

Appendix 1

Oil and Soap Production Statistics

EDIBLE OIL AND SOAP PRODUCTION STATISTICS¹

A1: EDIBLE OIL PRODUCTION STATISTICS

Table A1.1: Annual Available Production Capacity for Edible Oil

Product	Year	Public sector Production		Private Sector Production		Total Production	
		Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)
Cotton and sunflower	1994 - 1995	477,902	1,590.97	29,060	73.72	506,962	1,664.69
	1995 - 1996	479,600	1,577.78	36,660	105.78	516,260	1,683.57
	1996 - 1997	483,100	1,546.27	37,720	107.67	520,820	1,653.94
Corn	1994 - 1995	7,101	22.25	10,000	29.8	17,101	52.05
	1995 - 1996	5,311	15.55	13,450	48.2	18,761	63.75
	1996 - 1997	5,311	15.55	14,222	49.85	19,533	65.4
Soybean	1994 - 1995	13,497	43.53	1,200	3.19	14,697	46.72
	1995 - 1996	6,300	19.68	3,360	8.85	9,660	28.53
	1996 - 1997	6,300	20.04	1,920	5.2	8,220	25.24
Palm	1994 - 1995	0	0	29,559	78.56	29,559	78.56
	1995 - 1996	0	0	25,606	74.92	25,606	74.92
	1996 - 1997	0	0	26,721	80.55	26,721	80.55
Total	1994 - 1995	498,500	1,656.76	69,819	185.26	568,319	1,842.03
	1995 - 1996	491,211	1,613.02	79,076	237.74	570,287	1,850.76
	1996 - 1997	494,711	1,081.87	80,583	243.27	575,294	1,825.14

Table A1.2: Annual Actual Production Capacity for Edible Oil

Product	Year	Public Sector Production		Private Sector Production		Total Production	
		Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)
Cotton and sunflower	1994 - 1995	315,020	1,039.8	19,357	57.1	334,377	1,096.9
	1995 - 1996	299,945	977.41	25,055	73.59	325,000	1,050.99
	1996 - 1997	303,077	962.5	28,820	82.41	331,897	1,044.91
Corn	1994 - 1995	1,229	5.83	7,638	20.73	9,567	26.67
	1995 - 1996	3,702	10.1	9,985	36.48	13,687	46.58
	1996 - 1997	3,346	8.65	11,222	39.85	14,568	48.5
Soybean	1994 - 1995	7,858	24.02	480	1.37	8,338	25.39
	1995 - 1996	5,248	16.39	3,060	7.1	8,308	23.49
	1996 - 1997	4,795	15.26	1,400	3.82	6,195	19.08
Palm	1994 - 1995	0	0	28,994	77.15	28,994	77.15
	1995 - 1996	0	0	25,409	74.36	25,409	74.36
	1996 - 1997	0	0	26,721	80.55	26,721	80.55
Total	1994 - 1995	324,807	1,069.65	56,469	156.35	381,276	1,226
	1995 - 1996	308,895	1,003.9	63,509	191.53	372,404	1,195.43
	1996 - 1997	311,218	986.4	68,163	206.64	379,381	1,193.04

¹ Source of all statistics is the Central Agency for Population Mobilisation And Statistics (annual report issued in October 1998)

Table A1.3: Profile of Edible Oil - Foreign Trade

Product	Year	Production: Export		Production: Import	
		Rate (ton/year)	Value (10 ³ L.E)	Rate (ton/year)	Value (10 ³ L.E)
Cotton and sunflower	1994 - 1995	500	1,687	27,000	680,017
	1995 - 1996	757	1,756	23,298	52,878
	1996 - 1997	1,577	4,088	26,573	68,017
Corn	1994 - 1995	499	1,468	1,174	2,249
	1995 - 1996	198	637	1,213	3,249
	1996 - 1997	414	1,931	2,708	7,800
Soybean	1994 - 1995	136	344	10,428	18,585
	1995 - 1996	364	743	278	769
	1996 - 1997	175	239	6,819	13,080
Palm	1994 - 1995	90	214	26,000	35,831
	1995 - 1996	28	110	40,861	89,453
	1996 - 1997	294	1,783	27,351	51,728
Total	1994 - 1995	1,225	3,713	64,603	124,682
	1995 - 1996	1,347	3,246	65,650	146,349
	1996 - 1997	2,460	8,042	63,451	140,625

A2 RESOURCES AND USAGE FOR EDIBLE OIL PRODUCTS
Table A2.1: Cottonseed Oil and Sunflower Oil (1996 -1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	331,897	89	Available for consumption	359,407	96.4
Import	26,573	7.1	Export	1,577	0.4
Stock from last year	14,336	3.9	Stock for next year	11,822	3.2
Total	372,806	100	Total	372,806	100

