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**ADDENDUM TO
FINAL NON-CONFIDENTIAL REPORT**

ON

**TECHNO ECONOMIC ASSESSMENT OF THE FINANCIAL VIABILITY
OF THE COLLECTION AND SAFE DISPOSAL OF REFRIGERANT
GASES AND RELATED MATERIALS IN AFRICA
(Project No. US/RAF/90/173)**

FOR

**UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION
VIENNA, AUSTRIA
(UNIDO CONTRACT No.91/212)**

M.92.629 N/210A

NOVEMBER, 1992

**MANTEC CONSULTANTS PVT. LTD., INDIA
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S. B. BILLIMORIA & CO., INDIA**

**and experts from
INDIAN INSTITUTE OF TECHNOLOGY, NEW DELHI, INDIA
ACS, AUSTRALIA**

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CHAPTER - 1

INTRODUCTION

The final non-confidential & final confidential reports were circulated by UNIDO to the governments of the countries studied and other agencies concerned and based on the comments received it was considered desirable to prepare an addendum to the final non-confidential report.

This addendum provides additional analysis & information to respond to the requirements expressed by the countries concerned.

The areas covered are further analysis on "Framework for implementation", "Venture level analysis for mobile air-conditioning sector" and "National Economic Cost Benefit Analysis".

The analysis has been done in a country specific manner for Egypt, Kenya and Nigeria.

CHAPTER- 2

FRAMEWORK FOR IMPLEMENTATION

The additional analysis in a specific manner for each country is given below :

2.1

EGYPT

The measures outlined earlier covered

- i) Enacting legislation on
 - a) supply of CFC's to enable monitor imports and sales
 - b) use of CFC's - to restrict use to accredited agencies and in line with codes of practice
- ii) Financial support measures covering
 - a) subsidies on bags, equipment
 - b) increased duties on CFC's
 - c) funding of training activities
- iii) Creating the Institutional Frame-work to coordinate and monitor various aspects of a recovery and recycling program.

Some of the specific proposals or recommendations in relation to the above are enumerated below :

Pricing & Trade

The indicative retail prices in Egypt for CFC-11 and CFC-12 have been USD 2.2 and between USD 3.5 to USD 3.9 respectively depending upon the packing and source of supply. CFC's at present attract a very low rate of duty which is 10%. There is ample scope for increasing the duty manifold - perhaps to 50%.

The impact of higher prices of virgin CFC's will be to make recovery and recycling more attractive.

In our workings we have assumed that prices will be higher than present as a result of higher duties as

well as reduction in availability considering that most of Egypt's requirements of CFC's are met by three manufacturers from developed countries which are party to the protocol.

The permits for import of CFCs may be auctioned by the government to make the market forces dictate the pricing of CFCs in a reducing supply scenario.

It must also be kept in mind that while every encouragement should be given to reduce CFC consumption and emission the policies must not lead to premature retirement of CFC based equipment, because of constraints on availability of CFC for recharging.

This is particularly so for domestic refrigerators where there is a very large population of CFC 12 based equipment.

Collection

The bedrock of the national system outlined is the concept of the seller of virgin CFC accepting recovered CFC for recycling.

The fact of centres of consumption being localised at urban centres would be compatible with the number of recycling centres proposed - about 12. Clear legislation making it obligatory for a seller to buy back CFC's in bags or cylinders would prompt the major suppliers and their agents to have recycling facilities and separate recovery units to accept plastic bags.

The other critical issue in collection of CFC's in the case of Egypt is in terms of ensuring collection through plastic bags. The refrigerator sector accounts for 80% of the technically recoverable quantity (1991) of which a large proportion will have to be eventually recovered by small service agencies using plastic bags.

Transitional Arrangements

In the mobile air-conditioning sector cars fitted with air-conditioners running on 134a have already been introduced in Egypt by Mercedes Benz and BMW. We are informed that other overseas car manufacturers are at various stages of introducing models with HFC based air-conditioners.

In domestic refrigerators it may take two or more years before HFC 134a based fridges are introduced.

In the case of fridges, owing to the long life there will be long period of transition during which CFC 12 and HFC 134a equipment will coexist.

In cars owing to the technical difficulty in retrofitting a HFC 134a based air-conditioners there is likely to be a long period of transition.

Among others a step that can be taken to speed up the transition is to encourage switch over by lowering duty on substitutes and substitute based equipment.

2.2

KENYA

We have outlined various measures for implementing a recovery and recycling program in Kenya in the text of the main report.

These included :

- legislation to monitor supply and usage
- financial measures in terms of subsidies and grants to set up ventures for collection/recovery and recycling and to fund costs of training and public awareness.
- institutional strengthening

While all the above areas are equally important, we would focus attention on some specific areas which are more crucial stemming from Kenya's specific economic situation and the structure of its refrigeration sector.

The overall consumption of CFC's in Kenya is fairly small, and that of CFC-12 has been forecast to move from 83 tons in 1991 to 55 tons in 1996 and 37 tons in 2005.

In 1991 a significant proportion of the consumption i.e. 30% was technically recoverable of which a further 60-70% could be eliminated simply through better practices.

In 1996 of the total demand almost 50% would be technically recoverable of which a significant proportion could again be expected to be eliminated through better practices.

Thus the focus of measures should be on implementing a better code of practice.

Since number of service agencies are limited a proper procedure for accreditation and certification should be implemented. Thus it should be made mandatory to use Nitrogen for flushing and leak detection instead of CFC unless a recovery equipment is used to avoid the CFC being let out in the atmosphere.

Pricing and Trade

The indicative retail prices in Kenya for CFC 11 and CFC 12 have been USD 2.9 and between USD 4.6 to USD 7.9 respectively.

Unlike in many other countries the total quantity of CFC required by Kenya is insignificant. Thus the imports of this would not be as severely affected by reduced availability from developed countries.

Thus the situation would call for a conscious initiative from the Government to curtail the import of CFC's from year to year.

This could be achieved by auction of import permits for a specified aggregate quantity.

Customs duties which are currently 31.26% could also be enhanced - perhaps to 50% which would be another method of increasing price and encourage recovery and recycling.

Collection

With the low magnitude of consumption as also the distribution of refrigerators confined to the affluent sections of society the manufacturers and large service agencies could be asked by the Government/Nominated Environmental Agency to install portable recovery equipment together with plastic bags for collection.

This again would require financial support, particularly for plastic bags whose unit price per cycle of usage is much too high in proportion to the value of CFC collected.

We envisage that the cost of plastic bags will be met through external funding or by an arrangement so that it is not a national cost.

Transitional Arrangements

Here again given the low order of magnitude of CFC consumption the transition to substitutes may not pose very serious problems. Manufacturers of refrigerators

have already indicated that their overseas collaborators would be advising them on switch over to equipment based on substitutes shortly.

