Annex A substances) under the Montreal Protocol phase-out scenario (maximum allowable consumption)



The likely substitution and the assumptions for each sector are as below:

Foams sector:

At present no controlled substances are used by the foam industry in the manufacture of flexible foam. Water blowing is used. Any new foam manufacturing factories could use methylene chloride as an auxiliary blowing agent which is an alternative to using CFC-11. Methylene chloride is cheaper than CFC-11 and the capital costs required for the equipment to use methylene chloride would be similar to that for using CFC-11.

Assumptions:

- Incremental cost is zero.

Solvent sector:

Through the current survey, only a small quantity (less than 1 Tonne) of carbon tetrachloride was found to be used as laboratory solvent. No other controlled substances were found to be used as solvent. Possible substitutes for laboratory applications for analytical standards and extraction has not yet been developed.

Assumption:

- Incremental cost is zero.

Aerosol Sector:

LPG is the most commonly used substitute propellant in aerosol sprays, particularly for insecticide sprays and other household aerosols. For cosmetic aerosols there is no universal alternative for CFCs as each type of cosmetics has its own specific requirements, but deodorized LPG can be used. Dimethylether is also used as substitute propellant.

LPG are cheaper than CFCs, but since LPG are flammable safety measures are required. Conversion to LPG will result in cost savings in the aerosol industries in the long run. Any new aerosol factories could use LPG as aerosol propellant.

Assumptions:

- The incremental cost is zero

Refrigeration and air-conditioning sector:

Likely substitution:

HFC-134a refrigerant is currently about 5 times as expensive as CFC-12 (HFC-134a: approximately US \$ 20 per kg as compared with CFC-12: approximately US \$ 4 per kg), but approximately 10% less of it is necessary for the new equipment using HFC-134a. The price of the HFC-134a refrigerant should decrease gradually.

Domestic refrigerators with HFC-134a refrigerant have begun to appear in market (e.g. Denmark) at prices that are only slightly higher than those with CFC-12 refrigerant. In many cases, the energy efficiency of the HFC-134a equipment is at least as good as the CFC using equipment.

The costs of retrofitting industrial/commercial refrigeration equipment is dependant upon the substitute refrigerant, size, age and type of the equipment hence difficult to estimate. In new industrial refrigeration systems, CFCs can be replaced by HCFC-22, ammonia, hydrocarbons or HFCs. Many companies consider that conversion to ammonia and hydrocarbons are the best available options. Existing industrial refrigeration systems (including cold rooms) may be retrofitted to use ammonia or HCFC-22.

Assumptions:

- The average cost of early forced retirement of any domestic refrigeration equipment is assumed to be US \$ 200. Life time of a refrigeration equipment is taken to be 12 years.
- Under the accelerated phase-out, early forced retirement will begin in the year 2000 at the rate of 10%. (No of CFC-12 equipment to undergo forced early retirement is 255,256 units (estimated 1996 stock).)
- Under the Montreal Protocol phase-out following percentages of retirement is assumed at each control step: 12% in 1999, 10% in 2005, 14% in 2007 and 10% for 2010. (No of CFC-12 equipment to undergo forced early retirement is 295,491 units (estimated 1999 stock).)
- Average cost for retrofitting industrial or commercial refrigeration equipment is taken to be US \$ 1000.
- It is assumed that all the stock of equipment containing controlled substances (industrial and commercial equipment combined) will be retrofitted, hence no early forced retirement costs are included.
- It is assumed that the retrofit under the accelerated phase out will start to take place in the year 1997 and under the Montreal Protocol phase out in the year 2000.
- For recovery and recycling of refrigerants, incremental cost is assumed to be the cost of recovery and recycling machines, each costing US \$ 4,000.
- For the accelerated phase out it is assumed that the machines will be purchased during 1997 and under the Montreal Protocol phase out in the year 2000. The number of units of recovery and recycling equipment purchase will be equal to the tonnes of consumption of refrigerants in those years.

Institutional strengthening

Assumptions:

- Cost of the required institutional strengthening is assumed to be US \$ 30,000 for the first year and US \$ 15,000 per year thereafter.
- For the accelerated phase out the costs will be incurred from 1994 to 1999 and for the Montreal Protocol phase out from 1997 to 2009.

Conclusions:

The estimated incremental costs (in US \$) for each sector as follows:

	ACCELERATED	MONTREAL PROTOCOL
Refrigeration:		
- forced early retirement of domestic refrigeration equipment	11,500,000	8,300,000
- retrofit of ind/comm equipment	1,939,000	1,862,000
- recovery and recycling	52,000	45,000
Institutional strengthening	79,000	90,000
TOTAL	13,570,000	10,297,000

The estimated incremental costs are only indicative, based on the particular assumptions made for the estimation.