Table A2.2: Corn Oil (1996-1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	14,568	80.9	Available for consumption	16,877	93.7
Import	2,708	15	Export	414	2.3
Stock from last year	728	4.1	Stock for next year	713	4
Total	18,004	100	Total	18,004	100

Table A2.3: Soybean Oil (1996-1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	6,195	47.6	Available for consumption	12,625	97.1
Import	6,819	52.3	Export	175	1.4
Stock from last year	13	0.1	Stock for next year	200	1.5
Total	13,027	100	Total	13,027	100

Table A2.4: Palm Oil (1996-1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	26,721	49.3	Available for consumption	53,834	99.4
Import	27,351	50.5	Export	294	0.5
Stock from last year	106	0.2	Stock for next year	50	0.1
Total	54,178	100	Total	54,178	100

A3 SOAP PRODUCTION STATISTICS

Table A3.1: Annual Available Production Capacity for Soap

Product	Year	Production: Public Sector		Production: Private Sector		Production: Total	
		Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)
Laundry soap	1994 - 1995	326,450	401.49	57,400	83.23	383,850	484.72
	1995 - 1996	318,096	491.98	29,721	213.99	347,817	513.38
	1996 - 1997	300,400	448.63	43,950	22.0	344,350	470.63
Toilet soap	1994 - 1995	94,802	285.52	12,503	48.64	107,305	334.16
	1995 - 1996	125,146	407.98	20,239	102.39	145,385	510.37
	1996 - 1997	98,150	319.54	25,523	138.73	123,673	458.27
Total	1994 - 1995	421,252	687.01	69,903	131.87	491,155	818.88
	1995 - 1996	443,242	899.96	49,960	123.79	493,202	1,023.75
	1996 - 1997	398,550	768.17	69,473	160.73	468,023	928.9

Table A3.2: Annual Actual Production of Soap

Product	Year	Production: Public sector		Production: Private sector		Production: Total	
		Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)	Rate (ton/year)	Value (10 ⁶ L.E)
Laundry soap	1994 - 1995	110,081	171.45	43,250	62.71	153,339	234.16
	1995 - 1996	74,110	151.82	26,836	20.29	100,946	172.11
	1996 - 1997	55,816	84.07	40,731	20.84	96,547	104.91
Toilet soap	1994 - 1995	44,171	130.78	12,178	49.93	56,349	180.71
	1995 - 1996	47,563	150.11	18,162	93.88	65,725	243.99
	1996 - 1997	47,213	154.8	19,719	115.47	66,932	270.27
Total	1994 - 1995	154,260	302.22	55,428	112.64	209,688	414.86
	1995 - 1996	121,673	265.69	44,998	114.17	166,671	379.86
	1996 - 1997	103,029	238.87	60,450	136.31	163,479	375.18

Table A3.3: Profile of Soap Foreign Trade

Product	Year	Production: Export		Production: Import	
		Rate (ton/year)	Value (10 ³ L.E)	Rate (ton/year)	Value (10 ³ L.E)
Laundry soap	1994 - 1995	-	-	-	-
	1995 - 1996	-	-	-	-
	1996 - 1997	-	-	-	-
Toilet soap	1994 - 1995	4,007	15,226	52	416
	1995 - 1996	4,640	13,660	424	2,193
	1996 - 1997	5,63	18,090	607	1,883
Total	1994 - 1995	4,007	15,226	52	416
	1995 - 1996	4,640	13,660	424	2,193
	1996 - 1997	5,632	18,090	607	1,883

A4 RESOURCES AND USAGE FOR SOAP PRODUCTS

Table A4.1: Laundry Soap (1996-1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	96,547	90	Available for consumption	101,301	95
Import	-	-	Export	-	-
Stock from last year	10,558	10	Stock for next year	5,804	5
Total	107,105	100	Total	107,105	100

Table A4.2: Toilet Soap (1996-1997)

Resources			Usage		
Itemised resources	Quantity (ton)	% from total	Itemised usage	Quantity (ton)	% from total
Production	66,932	94	Available for consumption	60,862	86
Import	607	1	Export	5,632	8
Stock from last year	3,314	5	Stock for next year	4,359	6
Total	70,853	100	Total	70,853	100