2.3

NIGERIA

Various measures were outlined in the text of the main report for implementing a recovery and recycling programme. These included :

- i) Command and control measures such as enactment of legislation on -
 - supply of CFC's to enable closer monitoring of imports and sales
 - use of CFC's by accredited users only
- ii) Financial measures covering
 - a) subsidies on capital equipment, bags, etc.
 - b) increased duties on CFC's
 - c) Funding of promotion/training activities

iii) Steps for creating the Institutional Framework

In addition to the broad measures above we are presenting here below specific actions which in our opinion would be particularly relevant for Nigeria given the environment there.

Pricing and Trade

The indicative retail prices in Nigeria for CFC 11 and CFC 12 have been USD 1.8 to 2.3 and USD 3 to 4 respectively.

For a country with a severe balance of payments problem the existing duty rate of 15% on CFC's has considerable scope for enhancement. We see no difficulty in raising the customs duty to 50%.

The major supplier of CFC's to Nigeria is ICI through its subsidiary Chemicals and Allied Products Ltd (CAPL). With the implementation of the protocol in the advanced countries and the consequent cut back in production, there is bound to be constraints on supply of CFC's.

It is thus likely that even without resorting to specific curbs on imports there will be a shrinkage to supply with an attendant increase in prices.

Collection Policy

In Nigeria the major source of CFC for recovery is from mobile (car) air-conditioners which accounts for over 80% of recoverable CFC's.

A major proportion of the population of air-conditioned cars exists in Lagos.

Thus it is important that steps are taken to encourage service stations to install recovery equipment.

We have assumed that about 150 service stations would need to be operative to recover CFC's.

This calls for accreditation of agencies entitling only those with recovery machines to undertake repair of car air-conditioners.

Promotional campaign to encourage motorists to use such service stations would require to be initiated. In addition the duties on these equipment would be waived as already recommended earlier.

In case of servicing of domestic refrigerators at least manufacturers' service agencies should be obliged by law to equip service mechanics with portable recovery machines or plastic bags.

Transitional Arrangements

In key sectors namely mobile (car) air-conditioners and domestic refrigerators the transition to equipment based on substitutes would take a fairly long time in Nigeria.

In the case of car air-conditioners annual imports have been declining over the last few years and are but a small percentage of the population of a/c fitted cars. Given the health of economy and the consumer it will be a long time before the population of HFC 134a based air-conditioned cars builds up.

In domestic fridges again the population is increasing very slowly as the current levels of production are low in view of the state of the economy.

Since refrigerators have a longer life span than car air-conditioners there will be a large population of CFC-12 based fridges for the next few years.

Given the state of the Nigerian Economy and the currently low purchasing power any policy involving transition should ensure that assets are not scrapped before the end of their useful life.

However switch over to alternatives can be encouraged by reducing duty on substitutes and substitute based equipment.

CHAPTER-3

VENTURE LEVEL ANALYSIS FOR MOBILE AIR-CONDITIONING SECTOR

Appendix 3.1 A, B & C and 3.2 A, B & C detail the Economic Viability Analysis for a recovery venture & recycling venture with additional recovery unit respectively for Egypt, Kenya & Nigeria.

The break even levels for a recycling venture have been worked out and are given below for each country.

Country	Annual Break-even Quantity of CFC-12 (in Kg)
Egypt	1439
Kenya	1013
Nigeria	1306

Given the above break-even quantities, these ventures would require higher volumes of CFCs than the quantities recovered by typical garages. Therefore, it is assumed that these ventures would operate by using recovered CFC from different sectors. For garages where the volume of CFC recovered is low the type of venture would be one with a recovery machine alone.

The calculations pertaining to the above have been presented in appendix 5.3 of each country's Final Confidential Report.

For the typical venture having a recovery unit in garages catering to the mobile air-conditioning sector the investments, pay-back period & rate of return are given in the table below :

Country	Capital Employed	Internal rate of return	Pay-back period on total capital Employed
Egypt	4476 (LE)	23.5%	About 4 yrs
Kenya	38247 (KSH)	27.7%	4 yrs
Nigeria	24331 (N)	47.2%	2 yrs

The working details of the above have been given in each country's Final Confidential Report.

CHAPTER - 4

NET NATIONAL ECONOMIC ANALYSIS

4.1

CLARIFICATIONS ON THE METHODOLOGY

The Net National Economic Analysis presented in the report has been worked out using the principles of social cost benefit analysis within the limitations imposed by the necessity of confining ourselves to quantifiable variables.

The benefits and costs considered are :

Benefits

- B1 - Savings in imports of refrigerants (CFC's)
- B2 - Increase in employment measures in terms of increased private consumption and investment (taken equal to savings)
- B3 - weighted increase in consumption and investment of owners of enterprises
- B4 - Increased Government revenues on duties of CFC's

Costs

- C1 - Outflows on account of equipment and consumables
- C2 - Training costs and publicity at venture level and Government level
- C3 - Increase in costs of overheads and maintenance of ventures
- C4 - Duties and taxes foregone by the Government on imports of CFC saved

The National Economic Analysis uses the values obtained from the analysis of working of ventures involved in the recovery and recycling program.

While the relationship between the heads in the National Level Economic Analysis and their sources have been spelt out in Appendix 5.6 of the Final Report (read together with Appendix 5.4) the nature of linkage between venture level analysis and the National Economic Analysis is clarified below.

The starting point for the exercise is determining the practically recoverable quantity of CFC's over the years.

This has been done taking into account the recharging demand and estimating therefrom what is technically recoverable and practically recoverable.

Based on technical feasibility and a prima facie economic viability three types of ventures have been considered in the national system.

Venture type 'A' involving recovery of CFC's from domestic refrigerators using plastic bags where the quantity recovered by an individual service agency is low.

Venture type 'B' involving recovery of CFCs using a recovery machinery which would be installed at larger service agencies and car garages where the quantities recovered would be reasonably high.

Venture type 'C' involving a recycling unit with a separate recovery unit which would recycle all CFC's recovered by venture types 'B' and 'A' above.

Recycling ventures would be installed at selling agencies/distributors of CFC's who deal in large quantities and have an existing distribution channel linking them to service agencies and to the sources of supply.

The number of ventures of each type have been worked out taking into account the logistical considerations and more important the need to ensure that such ventures are able to run at a capacity utilisation above break-even level and are a viable project themselves.

The number of ventures of types 'B' and 'C' in each country is given below :

	Venture Type 'B'	Venture Type 'C'
Egypt	100	12
Kenya	40	5
Nigeria	150	10

Venture type 'A' does not involve capital investment and therefore numbers are not relevant.

Having determined the number of ventures of each type, the various costs at venture level have been aggregated to work out the net National Economic Analysis.

- * For instance the savings in import of CFCs has been taken in the quantity recycled by all ventures of type 'C' put together.
- * The increase in operating costs have been worked out by aggregating the operating costs of all ventures.