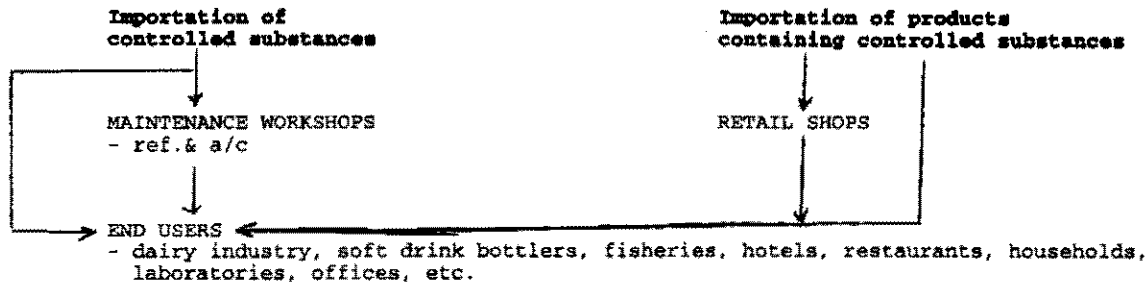
The comparison of the discounted costs (10% discount rate) of phase-out under the two scenarios indicates that the incremental costs are lower when the phase out schedule under the Montreal Protocol is followed. It should be kept in mind that the magnitude of seeming cost advantage in delaying the phase out is highly dependant upon the discount rate chosen. The discounted costs will change significantly with the discount rates.

The incremental cost figures above should not lead to a conclusion that Uganda should follow the Montreal Protocol phase-out schedule rather than an accelerated one. In reality the controlled substances are becoming increasingly difficult to obtain and the prices of the substances are already rising. Prolonged use of the controlled substances is likely to result in difficulties and considerable cost increase to the country in meeting the demand for the substances.

Furthermore, and most importantly, the environmental benefits of less consumption, hence emission of controlled substances would outweigh the extra costs that may be incurred in accelerating the phase-out. The estimated cumulative consumption shows that approximately 120 Tonnes less of controlled substances will be consumed by Uganda if accelerated phase out is followed as compared with the Montreal Protocol phase out schedule.

The Indicative List of Categories of Incremental Costs adopted by the Parties to the Montreal Protocol at their Second Meeting in London states that the most cost-effective and efficient options for phase-out projects should be chosen to be financed through the Multilateral Fund. It is important that the evaluation of the cost effectiveness takes into consideration all the benefits and the costs that could not be accounted for in the analyses, for example, the increased cost of controlled substances that the developing countries would have to pay for and the environmental benefits of reduced ODS consumption.

Figure 2.4: Flow chart showing the structure of the industries that deal with controlled substances and products that contain controlled substances.



2.5 The Status of Response to the Montreal Protocol

2.5.1 The Government Response

Uganda acceded to the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on 24 June 1988 and 15 September 1988, respectively. The Convention and the Protocol entered into force for Uganda on 29 September 1988 and 1 January 1989, respectively.

The Government of Uganda assigned the responsibility of implementation of the Vienna Convention and the Montreal Protocol to the Ministry of Environment Protection. Since then the Ministry has been renamed twice. Currently the Ministry is called the Ministry of Natural Resources. The Department of Environment Protection is responsible for the implementation of the Vienna Convention and the Montreal Protocol.

The Department of Environment Protection is the national focal point on environmental issues and is also the focal point to UNEP.

Uganda has participated with interest in the various meetings convened under the Vienna Convention and the Montreal Protocol. Uganda has been elected a member to the Implementation Committee for consecutive terms, the first term as the Vice-Chair.

In Uganda, there is a weekly Television programme focusing on the environment. The Department of Environment Protection provides inputs to the programme. Attempts are being made to focus on the issue of protection of the ozone layer. Attempts are also being made to produce a special thirty-minute programme on the protection of the ozone layer and ODS issues.

Currently the Government is considering strengthening the teaching of environmental issues under the school curriculum. The problem of ozone layer depletion is to be incorporated.

The Government of Uganda is committed to phase out the consumption of controlled substances in Uganda as soon as possible but not later than the year 2000. The Government is fully committed to successfully implement the Country Programme for the phase out of substances controlled under the Montreal Protocol. Although Uganda as a developing country operating under paragraph 1 of Article 5, is entitled to delay the phase out by 10 years, it will not await the elapse of this grace period before embarking on action and phasing out its consumption of the controlled substances. With timely and efficient provision of the necessary financial and technical support from the Multilateral Fund, effective technology transfer and implementation of the Country Programme, Uganda could meet its goal to phase out the consumption of the controlled substances in the year 2000.