Appendix 2

Three Processes used for Fat Splitting

Three Processes used for Fat Splitting

	TYPE OF FAT SPLITTING PROCESS			
Characteristics	Twitchell	Batch autoclave		Continuous countercurrent*
	212-220	300-350	450	485 approx.
Pressure (psig)	0	75-150	425-450.	600-700
Catalyst	Alkyl-aryl sulphonic acids or cycloaliphatic sulphonic acids, both used with sulphuric acid 0.75-1.25% of the charge.	Zinc, calcium or magnesium oxides 1-2%.	No catalyst.	Optional.
Time (hr)	12-48	5-10		2-3
Operation	Batch.	Batch.		Continuous.
Equipment	Lead-lined, copper-lined, Monel-lined, or wooden tanks.	Copper or stainless-steel autoclave.		Type 316 stainless tower.
Hydrolysed	85-98% hydrolysed. 5-15% glycerol solution obtained, depending on number of stages and type of fat.	85-89% hydrolysed. 10-15% glycerol, depending on number of stages and type of fat.		97-99%. 10-25% glycerol, dependent on type of fat.
Advantages	Low temperature and pressure; adaptable to small scale; low first cost because of relatively simple and inexpensive equipment.	Adaptable to small scale; lower first cost, for small scale than continuous process; faster than Twitchell.		Small floor space, uniform product quality; high yield of acids; high glycerine concentration; low labour cost; more accurate and automatic control; lower annual costs.
Disadvantages	Catalyst handling; long reaction time; fat stocks of poor quality must often be acid-refined to avoid catalyst poisoning; high steam consumption; tendency to form dark-coloured acids; need more than one stage for good yield and high concentration; not adaptable to automatic control; high labour cost.	High first cost; catalyst handling; longer reaction time than continuous processes; not so adaptable to automatic control as continuous; high labour cost; need more than one stage for good yield and high glycerine concentration.		High first cost; high temperature and pressure; greater operating skill.

Appendix 3

Summary of Wastes generated by Indian Edible Oil Factories

SUMMARY OF WASTES GENERATED BY INDIAN EDIBLE OIL FACTORIES

A3.1 Wastewater Volumes

A survey of 39 edible oil processing units in India indicated that shortening units generated the largest volumes of wastewater. Of these, the smaller units were the highest producers of wastewater. The units generating the least wastewater were the seed preparation units (where the incoming seeds are cleaned, dehulled, crushed and rolled), an essentially dry process. This is illustrated in more detail in Table A3.1.

Table A3.1: Wastewater Volumes generated by Different Process Units

Unit Name	Category	Wastewater volumes generated (litres/ton)
Seed Preparation	Large	60 - 180
	Medium	30 - 60
	Small	--
Solvent Extraction	Large	223 - 229
	Medium	200 - 214
	Small	280 - 400
Refinery	Large	900 - 2500
	Medium	600 - 800
	Small	800 - 900
Shortening (hydrogenated oil)	Large	1900 - 2700
	Medium	2100 - 2600
	Small	1500 - 1800

Where:

Large units are those which process >100 T/day of oil and/or 7250T/day of oil seeds;

Medium units are those which process >50-100 T/day of oil and/or >100 T/day-250 T/day oil seeds.

Small units are those which process <50 T/day of oil and/or <100 T/day of oil seeds.

Key issues identified by these figures are as follows:

1. Variation in wastewater generation is due to:

- The different operational procedures used in each of the mills and
- In large oil factories, filter clothes from refinery section are also washed along with filter clothes, therefore resulting in a relatively higher specific wastewater generation.

2. In solvent extraction plants, the high range of values of specific wastewater generation in the small-scale plants is due to variations in:

- operational procedures;
- the raw material being processed and
- the volumes recovered and methods used in steam condensate recovery/recycling.

3. The high variation in wastewater generation in large-scale refinery units is probably due to:

- the variation in the types of process used (eg batch refining/continuous refining) and
- discharge of uncontaminated cooling water. The lower range value of 900 litre/ton closely matches the specific values of medium and small-scale categories.

A3.2 Wastewater Characteristics

An analysis of flow proportionate composite samples from the same 39 units incorporated in Table A3.1 is presented in Table A3.2.

Table A3.2: Wastewater Characteristics generated by Different Process Units

Unit Name	Category	Wastewater Characteristics				
		pH	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	Oil & Grease (mg/l)
Seed Preparation	Large	8.5-9.5	6,350-14,000	22,500-40,000	17,650-33,500	5,750-7,800
	Medium	8.5-9.0	14,200-27,000	42,500-72,000	28,600-52,200	5,500-9,500
	Small	--	--	--	--	--
Solvent Extraction	Large	7.5-8.2	180-238	485-525	140-161	21-29
	Medium	6.8-7.2	364-495	678-835	79-90	5-30
	Small	5.4-6.6	239-1,083	489-2,740	104-1,352	9-12
Refining	Large	2.5-4.5	1,375-2,250	2,500-4,250	325-675	200-500
	Medium	1.3-7.0	2,500-6,500	4,000-10,500	100-5,800	150-1,900
	Small	1.0-2.0	3,000-3,500	5,500-6,500	800-1,250	400-750
Shortening (hydrogenated oil)	Large	4.5-5.0	1,200-1,700	2,700-3,500	350-425	410-490
	Medium	3.0-3.5	1,500-2,000	3,300-4,200	850-1,100	950-1,200
	Small	1.0-3.5	2,100-3,800	4,500-8,800	550-1,325	600-1,300

Key issues identified by these figures are as follows:

1. The higher BOD, COD, TSS and Oil & Grease concentrations recorded in the medium scale oil units as compared to large units are due to lower water usage resulting in more concentrated effluents.
2. The wastewater characteristics from the solvent extraction unit depend largely upon the type of process employed and maintenance and operational practices adopted. The higher range of values in the small-scale industries may be due to variation in the types of oil seed processed. The higher BOD and COD is due to discharge of total suspended solids (TSS) along with the wastewater.
3. The variation of wastewater characteristics from refinery units is due to:
 - variations in operational practices;
 - dilution factor variations depending upon the extent of water usage;
 - the types of process employed - batch or continuous;
 - in medium-scale industries, a neutral pH value coupled with a high oil & grease concentration is due to improper splitting of the soap stock, resulting from inadequate acid dosage;
 - less retention time for splitting and
 - inadequate heating of the batch.
4. Oil & grease concentrations are the most significant parameter for wastewater characterisation in refining units and hydrogenated oil units. Other wastewater parameters such as BOD and COD are mainly dependant on the oil concentration. Wide variations in the wastewater characteristics as a result of the types of operational practices adopted and the quantity of water usage and therefore the magnitude of the dilution factor.
5. The higher concentration of BOD and COD in small-scale units as compared to other units is because these units tend to employ obsolete technology and do not have proper oil seed/raw oil

storage facilities, which can lead to increasing levels of free acids.

6. Cottonseed oil processing units often develop problems related to the presence of excess gums. The gums, which do not get dissolved in the aqueous layer, settle at the bottom. These sediments are then discharged along with the aqueous layer as wastewater.

A3.3 Pollution Loads

The calculated specific pollution loads in terms of kg of pollutant per ton of seed/product processed are shown in Table A3.3.

Table A3.3: Specific Pollution Loads for each Process Unit (Kg/Ton of Seed or Product)

Unit	Category	Wastewater Characteristics			
		BOD	COD	TSS	Oil & Grease
Seed Preparation	Large	0.38-2.52	1.35-7.2	1.1-6.03	0.345-1.4
	Medium	0.43-1.62	1.27-4.32	0.86-3.13	0.16-0.57
	Small	--	--	--	--
Solvent Extraction	Large	0.04-0.05	0.11-0.12	0.03-0.04	0.004-0.007
	Medium	0.02-0.07	0.13-0.17	0.016-0.019	0.001-0.006
	Small	0.067-0.433	0.137-1.096	0.029-0.541	0.002-0.005
Refinery	Large	1.237-5.625	2.25-10.625	0.292-1.687	0.18-1.25
	Medium	1.5-5.2	2.4-8.4	0.06-4.66	0.09-1.52
	Small	2.4-3.15	4.4-5.85	0.64-1.125	0.32-0.675
Shortening (hydrogenated oil)	Large	2.28-4.59	5.13-9.45	0.665-1.147	0.779-1.323
	Medium	3.15-5.2	6.93-10.92	1.78-2.86	1.995-3.12
	Small	3.15-6.84	6.75-15.85	0.825-2.385	0.9-2.34

The wide variation in the specific pollution load is due to:

- Variation in type of seed/product to be processed;
- Variation in maintenance level of plant and machinery and
- Poor designs of free floating oil and suspended solids trapping system.

In the large scale industries, the lower pollution load (in terms of BOD and COD) is due to continuous solvent extraction process with scheduled maintenance and better housekeeping practices.

In the medium scale refineries, the higher range values of BOD, TSS and Oil & Grease is usually caused by the improper splitting of soap stock batch.

A3.4 Solid Wastes

The quantities of solid wastes and the calculated specific solid waste generation from large, medium and small scale oil mills are as shown in Table A3.4.

Table A3.4: Volumes of Solid Waste generated by each Unit

Unit	Category	Sources	Solid Waste (ton/day)	Specific Solid Waste (Kg/T) of Raw Material Processed
Seed Preparation	Large	**	3.3-6.5	32.5-33.0
	Medium	**	1.7-3.3	33.0-34.0
	Small	**	1.0-1.7	34.0-40.0
Solvent Extraction	Large	**	14.0-16.5	70.0-85.0
	Medium	**	8.2-14.0	82.0-94.0
	Small	**	6.0-8.2	80.0-82.0
Refinery	Large	Spent earth	720-1000	122-127
		Activated carbon	1500-2300	--
	Medium	Spent earth	525-720	127-129
		Activated carbon	450-1500	--
	Small	Spent earth	350-525	126-128
		Activated carbon	280-450	
Shortening (hydrogenated oil)	Large	Spent earth	1000-1500	--
		Activated carbon	2380-3600	--
		Spent catalyst	50-65	--
	Medium	Spent earth	800-1100	--
		Activated carbon	710-3600	--
		Spent catalyst	35-50	--
	Small	Spent earth	550-800	--
		Activated carbon	440-710	--
		Spent catalyst	25-40	--

Note: ** Combined Solid Waste.