The viability analysis at venture level for each country (and therefore the national level agencies) specifically takes into account the following :

- Assumed phase out of CFCs and replacement by substitutes.
- Increases in customs duties and expected increase in price of CFCs in future
- Reduction in overall CFC consumption to comply with the Montreal Protocol

These have been reflected in the working sheets presented in Appendix 5.3 of the Country-wise Final Confidential Reports.

We are presenting below additional analysis on sensitivity to change in various variables.

4.2 NET NATIONAL ECONOMIC ANALYSIS WITHOUT THE COST OF SUBSIDIZING PLASTIC BAGS

While the earlier analysis at venture level assumes cost of bags to be subsidised, the national level analysis recognises this as a cost to the country - the subsidy being merely an internal arrangement.

We have however presented, as desired, in Appendix 4.1 A, B & C for Egypt, Kenya & Nigeria respectively a revised computation of Net National Economic Analysis excluding the cost of plastic bags. This implies that the cost of bags will be entirely borne by an external agency or by an arrangement so that it is not a national cost.

4.3 SENSITIVITY ANALYSIS WITH 10% DISCOUNT RATE

The net national economic benefit has been recomputed for the three countries using a discount rate of 10% rather than 2%.

The results for Egypt, Kenya & Nigeria are presented in Appendix 4.2 A, B & C respectively.

4.4 SENSITIVITY ANALYSIS WITH REDUCED CFC SUPPLY

Appendix 4.3 A, B & C for Egypt, Kenya & Nigeria present the Net National Economic Benefit worked out on the basis of 10% lower levels of supply of CFCs.

We have assumed that imports of CFC's will have to be curtailed by 10% every year from 1993. We have further assumed for computation that this will be applicable for CFC 12 which is the major CFC imported for use in the domestic refrigeration and mobile air-conditioning sectors.

The shortfall in total requirement has been assumed to be made up by increased volumes of recovery and recycling.

This is necessary because after 1996 the total demand of CFC's in the countries is only recharging demand and if this is not met it would result in premature retirement of domestic fridges and/or car air-conditioners which would be a great cost to these economies.

As expected the increased activity level of recovery and recycling ventures reduce the total cost to each country by adopting a CFC recovery and recycling programme.

APPENDICES

APPENDIX 3.1 (A)
(EGYPT)

VENTURE LEVEL ANALYSIS FOR RECOVERY FROM MOBILE AIRCONDITIONERS

(IN LE)

1. Sale Price of recovered CFC (as % of selling price of virgin gas)	8.00 (50%)
2. Variable Costs	
- Raw material costs	0.00
- Consumables cost	1.03
- Utilities cost	0.00
- Labour cost	0.45
Total variable costs	1.48
Contribution	6.52
3. Fixed Costs	
- Repairs & Maintenance (including overheads)	233
- Selling & Administration expenses	200
- Financial expenses	483
- Depreciation	448
Total Fixed Costs	1364
4. Break-even Analysis	
- Breakeven quantity in Kg	209
- Breakeven level of sales	1673
- Breakeven level as % of sales	70

APPENDIX 3.1(B)
(KENYA)

VENTURE LEVEL ANALYSIS FOR RECOVERY FROM MOBILE AIRCONDITIONERS

(IN KSH)

1. Sale Price of recovered CFC (as % of selling price of virgin gas)	100.00 (50%)
2. Variable Costs	
- Raw material costs	0.00
- Consumables cost	8.68
- Utilities cost	0.10
- Labour cost	6.00
Total variable costs	14.78
Contribution	85.22
3. Fixed Costs	
- Repairs & Maintenance (including overheads)	1946
- Selling & Administration expenses	2000
- Financial expenses	4590
- Depreciation	3825
Total Fixed Costs	12360
4. Break-even Analysis	
- Breakeven quantity in Kg	145
- Breakeven level of sales	14504
- Breakeven level as % of sales	73

APPENDIX 3.11(C)
(NIGERIA)

VENTURE LEVEL ANALYSIS FOR RECOVERY FROM MOBILE AIRCONDITIONERS

(IN N)

1. Sale Price of CFC	50.00 (50%)
2. Variable Costs	
- Raw material costs	0.00
- Consumables cost	5.58
- Utilities cost	0.02
- Labour cost	2.38
Total variable costs	7.97
Contribution	42.03
3. Fixed Costs	
- Repairs & Maintenance(Including overheads)	1301
- Selling & Administration expenses	1000
- Financial expenses	3893
- Depreciation	2433
Total Fixed Costs	8627
4. Break-even Analysis	
- Breakeven quantity in Kg	205
- Breakeven level of sales	10263
- Breakeven level as % of sales	51

APPENDIX 3.2 (A)

(EGYPT)

VENTURE LEVEL ANALYSIS FOR RECYCLING WITH ADDITIONAL RECOVERY UNIT

(IN LE)

1. Sale Price of CFC	16.00
2. Variable Costs	
- Raw material costs	8.00
- (as % of selling price of recycled cfc)	(50%)
- Consumables cost	1.36
- Utilities cost	0.00
- Labour cost	0.68
- Transportation and Storage	0.42
Total variable costs	10.46
Contribution	5.54
3. Fixed Costs	
- Repairs & Maintenance(Including overheads)	2259
- Selling & Administration expenses	3500
- Financial expenses	1152
- Depreciation	1067
Total Fixed Costs	7979
4. Breakeven Analysis	
- Breakeven quantity in Kg	1439
- Breakeven level of sales	23027
- Breakeven level as % of sales	55

APPENDIX 3.2(B)

(KENYA)

VENTURE LEVEL ANALYSIS FOR RECYCLING WITH ADDITIONAL RECOVERY UNIT

(IN KSH)

1. Sale Price of recycled CFC	200.00
2. Variable Costs	
- Raw material costs (recovered CFC)	100.00
- (as % of selling price of recycled CFC)	(50%)
- Consumables cost	11.48
- Utilities cost	0.10
- Labour cost	9.00
- Transportation and Storage	12.93
Total variable costs	133.51
Contribution	66.49
3. Fixed Costs	
- Repairs & Maintenance(Including overheads)	17391
- Selling & Administration expenses	30000
- Financial expenses	10901
- Depreciation	9084
Total Fixed Costs	67376
4. Breakeven Analysis	
- Breakeven quantity in Kg	1013
- Breakeven level of sales	202675
- Breakeven level as % of sales	62

APPENDIX 3.2 (C)
(NIGERIA)