2.5.2 The Industry Response

The industries' awareness on the problem of ozone layer depletion is generally low. One of the main companies that deal with fire extinguishing systems were advised by the supplier companies in Europe against the use of halons. Hence during the mid 1980's this company has stopped the supply of halons to any local consumers. No other actions have so far been taken by industries to reduce the use of controlled substances.

2.4 Industry Structure

Most of the industries in Uganda are small scale.

Unlike in several other countries, Uganda does not have chemical suppliers that deal with controlled substances on a regular basis. Uganda Oxygen Ltd. has, this year (1993), started the importation of refrigerant gases, but the company may not continue the business on regular basis. About 15 refrigeration and air-conditioning maintenance workshops are importing controlled substances for their own use and also to sell to other users. Several industries that use refrigerants import their own refrigerants when needs arise.

All the refrigeration and air-conditioning equipment and aerosols are imported and some foam products are also imported although there are six companies manufacturing flexible polyurethane foams. Equipment and products are imported by retail shops. Some end-users of such products (e.g. large hotels) also import the equipment and products for their own use.

The estimated numbers of industries and companies dealing with ODSs and their products in Uganda are as follows:

Refrigeration and air conditioning sector:

- (i) 50-60 workshops that maintain refrigeration and air-conditioning equipment. There are many small-scale industries that repair about 100 units of equipment or less a year.
- (ii) 10-15 of the workshops import the refrigerants for their own use as well as for supplying other users.
- (iii) 10-15 importers of refrigeration and air-conditioning equipment. Many of these importers are dealing with second-hand equipment.
- (iv) Several retail shops importing compressors (both new and second-hand).

Foams sector:

- (v) 6 firms manufacturing flexible polyurethane foams.
- (vi) 1 new foam manufacturing factory to be established.
- (vii) A number of retail shops import foam products.

Users of carbon tetrachloride:

- (viii) 5 main laboratories were found to be using carbon tetrachloride in small quantities.
- (ix) 2 textile companies using negligible quantities of carbon tetrachloride as solvent.

Aerosols sector:

- (x) Various retail shops import aerosols, much of which are marked 'ozone friendly'.

Fire extinguishers:

- (xi) 15 dealers for fire extinguishers, 5 of which are dealing in halon fire extinguisher systems.

The structure of the industries that deal with controlled substances are shown in the Figure 2.4 below:

2.6 Institutional Framework

The Governmental and other institutions that are responsible for activities that affect the consumption of ODSs in Uganda are as follows:

Department of Environment Protection, Ministry of Natural Resources:

Under the existing institutional framework, all environmental issues, both national and international which includes global environmental issues such as the protection of the ozone layer, falls under the responsibility of the Department of Environment Protection of the Ministry of Natural Resources. The Department is the national and international focal point for environmental matters including UNEP matters.

The Department plays a coordinating role with other Governmental bodies as well as private enterprises regarding environmental matters. Its main activities include:

- Pollution control: Developing and recommending policies and legislation to control pollution through Ad Hoc Committees comprising representatives of appropriate Ministries and other Governmental bodies. Monitoring of pollution is also undertaken through the Department. Monitoring and Control Division checks that the industries operate safely, taking into account environmental considerations, but currently with no legislative back-up for enforcement.
- Monitoring of natural resources: Developing policies and legislation for sustainable use of the natural resources and to monitor these resources in the country.
- Environmental awareness: Organizing and developing programmes and articles through mass media and preparing and disseminating information publications. The Department also provides assistance in both formal and informal education.
- Environmental Impact Assessment: Carrying out Environmental Impact Assessments for all major projects before the projects are approved for implementation. (This is, however, not enforced by legislation.)
- Geographical Information Systems: Collecting data and information on and making inventories of utilization of natural resources in the country as well as developing a database for the data and information and disseminating them to the resource users and policy makers.

The National Environment Action Plan under the Department of Environment Protection is currently developing an umbrella environment legislation.

Ministry of Finance and Economic Planning

The Ministry is responsible for preparation of overall development plans (short, intermediate and long-term) and provides guidelines on priorities for development initiatives. It also ensures prudent management of public finances. The Ministry approves most projects that are implemented in the country.

Ministry of Trade and Industry:

This Ministry controls both public and private industrial activities through promoting industrial establishments and investments through provision of various assistance for facilitating businesses. Recently, Uganda Investment Authority was established under the Ministry for issuing of licenses for trade and operation of industries.

The National Bureau of Standards under the Ministry is responsible for standardization and quality control. It monitors the operation and activities in industries and trade to ensure product quality and to safeguard consumer health and safety.

Uganda Manufacturers Association:

Provides information and guidance to the industrialists on investments, market opportunities, and use of appropriate technologies. UMA organizes annual trade fairs through which information on newly available technologies and products is disseminated. It also actively seeks new information and provides a forum for discussion of various issues of interest to the member industries and companies.