Specific solid waste values in the small-scale units are relatively high due to the disposal of used filter cloths. Based on above values, the average specific solid waste generation for oil producing factories is calculated as being 34 Kg.

From refinery and hydrogenated oil, bleaching earth containing 15 - 20 % oil is either sold to soap manufacturers or disposed. The average specific waste generation in terms of Kg/Ton of raw material processed is calculated as 126.5 and 152.5 for refinery and hydrogenated oil respectively.

Appendix 4

Summary of Relevant Environmental Legislation

Summary of Relevant Environmental Legislation

Introduction

Industrial pollution control has been addressed in many Laws and regulations which has had implications on the level of enforcement scattered between many authorities. Therefore the need arose for a legal set-up that would co-ordinate all these regulations. The most recent of these is Law 4/1994 which designated the Egyptian Environment Affairs Agency (EEAA) as the highest national co-ordinating body for the environment in Egypt. As stated in the Law, EEAA main responsibilities include:

- Establishing of norms and conditions to be complied with by owners of projects and establishments before the start of construction and during the operation of these projects.
- Carrying out field inspections of compliance with norms and conditions to be followed by agencies and establishments. Also, it shall undertake the procedures stated in the Law against those who violate these norms and conditions.
- Establishing of necessary norms and standards to assure compliance with the permissible limits of pollutants and to ensure that these norms and standards are followed.
- Setting of principles and measures for environment impacts assessment of projects.

Relevant Environmental Laws and Regulations

The following are the laws and regulations concerning environmental protection. These concern the following:

- A. Wastewater
- B. Air pollution
- C. Solid waste
- D. Hazardous waste
- E. Occupational health and safety
- F Licenses

A. Wastewater

1. Law 48/1982 concerning protection of the River Nile and Egypt waterways from pollution:

Regulates the discharge of wastes to the River Nile, its branches and the marine environment by a permit from the Ministry of Public Works and Irrigation after fulfilling certain criteria monitored by periodic analysis.

2. Minister of Irrigation Decree 8/1983 implementing Law 48/1982 (the Executive Regulations of Law 48/1982):

Section 6 sets regulations, standards and specifications for treating wastewater before discharge to surface waters.

Article 60 indicates the quality of fresh water to which discharge of wastewater is allowed.

Articles 61 and 62 describe criteria of treated industrial wastewater to be discharged to fresh surface water and ground water.

Articles, 66, 67, 68 and 69 set criteria for domestic and industrial wastewater before being discharged to non-fresh surface waters and the quality of the receiving water body.

This Decree was amended by the following Decrees:

- **Minister of Irrigation Decree 140/1984:**
Amending some rules of the Minister Decree 8/1983 implementing Law 48/1982.
- **Minister of Irrigation Decree 225/1984:**
Amending some rules of the Minister Decree 8/1983 implementing Law 48/1982.
- **Minister of Irrigation Decree 43/1985:**
Amending some rules of the Minister Decree 8/1983 implementing Law 48/1982.
- **Minister of Housing and Utilities Decree 9/1988:**
Amending some rules of the Minister Decree 8/1983 implementing Law 48/1982.
- **Minister of Housing and Utilities Decree 106/1991:**
Amending some rules of the Minister Decree 8/1983 implementing Law 48/1982.

3. Law 93/1962 concerning sewage disposal:

Sewage disposal in public sewers is prohibited except by special permits and on condition of observing the specifications and standards decided by the Minister of Housing. Samples from commercial and industrial facilities are to be analysed in special laboratories designated by the Ministry of Housing to ensure fulfilment of the required criteria.

4. Minister of Housing and Utilities Decree 463/1962 implementing Law 93/1962:

Section 6 sets the specification and standards that must be fulfilled for wastewater discharge into public sewers.

Section 7 describes the methods and frequency of taking samples of wastewater for analysis.

B. Air Pollution

Presidential Decree 864/1969:

Establishes the Supreme Committee to Protect Air from Pollution, chaired by the Minister of

- a) studying sources of air pollution,
- b) formulating a general policy for preventing air pollution,
- c) Setting standards for air quality, and
- d) Preparing legislation for air quality.

Minister of Health Decree 470/1971:

Sets standards for permissible pollution loads for ambient and workplace air and was later amended by Decree 240 of 1979.

Minister of Housing Decree 380/1975:

Specifies the general conditions for public, commercial and industrial buildings and comprises rules for ventilation and avoiding severe heat, cold and humidity.

Minister of Housing Decree 600/1982 implementing Law number 3/1982 for Urban Planning:

Sets the specifications for establishing the new industrial areas.

Minister of Industry Decree 380/1982 implemented by Minister of Housing Decree 60 of 1982:

Necessitates the utilisation of air pollution abatement equipment in industry.

Decree 2/1996 which confined the location of heavy industries in specific locations nationwide.