VENTURE LEVEL ANALYSIS FOR RECYCLING WITH ADDITIONAL RECOVERY UNIT

	(IN N)
1. Sale Price of CFC	100.00
2. Variable Costs	
- Raw material costs	50.00
- (as % of selling price of recycled CFC)	(50%)
- Consumables cost	7.38
- Utilities cost	0.02
- Labour cost	3.50
- Transportation and Storage	3.01
Total variable costs	63.91
Contribution	36.09
3. Fixed Costs	
- Repairs & Maintenance(Including overheads)	12042
- Selling & Administration expenses	20000
- Financial expenses	9282
- Depreciation	5801
Total Fixed Costs	47125
4. Breakeven Analysis	
- Breakeven quantity in Kg	1306
- Breakeven level of sales	130582
- Breakeven level as % of sales	55

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Without the cost of plastic bags)

APPENDIX 4.1(A)
EGYPT

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	100	100	100	100	100	100	100
- Recycling only	12	12	12	12	12	12	12	12
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	31	120	126	126	125	96	82	57
- CIF price (in LE per MT)	7282	7282	7282	7282	7282	7282	7282	7282
- Value saved (in LE ; quantity * CIF price)	229230	872529	915347	919353	913163	701038	599709	415547
2. Employment related benefits								
- Increase in consumption	123519	584158	602610	598634	585053	469781	411181	294566
- Increase in saving	37944	179447	185115	183894	179722	144312	126310	90488
- Total increase	161462	763605	787725	782528	764775	614093	537491	385054
3. Government expenditure related benefits								
- Increase in consumption	864961	143444	129301	129301	129301	129301	129301	129301
- Increase in saving	265707	44064	39720	39720	39720	39720	39720	39720
- Total increase	1130668	187508	169021	169021	169021	169021	169021	169021
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	21155	124285	139183	144681	151160	109484	84962	44617
- Series 2 Ventures	0	6527	7131	10249	13430	13221	9508	4093
- Series 3 Ventures	0	5923	6527	7131	11962	15129	11364	5846
- TOTAL INCREASE IN TAXES	21155	136735	152841	162061	176553	137834	105834	54556
TOTAL BENEFITS (A)	1542515	1960377	2024935	2032963	2023512	1621986	1412055	1024178

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Without the cost of plastic bags)

APPENDIX 4.1(A)
EGYPT

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	100	100	100	100	100	100	100
- Recycling only	12	12	12	12	12	12	12	12
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	31	120	126	126	125	96	82	57
- CIF price (in LE per MT)	7282	7282	7282	7282	7282	7282	7282	7282
- Value saved (in LE ; quantity * CIF price)	229230	872529	915347	919353	913163	701038	599709	415547
2. Employment related benefits								
- Increase in consumption	123519	584158	602610	598634	585053	469781	411181	294566
- Increase in saving	37944	179447	185115	183894	179722	144312	126310	90488
- Total increase	161462	763605	787725	782528	764775	614093	537491	385054
3. Government expenditure related benefits								
- Increase in consumption	864961	143444	129301	129301	129301	129301	129301	129301
- Increase in saving	265707	44064	39720	39720	39720	39720	39720	39720
- Total increase	1130668	187508	169021	169021	169021	169021	169021	169021
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	21155	124285	139183	144681	151160	109484	84962	44617
- Series 2 Ventures	0	6527	7131	10249	13430	13221	9508	4093
- Series 3 Ventures	0	5923	6527	7131	11962	15129	11364	5846
- TOTAL INCREASE IN TAXES	21155	136735	152841	162061	176553	137834	105834	54556
TOTAL BENEFITS (A)	1542515	1960377	2024935	2032963	2023512	1621986	1412055	1024178

	1993	1995	1996	1997	1999	2005	2007	2010	
B. COSTS									
1. Additional outflows on account of imports (net of duties and taxes)									
- Capital equipment	273869	86888	0	0	0	0	0	0	
- Consumables & spares	58112	193391	205372	207884	208813	155274	130562	88114	
2. Capital investment (excluding (1) above)	64268	20661	0	0	0	0	0	0	
3. Government expenditures									
a. Training cost incurred in foreign currency	99300	0	0	0	0	0	0	0	
b. Training cost incurred in local currency	27387								
c. Publicity expenses	358387	8689	0	0	0	0	0	0	
d. Administrative Expenses	145640	79440	79440	79440	79440	79440	79440	79440	
e. Subsidy on equipments	52166	16550	0	0	0	0	0	0	
4. Increase in wage costs (total wages and salaries weighted by 0.2)	4743	22431	23139	22987	22465	18039	15789	11311	
5. Increase in operating costs (excluding raw material, consumables and labour)									
- Series 1 Ventures *	121729	318866	331977	333181	331241	266193	235105	178565	
- Series 2 Ventures	0	1070	1070	1146	1205	1010	898	735	
- Series 3 Ventures	0	1070	1070	1070	1179	1067	954	788	
- TOTAL OPERATING COST	121729	321007	334117	335396	333625	268269	236957	180088	
6. Decrease in government duties on import of CFCs									
- Rate of duty (%)	50	50	50	50	50	50	50	50	
- Quantity of CFC import reduced (in MT)	31	120	126	126	125	96	82	57	
- Value of reduced duties	114615	436265	457674	459676	456581	350519	299855	207774	
TOTAL COSTS (B)	1320215	1185320	1099743	1105383	1100925	871542	762603	566727	
NET NATIONAL ECONOMIC BENEFIT									
- ANNUAL		222300	775057	925192	927580	922587	750444	649453	457451
- PRESENT VALUE (22.0% discounting)		LE 10914568							
		US \$ 3297453							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Without the cost of plastic bags)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	15	40	40	40	40	40	40	40
- Recycling only	3	5	5	5	5	5	5	5
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	5	13	15	17	18	16	13	9
- CIF price (in KSH per MT)	70000	70000	70000	70000	70000	70000	70000	70000
- Value saved (in KSH ; quantity * CIF price)	341953	881326	1064188	1170877	1263522	1088623	920053	600307
2. Employment related benefits								
- Increase in consumption	121991	435504	484629	504847	513030	413769	349932	234764
- Increase in saving	77341	276104	307248	320066	325254	262324	221853	148837
- Total increase	199332	711608	791878	824913	838284	676093	571785	383602
3. Government expenditure related benefits								
- Increase in consumption	3287972	614703	529979	529979	529979	529979	529979	529979
- Increase in saving	2084531	389714	336000	336000	336000	336000	336000	336000
- Total increase	5372504	1004417	865979	865979	865979	865979	865979	865979
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	54478	111266	181857	228331	277956	268045	214624	111070
- Series 2 Ventures	0	37185	47400	82994	119899	141659	122300	76668
- Series 3 Ventures	0	36895	47700	57712	137609	196878	179507	125760
- TOTAL INCREASE IN TAXES	54478	185347	276957	369038	535463	606583	516431	313498
TOTAL BENEFITS (A)	5968267	2782698	2999002	3230807	3503249	3237278	2874248	2163386