Uganda National Chamber of Commerce and Industry:

This is an association of traders. It protects the interest of the traders and negotiates trade terms with the Government. The Chamber also advises its members on legal requirements for trade and on market situations.

Training Institutes:

Institutions and organizations in Uganda that offer various opportunities for training are as below. These institutions could play an important role in training and educating the relevant technicians as well as the public in matters related to the ozone depleting substances, and their use.

(a) **Vocational Training Centre (under the Ministry of Labour and Social Affairs):**

The Centre conducts courses for technicians to acquire extra skills and to update their knowledge. All the courses are short term (less than two months). No certificates are issued.

(b) **Makerere University:**

Faculty of Technology conducts various technical courses including training on heating, refrigeration and air-conditioning. Institute of Environment and Natural Resources under the University runs courses on Environmental Science.

(c) **Uganda Polytechnic:**

Technical courses on refrigeration and air-conditioning equipment are conducted at the Polytechnic. Facilities are available for organizing extra technical courses and demonstration projects.

(d) **Fisheries Training Institute Entebbe:**

The Institute offers technical training up to diploma level. Maintenance of refrigeration equipment is an important part of the courses.

2.7 Existing Policy and Operational Framework in Uganda that Govern Trade and Industries

There are no specific laws and regulations that have yet been enacted in Uganda for the reduction and phase out of the consumption of controlled substances.

The general policy and operational framework and regulations relevant to trade and industries are explained below:

2.7.1 Trade

The Division of External Trade in the Ministry of Trade and Industry is responsible for issuing trade licenses. Some chemical imports must be approved by appropriate Ministries.

The Department of Customs is under the Uganda Revenue Authority of the Ministry of Finance and Economic Planning is responsible for checking the imported commodities at entry points, against import licenses and invoices, and for record keeping

The Cabinet adopts the import duties and taxes which are announce with the Annual Budget.

The records on industries are kept by the Ministry of Trade and Industry on the basis of licenses issued for the operation of the industries. Uganda Revenue Authority issues the licenses for establishment of industries (investment licenses). The Investment Authority promotes and facilitates investments in Uganda and provides various assistance to the investors.

3. IMPLEMENTING PHASE OUT

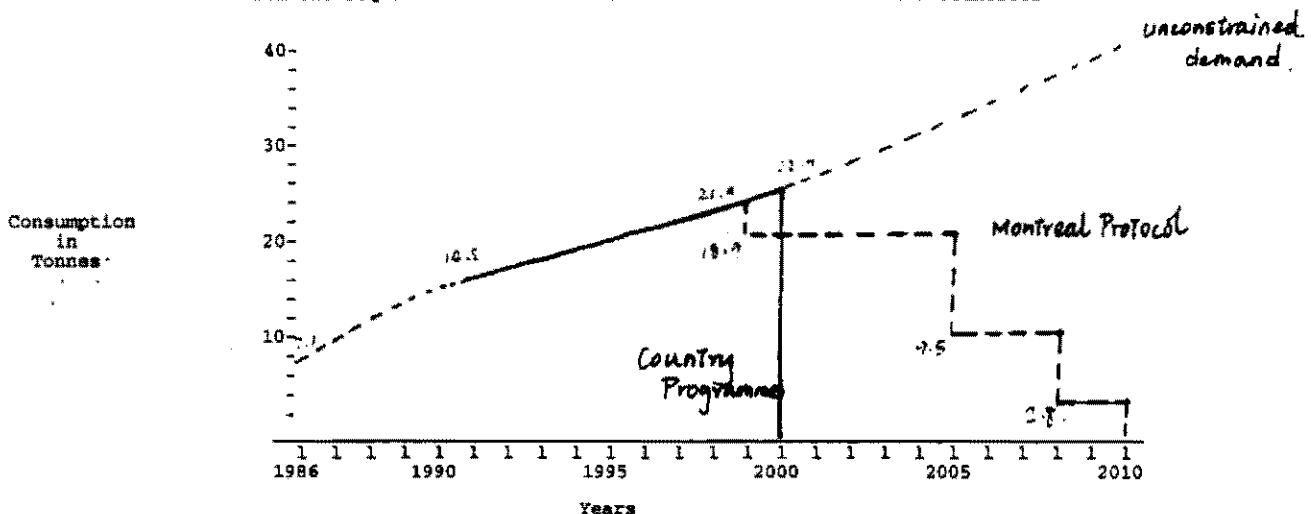
3.1 Strategy Statement by Government

Uganda is a Party operating under paragraph 1 of Article 5, hence is required to phase out the consumption of CFCs, halons and carbon tetrachloride controlled under the Montreal Protocol by the year 2010 and methyl chloroform by the year 2015. These phase out years have been brought forward under the adjustments adopted by the Parties at their Fourth Meeting in Copenhagen (November 1992), but how these provisions will be applied to Article 5 countries will depend upon a review in 1995. The Government of Uganda is committed to phase out the consumption of the controlled substances as soon as possible, even before the phase out years of 2010 and 2015.