Law 4/1994 for the environment and its Executive Regulations promulgated by the Prime Minister Decree 338/1995:

Article 34 prerequisites for granting a permit for the establishment of a project that the site chosen should be appropriate for its activity to ensure compliance with the accepted limits of air pollutants.

Article 35 the establishments should ensure that while practising their activities, no leaked or emitted air pollutants shall exceed the maximum permissible levels specified in laws and decrees that are in force and stated in the executive regulations of this Law.

Article 36 prohibits the use of machines, engines or vehicles that emit exhaust fumes exceeding limits set by the executive regulations of this Law.

Article 40 states that during burning of any fuel, the resulting smoke, gases and harmful vapours are within permissible levels. The executive regulations of this Law shall define these precautions and permissible limits as well as the specifications of chimneys and other means to control emissions.

Article 42 sets permissible limits of sound intensity and the permissible time limits for exposure to said noise.

Article 43 sets permissible limits of leakage or emission of air pollutants inside the work premises.

C. Solid Waste

Law 38/1967 amended by Law 31/1976:

Concerns public cleanliness, regulates collection and disposal of solid waste from houses, public places and commercial and industrial establishments.

Minister of Housing Decree 134/1968 implementing Law 38/1967:

Define garbage and solid waste, including domestic and industrial waste.

Identifies garbage containers, method of transport, schedules for solid waste collection.

Sets specifications and locations of dumping places and methods of treatment (sanitary dumps, composting, incineration).

D. Hazardous Waste

Law 4/1994 for the environment and its Executive Regulations promulgated by the Prime Minister Decree 338/1995:

Articles 25-27 of the executive regulations: outline of regulations, permitting authorities and procedures, as well as permit cancelling/suspension conditions.

Article 28 sets regulations/guidelines, procedures and policies controlling hazardous waste management (generation, collection and storage, transportation, treatment and disposal).

Article 29 assigns specific responsibilities relevant to permitting hazardous waste treatment facilities.

Article 30 prohibits hazardous waste import and defines license procedures for trans-boundary movement of hazardous wastes.

Articles 31 and 32 outline general guidelines/precautions for those generating, handling, producing and importing hazardous materials (gases, liquids, solids) to ensure that no harm occurs to the environment.

Article 33 requires that owners of establishments whose activities result in the production of dangerous wastes must keep a register for these wastes and the methods of disposal and the quarters receiving these wastes.

E. Occupational Health and Safety

Law 137/1981 (Labour and Workplace Safety)

Requires industries to take special precautions for occupational safety and health in the work place, and it deals with physical danger including noise. Section 5 presents the required standards of occupational health and safety.

Minister of Manpower Decree 55/1983

The Decree grants the industrial safety inspectors the right to check the types and composition of the chemicals used.

Article 6 of chapter 3 sets the precaution measures for exposure to chemicals used in the workplace. It also sets the standards for noise in working locations.

Minister of Industry Decree 91/1985 for implementing Law 21/1985

Regulates the production, handling, and importing of dangerous chemicals. It also regulates the conditions of the production and storage area.

Law 4/1994 for the environment and its Executive Regulations promulgated by the Prime Minister Decree 338/1995:

Article 43 sets permissible limits of leakage or emission of air pollutants inside the work premises.

F. Licenses

Law 453/1954 which gives relevant powers to local administration as the competent enforcement authorities.

Minister of Housing Decrees 380/1975 and 140/1976: implementing Law 453/1954.

Law 21/1956: deals with the industry organisation and the presidential Decree 449/1958 implementing Law 21/1958.

Appendix 5

Industrial Audit Checklist

Industrial Audit Checklist

This Checklist should be used as an aide memoire to assist the gathering of relevant information. Not all sections will be relevant to each site.

		Name	Action
SECTION A - COMPANY DETAILS			
1.0	Site		
1.1	Visual impact		
1.2	Previous land use		
1.3	Plans for expansion		
1.4	Geological / hydrogeological information		
1.5	Protection of sensitive environments on-site and adjacent to site		
1.6	Alternative sites considered		
1.7	Site security		
1.8	Location of any sites of special scientific or historical interest		
1.9	Surroundings including habitation, surface waters, neighbouring industries etc.		
1.10	On-site laboratories and capabilities, considering laboratory management and expertise, methods used, standards and calibration techniques, sampling methods.		
2.0	General		
2.1	Person(s) responsible for environmental issues		
2.2	Person(s) responsible for health and safety issues		
2.3	Person(s) responsible for product quality		
2.4	Pollution incidents in the last 5 years		
2.5	Major health and safety incidents in the last 5 years		
2.6	Government / local controls and checks - type and frequency		
2.7	Government permits and certificates held		
2.8	Complaints in the last 5 years		
2.9	Written procedures for dealing with incidents		
3.0	Costs		
3.1	Cost of water (Piasters [Pt] per cubic metre)		
3.2	Cost of energy: electricity (Pt per kilowatt), oil (Pt per kg), gas (Pt per m ³)		
3.3	Cost of discharge of waste to a public sewer (Pt per cubic metre)		
3.4	Cost of the disposal of other wastes including solids, process materials, etc.		
3.5	Cost of raw materials and process consumables		
3.6	Cost of manpower		