	1993	1995	1996	1997	1999	2005	2007	2010	
B. COSTS									
1. Additional outflows on account of imports (net of duties and taxes)									
- Capital equipment (including machine spares)	685314	537138	0	0	0	0	0	0	
- Consumables	82120	211201	263622	295969	326012	286776	242321	156763	
2. Capital investment (excluding (1) above)	160918	127409	0	0	0	0	0	0	
3. Government expenditures									
a. Training cost incurred in foreign currency	840000	0	0	0	0	0	0	0	
b. Training cost incurred in local currency	68531	53714	0	0	0	0	0	0	
c. Publicity expenses	2868531	53714	0	0	0	0	0	0	
d. Administrative Expenses	1232000	672000	672000	672000	672000	672000	672000	672000	
e. Subsidy on equipments	130536	102312	0	0	0	0	0	0	
4. Increase in wage costs (total wages and salaries weighted by 0.2)	9668	34513	38406	40008	40657	32791	27732	18605	
5. Increase in operating costs (excluding raw material, consumables and labour)									
- Series 1 Ventures *	245591	318528	361872	387153	409098	367592	327618	251799	
- Series 2 Ventures	0	93122	107886	122605	134971	128902	118377	95010	
- Series 3 Ventures	0	85350	94865	109595	133371	134867	126955	105470	
- TOTAL OPERATING COST	245591	497000	564623	619353	677441	631361	572949	452279	
6. Decrease in government duties on import of CFCs									
- Rate of duty (%)	65	65	65	65	65	65	65	65	
- Quantity of CFC import reduced (in MT)	5	13	15	17	18	16	13	9	
- Value of reduced duties	222269	572862	691722	761070	821289	707605	598034	390199	
TOTAL COSTS (B)	7777479	3533863	2902373	3060401	3209399	3002533	2785036	2361846	
NET NATIONAL ECONOMIC BENEFIT									
- ANNUAL	KSH	-1809212	-751165	96629	170406	293850	234745	89212	-198460
- PRESENT VALUE (@ 2.0% discounting)	KSH	-1135781							
	US \$	-40564							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Without the cost of plastic bags)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	150	150	150	150	150	150	150
- Recycling only	10	10	10	10	10	10	10	10
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	24	78	77	72	65	35	23	8
- CIF price (in N per MT)	40000	40000	40000	40000	40000	40000	40000	40000
- Value saved (in N ; quantity * CIF price)	942398	3126031	3076776	2898311	2592821	1408240	909157	300445
2. Employment related benefits								
- Increase in consumption	269694	1044464	1029766	962322	826129	438085	274309	87929
- Increase in saving	132624	513623	506396	473259	406256	215432	134894	43240
- Total increase	402317	1558087	1536162	1435641	1232385	653517	409203	131169
3. Government expenditure related benefits								
- Increase in consumption	2934071	641016	439240	439240	439240	439240	439240	439240
- Increase in saving	1442853	315225	216000	216000	216000	216000	216000	216000
- Total increase	4376924	956241	655240	655240	655240	655240	655240	655240
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	151944	636847	632237	594648	536625	259442	124938	-41507
- Series 2 Ventures	0	86711	91577	93613	86722	70694	43978	8402
- Series 3 Ventures	0	81845	86711	91577	89883	82604	57410	19958
- TOTAL INCREASE IN TAXES	151944	805402	810525	779823	713230	412740	226326	-13146
TOTAL BENEFITS (A)	5873583	6445762	6078703	5769031	5193677	3129738	2199926	1073708

	1993	1995	1996	1997	1999	2005	2007	2010
B. COSTS								
1. Additional outflows on account of imports (net of duties and taxes)								
- Capital equipment (including machine spares)	1468530	992250	0	0	0	0	0	0
- Consumables	285472	911553	896774	846565	765556	418303	272067	90551
2. Capital investment (excluding (1) above)	328155	224295	0	0	0	0	0	0
3. Government expenditures								
a. Training cost incurred in foreign currency	540000	0	0	0	0	0	0	0
b. Training cost incurred in local currency	146853	99225	0	0	0	0	0	0
c. Publicity expenses	1946853	99225	0	0	0	0	0	0
d. Administrative Expenses	792000	432000	432000	432000	432000	432000	432000	432000
e. Subsidy on equipments	279720	189000	0	0	0	0	0	0
4. Increase in wage costs (total wages and salaries weighted by 0.2)	16578	64203	63299	59157	50782	26929	16862	5405
5. Increase in operating costs (excluding raw material, consumables and labour)								
- Series 1 Ventures *	569807	1313028	1296146	1234941	1130119	724015	552916	344267
- Series 2 Ventures	0	13400	13400	13259	12430	9691	8359	6585
- Series 3 Ventures	0	13400	13400	13400	12831	10284	9028	7161
- TOTAL OPERATING COST	569807	1339829	1322946	1261600	1155380	743990	570303	358014
6. Decrease in government duties on import of CFCs								
- Rate of duty (%)	50	50	50	50	50	50	50	50
- Quantity of CFC import reduced (in MT)	24	78	77	72	65	35	23	8
- Value of reduced duties	471199	1563016	1538388	1449156	1296411	704120	454578	150222
TOTAL COSTS (B)	7637167	6346595	4685408	4480479	4132129	2757342	2177810	1468192
NET NATIONAL ECONOMIC BENEFIT								
- ANNUAL	-1763584	99167	1393295	1288552	1061548	372396	22116	-394484
- PRESENT VALUE (@ 2.0% discounting)	N 5151940							
	US \$ 286219							

* Series 1 Ventures - Those starting in 1993
Series 2 Ventures - Those starting in 1994
Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by some external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Using 10% discounting rather than 2% discounting)

APPENDIX 4.2(A)
EGYPT

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	100	100	100	100	100	100	100
- Recycling only	12	12	12	12	12	12	12	12
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	31	120	126	126	125	96	82	57
- CIF price (in LE per MT)	7282	7282	7282	7282	7282	7282	7282	7282
- Value saved (in LE ; quantity * CIF price)	229230	872529	915347	919353	913163	701038	599709	415547
2. Employment related benefits								
- Increase in consumption	123519	584158	602610	598634	585053	469781	411181	294566
- Increase in saving	37944	179447	185115	183894	179722	144312	126310	90488
- Total increase	161462	763605	787725	782528	764775	614093	537491	385054
3. Government expenditure related benefits								
- Increase in consumption	864961	143444	129301	129301	129301	129301	129301	129301
- Increase in saving	265707	44064	39720	39720	39720	39720	39720	39720
- Total increase	1130668	187508	169021	169021	169021	169021	169021	169021
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	21155	124285	139183	144681	151160	109484	84962	44617
- Series 2 Ventures	0	6527	7131	10249	13430	13221	9508	4093
- Series 3 Ventures	0	5923	6527	7131	11962	15129	11364	5846
- TOTAL INCREASE IN TAXES	21155	136735	152841	162061	176553	137834	105834	54556
TOTAL BENEFITS (A)	1542515	1960377	2024935	2032963	2023512	1621986	1412055	1024178