Through the implementation of the Country Programme the Government of Uganda will phase out the consumption of all the controlled substances by the year 2000. The steps for reduction up to complete phase out of consumption for each group of substances are presented graphically in Figure 3.1 below.

Figure 3.1

Graph showing the expected consumption of the controlled substances following the Government strategy for the phase-out as compared with the phase-out in accordance with the requirements of the Montreal Protocol for Article 5 countries



The actions to be taken by the Government will include development and adoption of appropriate policies and legislation to control the consumption of controlled substances; preparation, coordination and organization of phase-out projects under the Country Programme; ensuring the necessary dissemination and exchange of information both nationally and internationally; provision of necessary assistance to the industries and the public to successfully and smoothly phase-out the controlled substances. These actions constitute the project for institutional strengthening.

In Uganda, the consumption of the controlled substances is currently very small. The total consumption of the controlled substances in 1993 was about 16 Tonnes. However, the consumption of the controlled substances will certainly increase as the economy of the country improves and if the controlled substances continues to be available without constraints. The Government believes that raising public awareness and sensitizing industries would be the key to enabling the early phase out of controlled substances in the country. Early change to ozone friendly substitutes and related technology is of paramount importance as controlled substances are expected to rapidly become scarce and unavailable. Through effective public awareness raising and sensitization of industries, unwanted disruptions of the economy and lives of people could be minimized.

Financial and technical assistance of the Multilateral Fund, its Secretariat and the Implementing Agencies is fundamental for Uganda in order for Uganda to be able to implement the Country Programme, especially in light of the difficult economic situation that the country is faced with at present.

Institutional strengthening project would form the basis for the effective and timely phase out of controlled substances.

The Government requests that UNEP be the Implementing Agency for the implementation of this Country Programme.

3.2 Action Plan.

The Action Plan for the Phase-out of controlled substances consists of two parts:-

- (i) Government Actions Comprising of one project; and
- (ii) Industry Actions Comprising of three phase-out projects

3.2.1 Government Actions

Institutional Strengthening Project

Project Description.

Please refer to annex A

3.2.2 Industry Actions

The Industry Actions will consist of three projects - two for the refrigeration and air-conditioning sector and one for the halon fire extinguisher.

SECTOR: REFRIGERATION AND AIR-CONDITIONING

Project R1: Recovery and recycling of refrigerants

Uganda has several small-scale refrigeration and air-conditioning equipment maintenance workshops (larger ones repairing 1000-2000 units a year and smaller ones repairing less than 100 units a year). The workshops are interested in recycling the refrigerants but many cannot afford to acquire a recovery and recycling machine.

A feasibility study will be conducted **early 1995** to develop a project for recovery and recycling of refrigerants.

Phase I: Feasibility study

An international expert in the field of recovery and recycling of refrigerants will be contracted to conduct a feasibility study together with a local consultant and the ODS Unit to determine the best means to recover and recycle refrigerants in Uganda. The study could also determine whether or not a business for manufacturing recycling equipment could be established in Uganda. The feasibility study will include development of a project proposal for recovery and recycling of refrigerants. The project will be submitted to the Fund Secretariat/ Executive Committee for consideration for funding during 1995.

The international expert will be also requested to advise on how to improve the existing refrigeration and air-conditioning courses in Uganda.

Budget for the feasibility study :

International expert :	fee :	US \$ 7,000
	travel :	US \$ 10,000

Local experts (2) : fee : US \$ 4,000

Phase II: Project Implementation

The project implementation should begin in 1995.

Project R2: Feasibility/pre-investment study for retrofitting existing industrial and commercial refrigeration systems

By end 1995, an international expert on industrial and commercial refrigeration systems will be contracted to conduct a feasibility study together with a local consultant and ODS Unit to assess the possibilities of retrofitting the industrial and commercial refrigeration systems in the country. The feasibility/pre-investment study will identify suitable substitute refrigerants for the equipment that can be retrofitted to use the substitutes.

The feasibility study will lead to developing projects for retrofitting existing industrial and commercial refrigeration systems to use substitute refrigerants. The project will be incorporated into the Country Programme update.

A detailed feasibility study budget would be submitted to the Executive Committee during 1994.

SECTOR: HALONS

Project H1 **Management of banked halons and alternatives for halon fire extinguisher**

In **early 1995**, an international expert on halon fire extinguisher will be contracted to work together with a local expert and the ODS Unit on a study on the halon fire extinguisher systems in Uganda. The objective of the study will be to develop a strategy for management of banked halons in the country and to propose best alternatives for the various halon fire extinguisher systems existing in the country.