		Name	Action
SECTION B - ENVIRONMENTAL TOPICS - HIGH PRIORITY			
4.0	Environmental Management and Housekeeping		
4.1	General tidiness of site		
4.2	Losses through spillage, handling procedures etc.		
4.3	Spill and loss control procedures		
4.4	Presence of documented good housekeeping practices		
4.5	Other areas such as laboratories, maintenance shops, transportation etc.		
5.0	Resource Usage		
Resource usage associated with each process unit, factory unit and overall should be investigated.			
5.1	Raw materials:		
	Quantity and quality of raw materials used in process		
	Quantity and quality of cleaning materials		
	Quantity and quality of packaging material		
	Potential for reduction in wastage, reuse, rework or recycling		
5.2	Water:		
	Sources		
	Quantities used		
	Quality of public and private potable water supplies		
	Sufficiency of public and private potable water supplies		
	Results of laboratory analysis		
	Quality of process water		
	Sufficiency of process water		
	Abstraction licences		
	Treatment of water on site		
	Cost of on-site treatment		
	Potential for reuse of water (with or without treatment)		
5.3	Energy:		
	Quantity of oil used		
	Quantity of electricity		
	Quantity of natural gas		
	Potential for reduction		
	Potential for alternative energy sources		
	Checks on boiler efficiency		
Frequency of power disruptions and effect on production, wastage, etc.			

		Name	Action
6.0	Wastewaters		
6.1	Details of effluent discharges (human and process waste)		
6.2	Details of surface water drainage		
6.3	Details of receiving water or sewerage system		
6.4	Typical effluent composition:		
	Volume		
	Analysis		
	Discharge conditions		
6.5	Details of wastewater treatment systems		
6.6	Costs associated with effluent discharge		
6.7	Potential for recycling or reuse of Wastewaters		
6.8	Potential for a reduction in wastewater volumes by:		
	Process changes		
	Segregation of effluent streams		
6.9	Details of any planned changes		
7.0	Emissions to Air		
	Consideration should be given to point and fugitive (vapours and dusts from low level leakage, evaporation etc.) emissions.		
7.1	Types of gaseous emissions		
7.2	Consent conditions for discharges		
7.3	Sources of dust and whether a nuisance		
7.4	Sources of odour and whether a nuisance		
7.5	Potential for the reduction of emissions to air		
7.6	Details of emission control equipment (if any)		
8.0	Solid and Hazardous Waste		
8.1	Handling, storage and treatment of solid waste		
8.2	Details of hazardous and toxic wastes		
8.3	Waste minimisation studies		
8.4	Recycling and reuse of waste		
8.5	Details of landfill sites or other disposal routes		
9.0	Hazardous Materials on Site		
9.1	Details of hazardous chemicals used on site		
9.2	Availability of hazardous materials data sheets		
10.0	Storage Tanks		
	Note should be made of operational and redundant storage tanks.		
10.1	Location and condition of above ground storage tanks and vessels		
10.2	Suitable bunding of storage vessels		
10.3	Location and condition of below ground storage tanks and vessels		
10.4	Frequency and method of checking tank integrity		
10.5	Presence of records of storage inventories		
10.6	Drum storage, condition and spill containment		

		Name	Action
11.0	Fire Precautions and other Environmental Incident Emergency Procedures		
11.1	Documented and suitable fire control procedures		
11.2	Availability and suitability of fire fighting equipment		
11.3	Availability and suitability of fire fighting personnel		
11.4	Evacuation procedures and fire drills		
11.5	Containment of water used in fire fighting if contaminated		
11.6	Fire certificates		
11.7	Correct storage of flammable materials		
11.8	Identification of other environmental risks and control procedures		
12.0	Land Contamination		
12.1	Evidence of contamination, visible pollution, vegetation die-back etc.		
12.2	Previous site history		
12.3	Presence of dumps, stockpiles, buried wastes etc.		
13.0	Other Hazardous Materials on Site		
13.1	PCBs		
13.2	CFCs		
13.3	Asbestos		
13.4	Pesticides		
13.5	Radioactive materials		
13.6	Laboratory wastes - chemical and microbiological		
14.0	Noise		
14.1	Assessment of noise levels and details of noise surveys		
14.2	Compliance with noise regulations		
14.3	Noise and vibration control measures		
15.0	Other Considerations		
15.1	Aesthetics of the plant, blending with surroundings		
15.2	Damage to the ecology of area		
15.3	Damage to historical sites		
SECTION D - HEALTH, SAFETY AND QUALITY FACTORS			
16.0	Health and Safety		
Obvious deviations from good working practices are to be recorded.			
16.1	Documentation of hazards and presence of safety data sheets		
16.2	Compliance with regulations		
16.3	Issue and use of personal protective equipment		
16.4	Safe place of work provisions		
16.5	Safe systems of work including guarding of equipment		
16.7	Ventilation and indoor air quality		
16.8	Exposure to heat		