	1993	1995	1996	1997	1999	2005	2007	2010
B. COSTS								
1. Additional outflows on account of imports (net of duties and taxes)								
- Capital equipment	273869	86888	0	0	0	0	0	0
- Consumables & spares	58112	193391	205372	207884	208813	155274	130562	88114
2. Capital investment (excluding (i) above)								
	64268	20661	0	0	0	0	0	0
3. Government expenditures								
a. Training cost incurred in foreign currency	99300	0	0	0	0	0	0	0
b. Training cost incurred in local currency	27387							
c. Publicity expenses	358387	8689	0	0	0	0	0	0
d. Administrative Expenses	145640	79440	79440	79440	79440	79440	79440	79440
e. Subsidy on equipments	52166	16550	0	0	0	0	0	0
4. Increase in wage costs (total wages and salaries weighted by 0.2)								
	4743	22431	23139	22987	22465	18039	15789	11311
5. Increase in operating costs (excluding raw material, consumables and labour)								
- Series 1 Ventures *	121729	318866	331977	333181	331241	266193	235105	178565
- Series 2 Ventures	0	1070	1070	1146	1205	1010	898	735
- Series 3 Ventures	0	1070	1070	1070	1179	1067	954	788
- TOTAL OPERATING COST	121729	321007	334117	335396	333625	268269	236957	180088
6. Decrease in government duties on import of CFCs								
- Rate of duty (%)	50	50	50	50	50	50	50	50
- Quantity of CFC import reduced (in MT)	31	120	126	126	125	96	82	57
- Value of reduced duties	114615	436265	457674	459676	456581	350519	299855	207774
TOTAL COSTS (B)	1320215	1185320	1099743	1105383	1100925	871542	762603	566727
NET NATIONAL ECONOMIC BENEFIT								
- ANNUAL	222300	775057	925192	927580	922587	750444	649453	457451
- PRESENT VALUE (@10.0% discounting)	LE 5886882							
	US \$ 1778514							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Using 10% discounting rather than 2% discounting)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	15	40	40	40	40	40	40	40
- Recycling only	3	5	5	5	5	5	5	5
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	5	13	15	17	18	16	13	9
- CIF price (in KSH per MT)	70000	70000	70000	70000	70000	70000	70000	70000
- Value saved (in KSH ; quantity * CIF price)	341953	881326	1064188	1170877	1263522	1088623	920053	600307
2. Employment related benefits								
- Increase in consumption	121991	435504	484629	504847	513030	413769	349932	234764
- Increase in saving	77341	276104	307248	320066	325254	262324	221853	148837
- Total increase	199332	711608	791878	824913	838284	676093	571785	383602
3. Government expenditure related benefits								
- Increase in consumption	3287972	614703	529979	529979	529979	529979	529979	529979
- Increase in saving	2084531	389714	336000	336000	336000	336000	336000	336000
- Total increase	5372504	1004417	865979	865979	865979	865979	865979	865979
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures #	54478	111266	181857	228331	277956	268045	214624	111070
- Series 2 Ventures	0	37185	47400	82994	119899	141659	122300	76668
- Series 3 Ventures	0	36895	47700	57712	137609	196878	179507	125760
- TOTAL INCREASE IN TAXES	54478	185347	276957	369038	535463	606583	516431	313498
TOTAL BENEFITS (A)	5968267	2782698	2999002	3230807	3503249	3237278	2874248	2163386

	1993	1995	1996	1997	1999	2005	2007	2010	
B. COSTS									
1. Additional outflows on account of imports (net of duties and taxes)									
- Capital equipment (including machine spares)	685314	537138	0	0	0	0	0	0	
- Consumables	82120	211201	263622	295969	326042	286776	242321	156763	
2. Capital investment (excluding (1) above)	160918	127409	0	0	0	0	0	0	
3. Government expenditures									
a. Training cost incurred in foreign currency	840000	0	0	0	0	0	0	0	
b. Training cost incurred in local currency	68531	53714	0	0	0	0	0	0	
c. Publicity expenses	2868531	53714	0	0	0	0	0	0	
d. Administrative Expenses	1232000	672000	672000	672000	672000	672000	672000	672000	
e. Subsidy on equipments	130536	102312	0	0	0	0	0	0	
4. Increase in wage costs (total wages and salaries weighted by 0.2)	9668	34513	38406	40008	40657	32791	27732	18605	
5. Increase in operating costs (excluding raw material, consumables and labour)									
- Series 1 Ventures *	245591	318528	361872	387153	409098	367592	327618	251799	
- Series 2 Ventures	0	93122	107886	122605	134971	128902	118377	95010	
- Series 3 Ventures	0	85350	94865	109595	133371	134867	126955	105470	
- TOTAL OPERATING COST	245591	497000	564623	619353	677441	631361	572949	452279	
6. Decrease in government duties on import of CFCs									
- Rate of duty (%)	65	65	65	65	65	65	65	65	
- Quantity of CFC import reduced (in MT)	5	13	15	17	18	16	13	9	
- Value of reduced duties	222269	572862	691722	761070	821289	707605	598034	390199	
TOTAL COSTS (B)	7777479	3533863	2902373	3060401	3209399	3002533	2785036	2361846	
NET NATIONAL ECONOMIC BENEFIT									
- ANNUAL	KSH	-1809212	-751165	96629	170406	293850	234745	89212	-198460
- PRESENT VALUE (@ 10.0% discounting)	KSH	-1736761							
	US \$	-62027							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Using 10% discounting rather than 2% discounting)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	150	150	150	150	150	150	150
- Recycling only	10	10	10	10	10	10	10	10
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	24	78	77	72	65	35	23	8
- CIF price (in N per MT)	40000	40000	40000	40000	40000	40000	40000	40000
- Value saved (in N ; quantity * CIF price)	942398	3126031	3076776	2898311	2592821	1408240	909157	300445
2. Employment related benefits								
- Increase in consumption	269694	1044464	1029766	962382	826129	438085	274309	87929
- Increase in saving	132624	513623	506396	473259	406256	215432	134894	43240
- Total increase	402317	1558087	1536162	1435641	1232385	653517	409203	131169
3. Government expenditure related benefits								
- Increase in consumption	2934071	641016	439240	439240	439240	439240	439240	439240
- Increase in saving	1442853	315225	216000	216000	216000	216000	216000	216000
- Total increase	4376924	956241	655240	655240	655240	655240	655240	655240
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	151944	636847	632237	594648	536625	259442	124938	-41507
- Series 2 Ventures	0	86711	91577	93613	86722	70694	43978	8402
- Series 3 Ventures	0	81845	86711	91577	89883	82604	57410	19958
- TOTAL INCREASE IN TAXES	151944	805402	810525	779838	713230	412740	226326	-13146
TOTAL BENEFITS (A)	5873583	6445762	6078703	5769031	5193677	3129738	2199926	1073708