Any project that may emerge from the study will be submitted to the Fund Secretariat/Executive Committee for consideration for funding during 1995.

Budget for feasibility study :

International expert :	fee :	US \$ 7,000
	travel :	US \$ 10,000

Local experts (2) : fee : US \$ 4,000

3.2.3 Future Developments in the Action Plan

In the future, projects to deal with existing domestic refrigeration equipment will be considered. Under the Country Programme update, a feasibility study will be included for deciding on the best option to deal with the existing domestic refrigeration equipment.

Retrofit technology for domestic refrigeration equipment to use substitute refrigerants is currently not technically feasible. However, such technology may emerge in the future. Due to the fact that the energy efficiency of the current CFC-using equipment is up to four times greater than the older models, retrofitting refrigerators manufactured prior to 1990 may not be economical.

The two foreseeable options of domestic refrigeration project are briefly described below:

(a) *Replacing old domestic refrigerators and freezers*

If technology for retrofitting domestic refrigerators are not sufficiently developed in the world for introduction into Uganda by 1997, the domestic refrigerators and freezers that need compressor replacement from 1997 onwards will be scrapped.

A project may be developed to request coverage of the incremental cost to the consumers of forced replacement of refrigeration equipment.

Some means of disposal of the scrapped refrigerators may also be included in the project. A part of the cost for this may also be requested from the Multilateral Fund.

(b) *Retrofitting domestic refrigerators and freezers*

If the technology for retrofitting CFC-using refrigerators and freezers are developed in the world for introduction into Uganda by 1997, the domestic refrigerators and the freezers will be retrofitted. The necessary training activities will then be included in the Country Programme update.

A project may be developed to request coverage of the incremental costs for retrofitting the refrigerators.

3.3 Timetable for the Implementation of the Action Plan

The planned time schedule for the activities under the Action Plan is shown in Table 3.2.

3.4 Summary and Budget for the Action Plan

3.4.1 Implications of the Action Plan on the Consumption of Controlled Substances

The projects and elements under the Action Plan are summarized under Table 3.2. Under this Country Programme the only project that may have a direct effect on the consumption of controlled substances is the project for Recovery and Recycling of Refrigerants. However, the actual reduction in consumption would depend on the project to be implemented as a result of the feasibility study.

The implementation of this Country Programme is essential in enabling early change to ozone friendly substitutes, products and technology. The indirect impact of the projects, especially the Institutional Strengthening Project, is crucial in preventing rapid increase in demand for the controlled substances and averting from the difficulties arising from possible unavailability of controlled substances in the international market in the near future.

The expected total cumulative consumption of the controlled substances under the Country Programme (until complete phase-out) is 117 Tonnes. The expected cumulative consumption under the Montreal Protocol phase-out schedule and unconstrained demand are compared below:

Cumulative consumption (Tonnes)

Country Programme (1994-1999, inclusive):	117 Tonnes
Montreal Protocol (1994-2009, inclusive):	236 Tonnes
Unconstrained demand (1994-2009, inclusive):	406 Tonnes

3.4.2 Budget for the Action Plan

The budget for the Action Plan is shown in the table 3.1. below.

The budget for the Industry Actions consists of costs for international and local consultants that are required for conducting feasibility/pre-investment studies that will result in development of phase-out projects. Projects proposals will be submitted separately after feasibility/pre-investment studies have been conducted.

It is requested that the Executive Committee approves the budget for the Government and Industry Actions as shown in the table 3.1.

Table 3.1.

Projects	1995	1996	1997
Government			
I.S.	27,160	18,205	18,700
Industry Actions			
1. project R1	21,000		
2. Project R2	-		
2. Project H1	21,000		
Total	59,160	18,205	18,700

The Ministry of Natural Resources will annually submit an account of the expenditures to the Implementing Agency (UNEP). Any surplus would be accounted for in the Country Programme update and shortage would have to be re-requested from the Multilateral Fund.