		Name	Action
16.9	Sickness and accident records		
16.10	Health monitoring of employees		
16.11	Outstanding claims against the company		
16.12	Medical staff, first aid, emergency services		
16.13	Staff training		
16.14	Safety checks on boilers, pressure vessels, lifting equipment, etc.		
17.0	Quality		
Factors which affect the quality and safety of products should be noted. Particular care must be taken to ensure that changes to production practices do not compromise the quality and safety of products.			
17.1	Documented good manufacturing practices		
17.2	Quality management systems e.g ISO 9000		
17.3	Quality assurance system		
17.4	Effects of changing environmental practices on product quality		
SECTION E - OTHER FACTORS			
18.0	Miscellaneous		
18.1	Ways in which the facility is enhancing the environment or improving the local infrastructure		
18.2	Future plans		
18.3	Assistance required		
18.4	Information required		

Appendix 6

Environmental Practices of Selected Factories

ENVIRONMENTAL PRACTICES OF SELECTED FACTORIES

Table A6: Wastewater Control Systems - Existing and Planned

Factory Name	Location	Sector	Discharge Volume (m ³)	Discharge Point	Existing Wastewater Treatment	Planned Wastewater Treatment
Alexandria Co. for Oil & Soap	Alexandria	Public		Sewer	<ul style="list-style-type: none"> •Oil and grease traps. •Primary treatment (oil separation and sedimentation). 	--
Alexandria Oil & Soap Co.	Kafr El-Sheikh	Public		Agri. drain	<ul style="list-style-type: none"> • 	--
Alexandria Oil & Soap Co.	Kafr El-Zayatt	Public			<ul style="list-style-type: none"> • 	
Arma for Food Industries Co.	10 Ramadan City	Private		Sewer	<ul style="list-style-type: none"> •Oil and grease traps. •Sedimentation tanks. •Neutralisation. 	--
Chief Co.	10 Ramadan City	Private		Sewer	<ul style="list-style-type: none"> •Oil traps. •Air flotation. •Chemical aided gravity sedimentation. 	--
Cairo Oil & Soap	Badrasheen	Public			<ul style="list-style-type: none"> • 	
Edible Oil and Detergent Co.	Sohag	Public		Sewer	<ul style="list-style-type: none"> •Primary treatment (oil separation, sedimentation). 	--
MIGOP	Attaka, Suez	Private		Sea	<ul style="list-style-type: none"> •Oil Gravity separation. •Oil separation by air flotation. •Sedimentation. 	--
Misr Oil & Soap Co.	Mansoura	Public		Agri. drain	<ul style="list-style-type: none"> •Screening, settling, neutralisation. 	<ul style="list-style-type: none"> •Chemical-aided flotation treatment. •Biological treatment (Activated Sludge).
Misr Co. for Oil & Detergents,	Zagazig	Public		Agri. drain	<ul style="list-style-type: none"> •Oil traps. 	--
Nile Co. for Oil & Detergents	Asyut	Public	700 (1997)	Agri. drain	<ul style="list-style-type: none"> •Gravity oil separation. 	<ul style="list-style-type: none"> •Oil separation. •Coagulation, flocculation, sedimentation. •Biological treatment (Activated Sludge).
Salt and Soda Co.	Alexandria	Public		Sewer	<ul style="list-style-type: none"> •Sedimentation. 	<ul style="list-style-type: none"> •Gravity separation. •Chemically aided gravity sedimentation. •DAF unit.

Factory Name	Location	Sector	Discharge Volume (m ³)	Discharge Point	Existing Wastewater Treatment	Planned Wastewater Treatment
Savola Egypt Co.	10 Ramadan City	Private		Sewer	<ul style="list-style-type: none"> •Oil and grease traps. •Sedimentation tanks. •Filtration. 	--
Sila Edible Oil Co.	Fayoum	Private		Sewer	<ul style="list-style-type: none"> •Oil and grease traps. •Equalisation, coagulation, flocculation. •DAF unit. •Biological treatment processes - activated sludge. •Drying beds. 	--
Tanta Oil & Soap Co.	Tanta	Public		Agri. drain	<ul style="list-style-type: none"> •Gravity oil and grease traps. •DAF unit. •(Wastewater treatment plant to be installed). 	

Appendix 7

Case Studies from the SEAM Project

**Waste Minimisation at Sila Edible Oil Co., Fayoum
Oil and Fats Recovery, Tanta Oil and Soap Co., Tanta**