	1993	1995	1996	1997	1999	2005	2007	2010
B. COSTS								
1. Additional outflows on account of imports (net of duties and taxes)								
- Capital equipment (including machine spares)	1468530	992250	0	0	0	0	0	0
- Consumables	285472	911553	896774	846565	765556	418303	272067	90551
2. Capital investment (excluding (1) above)	328155	224295	0	0	0	0	0	0
3. Government expenditures								
a. Training cost incurred in foreign currency	540000	0	0	0	0	0	0	0
b. Training cost incurred in local currency	146853	99225	0	0	0	0	0	0
c. Publicity expenses	1946853	99225	0	0	0	0	0	0
d. Administrative Expenses	792000	432000	432000	432000	432000	432000	432000	432000
e. Subsidy on equipments	279720	189000	0	0	0	0	0	0
4. Increase in wage costs (total wages and salaries weighted by 0.2)	16578	64203	63299	59157	50782	26929	16862	5405
5. Increase in operating costs (excluding raw material, consumables and labour)								
- Series 1 Ventures *	569807	1313028	1296146	1234941	1130119	724015	552916	344267
- Series 2 Ventures	0	13400	13400	13259	12430	9691	8359	6585
- Series 3 Ventures	0	13400	13400	13400	12831	10284	9028	7161
- TOTAL OPERATING COST	569807	1339829	1322946	1261600	1155380	743990	570303	358014
6. Decrease in government duties on import of CFCs								
- Rate of duty (Z)	50	50	50	50	50	50	50	50
- Quantity of CFC import reduced (in MT)	24	78	77	72	65	35	23	8
- Value of reduced duties	471199	1563016	1538388	1449156	1296411	704120	454578	150222
TOTAL COSTS (B)	7637167	6346595	4685408	4480479	4132129	2757342	2177810	1468192
NET NATIONAL ECONOMIC BENEFIT								
- ANNUAL	-1763584	99167	1393295	1288552	1061548	372396	22116	-394484
- PRESENT VALUE (@ 10.0% discounting)	N	2408997						
	US \$	133833						

* Series 1 Ventures - Those starting in 1993
Series 2 Ventures - Those starting in 1994
Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by some external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Assuming 10% reduction in the supply of CFC-12)

APPENDIX 4.3(A)
EGYPT

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	100	100	100	100	100	100	100
- Recycling only	12	12	12	12	12	12	12	12
BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	76	158	159	154	151	114	97	67
- CIF price (in LE per MT)	7282	7282	7282	7282	7282	7282	7282	7282
- Value saved (in LE ; quantity * CIF price)	554299	1148051	1154867	1121035	1099728	832464	707104	487464
2. Employment related benefits								
- Increase in consumption	198316	665798	673658	658693	640398	508731	443112	315736
- Increase in saving	60921	204526	206941	202344	196724	156277	136119	96991
- Total increase	259236	870324	880599	861037	837122	665007	579231	412726
3. Government expenditure related benefits								
- Increase in consumption	864961	143444	129301	129301	129301	12301	129301	129301
- Increase in saving	265707	44064	39720	39720	39720	39720	39720	39720
- Total increase	1130668	187508	169021	169021	169021	169021	169021	169021
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	169855	213722	216948	210162	211679	152084	119863	67943
- Series 2 Ventures	0	34053	25439	26172	26323	22697	17501	9508
- Series 3 Ventures	0	49114	34053	25439	25371	25250	20067	11970
- TOTAL INCREASE IN TAXES	169855	296889	276440	261773	263373	200031	157431	89421
TOTAL BENEFITS (A)	2114058	2502771	2480927	2412866	2369244	1866524	1612787	1158633

	1993	1995	1996	1997	1999	2005	2007	2010
B. COSTS								
1. Additional outflows on account of imports (net of duties and taxes)								
- Capital equipment	273869	86888	0	0	0	0	0	0
- Consumables & spares	153067	273879	275355	256213	263283	193620	161966	109110
2. Capital investment (excluding (1) above)	64268	20661	0	0	0	0	0	0
3. Government expenditures								
a. Training cost incurred in foreign currency	99300	0	0	0	0	0	0	0
b. Training cost incurred in local currency	27387							
c. Publicity expenses	358387	8689	0	0	0	0	0	0
d. Administrative Expenses	145640	79440	79440	79440	79440	79440	79440	79440
e. Subsidy on equipments	52166	16550	0	0	0	0	0	0
4. Increase in wage costs (total wages and salaries weighted by 0.2)	7615	25566	25868	25293	24590	19535	17015	12124
5. Increase in operating costs (excluding raw material, consumables and labour)								
- Series 1 Ventures *	222498	403176	405271	394896	388329	306407	267969	200571
- Series 2 Ventures	0	1897	1620	1624	1592	1294	1138	898
- Series 3 Ventures	0	2368	1897	1620	1582	1371	1215	972
- TOTAL OPERATING COST	222498	407441	408788	398140	391503	309072	270323	202441
6. Decrease in government duties on import of CFCs								
- Rate of duty (%)	50	50	50	50	50	50	50	50
- Quantity of CFC import reduced (in MT)	76	158	159	154	151	114	97	67
- Value of reduced duties	277149	574025	577433	560517	549864	416232	353552	243732
TOTAL COSTS (B)	1681345	1493138	1366884	1330203	1308680	1017899	882296	646847
NET NATIONAL ECONOMIC BENEFIT								
- ANNUAL	432712	1009633	1114044	1082663	1060563	848625	730491	511786
- PRESENT VALUE (32.0% discounting)	LE 12956675							
	US \$ 3914403							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Assuming 10% reduction in the supply of CFC-12)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	15	40	40	40	40	40	40	40
- Recycling only	3	5	5	5	5	5	5	5
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	7	13	16	17	18	16	13	9
- CIF price (in KSH per MT)	70000	70000	70000	70000	70000	70000	70000	70000
- Value saved (in KSH ; quantity * CIF price)	455353	921226	1098838	1199227	1289772	1107523	934403	608707
2. Employment related benefits								
- Increase in consumption	199324	475272	519164	533103	539193	432607	364235	243136
- Increase in saving	126369	301316	329143	337980	341841	274267	230920	154145
- Total increase	325692	776588	848308	871083	881034	706873	595155	397282
3. Government expenditure related benefits								
- Increase in consumption	3287972	614703	529979	529979	529979	529979	529979	529979
- Increase in saving	2084531	389714	336000	336000	336000	336000	336000	336000
- Total increase	5372504	1004417	865979	865979	865979	865979	865979	865979
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures #	362146	176218	238262	274481	320687	298812	237984	124744
- Series 2 Ventures	0	113626	88313	118524	147891	163192	139526	87075
- Series 3 Ventures	0	321930	160131	117886	180364	230132	208011	144235
- TOTAL INCREASE IN TAXES	362146	611775	486706	510891	648943	692136	585520	356054
TOTAL BENEFITS (A)	6515695	3314007	3299830	3447180	3685728	3372512	2981057	2228022