Table 3.2. Planned time schedule for the implementation of the Action Plan

ACTIVITIES	1995	1996	1997
GOVERNMENT ACTIONS			
<u>Project G1:</u>			
- Establishment of the National Steering Committee	JANUARY		
(a) National Policy	JANUARY-Begin preparation JUNE-Adoption	Implementation	Implementation
(b) Legislation	JANUARY-Begin preparation		
- Establishment of ODS Unit	JANUARY		
(a) Public awareness	Plan	Implementation	Implementation
(b) Information exchange	Plan	Implementation	Implementation
(c) ODS monitoring			
Industry reporting	JANUARY-Plan	JANUARY - request 1995 data	JANUARY-request 1996 data
Customs coding system	JANUARY-Preparation JUNE-Training of Customs Officer	JANUARY-Use of amended coding system	
- Establishment of a Refrigeration Association	JANUARY		
INDUSTRY ACTIONS			
<u>Project R1:</u>			
- Feasibility study	JANUARY MAY/JUNE-project proposal submission		
- Project implementation	NOVEMBER		
<u>Project R2:</u>			
- Feasibility study	During 1995		
<u>Project H1:</u>			
- Study to develop strategy	JANUARY		
- Project implementation	JUNE		

INSTITUTIONAL STRENGTHENING PROJECT COVER SHEET

COUNTRY	:	UGANDA
PROJECT TITLE	:	INSTITUTIONAL STRENGTHENING FOR THE PHASE-OUT OZONE DEPLETING SUBSTANCES
SECTOR COVERED	:	ALL SECTORS
ODP CONSUMPTION	:	16.3 Tonnes ODP
PROJECT DURATION	:	3 YEARS
PROJECT IMPACT	:	CAPACITY BUILDING FOR UGANDA TO PHASE-OUT ODS PER YEAR AS COUNTRY PROGRAMME.
TOTAL BUDGET (Incremental Cost)	:	US\$ 64,515
IMPLEMENTING AGENCY	:	UNEP
NATIONAL IMPLEMENTING AGENCY	:	DEPARTMENT OF ENVIRONMENT, MINISTRY OF NATURAL RESOURCES

Project Description

The existing institutional framework needs to be strengthened in order to ensure that the Country Programme is implemented effectively. The Institutional Strengthening Project will consist of three elements i.e

1. Establishment of a National Ozone Office (ODS-Unit)
2. Establishment of National Steering Committee
3. Public Awareness and Information Exchange Campaigns

Element 1: Establishment of National Ozone Office (ODS-Unit)

Purpose of the Project:

The ODS Unit will ensure and monitor the implementation of the Country Programme through coordination with Governmental and other bodies as well as with the Implementing Agencies, and the Fund Secretariat in implementing the various projects and elements under the country programme. ODS Unit will also act as the Secretariat to the National Steering Committee for the Protection of the Ozone Layer (see Element 2).

Project Organization and Management.

- The ODS Unit will function under the supervision of the Commissioner for Environment Protection.
- Personnel requirement for the ODS Unit is one professional officer. Incentive for this officer is requested to be covered by the Multilateral Fund. The officers are expected to be recruited by August 1994.
- The necessary equipment for the ODS Unit in order for it to be able to efficiently and effectively carry out its tasks are as follows:
 - (a) A personal computer and a printer (with computer software for word processing, data base and graphics and the necessary equipment to enable connections to the OzonAction database) for information gathering (e.g. through OzonAction Data Base being developed by IE/PAC), production of information pamphlets and newsletters as well as for record keeping and monitoring of relevant industries and the consumption of the controlled substances;

- (b) A fax machine; and
- (c) A heavy duty photocopier.
- Other necessary administrative support for the ODS Unit will be provided by the Ministry of Natural Resources.
- The specific functions and responsibilities of the ODS Unit will include:
 - (a) assisting the National Steering Committee for the Protection of the Ozone Layer in formulating the necessary policy and legislation/laws and regulations for the protection of the ozone layer and controlling the ODS consumption;
 - (b) monitoring and recording (as database) the consumption and use of the controlled substances, monitoring and evaluating the implementation of the Country Programme, and reporting data and information as necessary to the Ozone Secretariat, Fund Secretariat and the Implementing Agency;
 - (c) organizing and coordinating the various information exchange, public awareness and training activities;
 - (d) operating as information focal point to help industries, companies and the public on ODS issues;
 - (e) preparing phase-out projects for submission to the Fund Secretariat with necessary assistance of the Implementing Agencies, international consultants and local consultants.

ODS Phase out Monitoring

ODS Unit will monitor Uganda's consumption and use of ODSs through industries and the Customs. The ODS Unit will establish a database on the industries dealing with controlled substances and ODS imports to record all the relevant data. The following monitoring arrangements will be implemented:

(a) Monitoring of industries and their ODS consumption

Every industry/company dealing with controlled substances will be required to report data on the ODS annually to the ODS Unit. A reporting format will be designed by the ODS Unit.

(b) **Customs data**

The Customs code will be amended so that importation of individual controlled substance will be recorded by the Customs. Customs will report the relevant importation data to the ODS Unit on a half yearly basis.

ODS Unit will recommend ways of modification according to its needs for monitoring. Training of Customs officers may be conducted as part of the training activities under the Institutional Strengthening Project.

Element 2: Establishment of a National Steering Committee for Protection of the Ozone Layer

A National Steering Committee for the Protection of the Ozone Layer will be established under the Ministry of Natural Resources to assist the Ministry in implementing the Vienna Convention, the Montreal Protocol and the Country Programme. The Committee will assist the Ministry in formulating policies and legislation for recommendation to the Cabinet. The Committee will approve the project proposals prepared by the ODS Unit before submission to the Fund Secretariat.

(a) **Government Policies for the Protection of the Ozone Layer**

An overall policy strategy, 'Government Policies for the Protection of the Ozone Layer' will be developed for adoption by the Government.

(b) **Legislation**

Formulation of a new legislation for ozone layer protection and/or amendments to appropriate existing laws and regulations will be considered.

Element 3: Public awareness raising

- TV, radio and newspaper announcements/advertisements on Ozone Science and Implementation Phase-out.

Information exchange

- ODS Unit will establish a link to the UNEP IE/PAC's OzonAction Database which contains up-to-date information on substitutes, new technologies, new products, contacts to producer industries, and other activities in the field of protection of the ozone layer. The ODS Unit will gather information through the Database as well as other sources such as through direct contacts with manufacturing industries abroad.
- The ODS Unit will function as information service office for the industries and the public. The TV, radio and newspaper announcements will include an introduction of the ODS Unit and its information service role.
- Disseminate information to the industries and public through issuing of newsletters and pamphlets on the substitutes and new products:

Technical assistance and training

Training Programmes, through separate funding will be undertaken in the field of refrigeration and air-conditioning, customs-control and project preparation.

BUDGET FOR THE INSTITUTIONAL STRENGTHENING PROJECT (in US \$):

Assistance of the Implementing Agency is requested in contracting appropriate international experts as consultants for the feasibility/pre-investment studies. It is also requested that the Implementing Agency (UNEP) administers the Budget lines for international consultants and engage them (with the concurrence of the Government) under UNEP contracts. This would facilitate the administrative process for the international consultants and maximize the value of the US dollars.

Budget for the Government (local component):

	1995	1996	1997	Total
Personnel cost				
1 officer	3,000	3,150	3,300	9,450
1 focal point (Ref.Assoc.)	2,000	2,100	2,200	6,300
Consultants-Local (6 m/m)	2,100	2,200	2,300	6,600
sub-total				
Equipment	9,000	-	-	9,000
Travel-Local	2,000	2,100	2,200	6,300
Public awareness, information exchange, etc.	5,000	5,000	5,000	15,000
Meetings of the Steering Committee	1,000	1,000	1,000	3,000
Miscellaneous (stationary, commun., equipmt. maintenance, etc.)	1,000	1,000	1,000	3,000
SUB-TOTAL	25,100	16,550	17,000	58,650
contingency (10%)	2,510	1,655	1,700	5,865
GRAND TOTAL	27,610	18,205	18,700	64,515

RECOVERY AND RECYCLING OF REFRIGERANTS

COVER SHEET

COUNTRY	:	UGANDA
PROJECT TITLE	:	RECOVERY AND RECYCLING OF REFRIGERANTS
SECTOR COVERED	:	REFRIGERATION AND AIR CONDITIONING
ODP CONSUMPTION	:	16.3 Tonnes ODP
PROJECT DURATION	:	6 MONTHS
PROJECT IMPACT	:	RECOVERY AND RECYCLING OF CFC12
TOTAL BUDGET	:	US\$ 21,000
IMPLEMENTING AGENCY	:	UNEP
NATIONAL IMPLEMENTING AGENCY	:	DEPARTMENT OF ENVIRONMENT, MINISTRY OF NATURAL RESOURCES

Uganda has several small-scale refrigeration and air-conditioning equipment maintenance workshops (larger ones repairing 1000-2000 units a year and smaller ones repairing less than 100 units a year). The workshops are interested in recycling the refrigerants but many cannot afford to acquire a recovery and recycling machine.

A feasibility study will be conducted **early 1995** to develop a project for recovery and recycling of refrigerants.

Phase I: Feasibility study

An international expert in the field of recovery and recycling of refrigerants will be contracted to conduct a feasibility study together with a local consultant and the ODS Unit to determine the best means to recover and recycle refrigerants in Uganda. The study could also determine whether or not a business for manufacturing recycling equipment could be established in Uganda. The feasibility study will include development of a project proposal for recovery and recycling of refrigerants. The project will be submitted to the Fund Secretariat/ Executive Committee for consideration for funding during 1995.

The international expert will be also requested to advise on how to improve the existing refrigeration and air-conditioning courses in Uganda.

<u>Budget:</u>	US \$
International expert fee	7,000
Travel	10,000
Local experts (2) fee	4,000
Total	21,000

Phase II: Project Implementation

The project implementation should begin in **1995**.