	1993	1995	1996	1997	1999	2005	2007	2010	
B. COSTS									
1. Additional outflows on account of imports (net of duties and taxes)									
- Capital equipment (including machine spares)	685314	537138	0	0	0	0	0	0	
- Consumables	171026	257325	303678	328742	356357	308625	258909	166474	
2. Capital investment (excluding (f) above)									
	160918	127409	0	0	0	0	0	0	
3. Government expenditures									
a. Training cost incurred in foreign currency	840000	0	0	0	0	0	0	0	
b. Training cost incurred in local currency	68531	53714	0	0	0	0	0	0	
c. Publicity expenses	2868531	53714	0	0	0	0	0	0	
d. Administrative Expenses	1232000	672000	672000	672000	672000	672000	672000	672000	
e. Subsidy on equipments	130536	102312	0	0	0	0	0	0	
4. Increase in wage costs (total wages and salaries weighted by 0.2)									
	15796	37665	41143	42248	42730	34283	28865	19268	
5. Increase in operating costs (excluding raw material, consumables and labour)									
- Series 1 Ventures *	296336	329240	371175	394765	416146	372666	331470	254055	
- Series 2 Ventures	0	100688	111935	126121	137742	131033	120082	96040	
- Series 3 Ventures	0	106796	103324	114123	136588	137369	129099	106860	
- TOTAL OPERATING COST	296336	536724	586434	635009	690476	641069	580651	456954	
6. Decrease in government duties on import of CFCs									
- Rate of duty (%)	65	65	65	65	65	65	65	65	
- Quantity of CFC import reduced (in MT)	7	13	16	17	18	16	13	9	
- Value of reduced duties	295979	598797	714244	779498	838352	719890	607362	395659	
TOTAL COSTS (B)	7996968	3648798	2989499	3129496	3271915	3047867	2819787	2382355	
NET NATIONAL ECONOMIC BENEFIT									
- ANNUAL	KSH	-1481273	-334791	310331	317685	413814	324645	161270	-154333
- PRESENT VALUE (@ 2.0% discounting)	KSH	1168239							
	US \$	41723							

* Series 1 Ventures - Those starting in 1993

Series 2 Ventures - Those starting in 1994

Series 3 Ventures - Those starting in 1995

NOTE : Assumed that the cost of plastic bags will be totally borne by an external agency or by an arrangement so that it is not a national cost

NET NATIONAL ECONOMIC BENEFIT ANALYSIS
(Assuming 10% reduction in the supply of CFC-12)

	1993	1995	1996	1997	1999	2005	2007	2010
TOTAL NUMBER OF VENTURES								
- Recovery only	50	150	150	150	150	150	150	150
- Recycling only	10	10	10	10	10	10	10	10
A. BENEFITS								
1. Savings in import of CFC refrigerants								
- Quantity (in MT ; equal to recycled quantity)	65	113	105	93	81	42	27	8
- CIF price (in N per MT)	40000	40000	40000	40000	40000	40000	40000	40000
- Value saved (in N ; quantity * CIF price)	2618398	4503631	4211976	3716311	3236421	1683840	1093957	317245
2. Employment related benefits								
- Increase in consumption	599724	1315925	1253209	1123300	952737	492387	310795	91333
- Increase in saving	294919	647117	616276	552392	468516	242135	152836	44914
- Total increase	894642	1963042	1869484	1675691	1421252	734522	463630	136246
3. Government expenditure related benefits								
- Increase in consumption	2934071	641016	439240	439240	439240	439240	439240	439240
- Increase in saving	1442853	315225	216000	216000	216000	216000	216000	216000
- Total increase	4376924	956241	655240	655240	655240	655240	655240	655240
4. Increase in government revenues								
- Increase in duties on equipments	0	0	0	0	0	0	0	0
- Increase in corporate taxes								
- Series 1 Ventures *	875621	1040680	964792	834201	725103	340227	179172	-36501
- Series 2 Ventures	0	251565	187326	172293	137510	93590	59797	12982
- Series 3 Ventures	0	430703	251565	187326	146500	109247	76559	28701
- TOTAL INCREASE IN TAXES	875621	1722949	1403683	1193820	1009113	543064	315529	5182
TOTAL BENEFITS (A)	8765585	9145863	8140383	7241063	6322027	3616667	2528356	1113913

	1993	1995	1996	1997	1999	2005	2007	2010
B. COSTS								
1. Additional outflows on account of imports (net of duties and taxes)								
- Capital equipment (including machine spares)	1468530	992250	0	0	0	0	0	0
- Consumables	828496	1358230	1264412	1111318	973860	507653	332109	96162
2. Capital investment (excluding (1) above)								
	328155	224295	0	0	0	0	0	0
3. Government expenditures:								
a. Training cost incurred in foreign currency	540000	0	0	0	0	0	0	0
b. Training cost incurred in local currency	146853	99225	0	0	0	0	0	0
c. Publicity expenses	1946853	99225	0	0	0	0	0	0
d. Administrative Expenses	792000	432000	432000	432000	432000	432000	432000	432000
e. Subsidy on equipments	279720	189000	0	0	0	0	0	0
4. Increase in wage costs (total wages and salaries weighted by 0.2)								
	36865	80890	77034	69049	58564	30267	19104	5614
5. Increase in operating costs (excluding raw material, consumables and labour)								
- Series 1 Ventures *	1155418	1784854	1684939	1515093	1350541	818407	616213	350025
- Series 2 Ventures	0	21619	18174	17182	14962	10832	9147	6814
- Series 3 Ventures	0	30792	21619	18174	15653	11613	9983	7597
- TOTAL OPERATING COST	1155418	1837264	1724731	1550448	1381157	840852	635343	364436
6. Decrease in government duties on import of CFCs								
- Rate of duty (%)	50	50	50	50	50	50	50	50
- Quantity of CFC import reduced (in MT)	65	113	105	93	81	42	27	8
- Value of reduced duties	1309199	2251816	2105988	1858156	1618211	841920	546978	158622
TOTAL COSTS (B)								
	9624089	7996194	6036165	5452971	4895791	3084692	2397535	1488834
NET NATIONAL ECONOMIC BENEFIT								
- ANNUAL	-858504	1149669	2104218	1788093	1426236	531975	130821	-374921
- PRESENT VALUE (at 2.0% discounting)	N 11282458							
	US \$ 626803							

* Series 1 Ventures - Those starting in 1993
Series 2 Ventures - Those starting in 1994
Series 3 Ventures - Those starting in 1995

NOTE: Assumed that the cost of plastic bags will be totally borne by some external agency or by an arrangement so that it is not a national cost