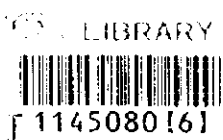


JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)  
FEDERAL MINISTRY OF ENERGY, MINING AND INDUSTRY  
BOSNIA AND HERZEGOVINA

**FEASIBILITY STUDY ON THE REHABILITATION OF A PULP,  
KRAFT PAPER AND PAPER PACKAGING FACTORY IN  
BOSNIA AND HERZEGOVINA**

**FINAL REPORT**

**AUG. 1998**



**DAIWA INSTITUTE OF RESEARCH LTD.**

<b>MPI</b>
<b>CR(3)</b>
<b>98-139</b>



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1145080 (6)

## PREFACE

In response to a request from the Government of the Bosnia and Herzegovina, the Government of Japan decided to conduct Study on the Rehabilitation of a Pulp, Kraft Paper and Packing Factory of a government-owned enterprise "NATRON" in the Bosnia and Herzegovina, and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent a study team, lead by Mr. Masatoshi MIZUNO of Daiwa Institute of Research Ltd. and constituted by members of Daiwa Institute of Research Ltd. and other organization to the Bosnia and Herzegovina two times from February 1998 to August 1998.

The team held discussions with the officials concerned of the Government of the Bosnia and Herzegovina, and conducted related field surveys. After returning to Japan, the team conducted further studies and compiled the final results in this report.

I hope this report will contribute to rehabilitation of the factory in the Bosnia and Herzegovina and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Bosnia and Herzegovina for their close cooperation throughout the study.

August 1998



Kimio Fujita

President

Japan International Cooperation Agency



## Letter of Transmittal

August 1998

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency

We have the pleasure of submitting herewith our report for the Study on the Feasibility Study on the Rehabilitation of a Pulp, Kraft Paper and Paper Packaging Factory In Bosnia and Herzegovina. The report describes the result of the Study conducted by Daiwa Institute of Research Ltd. In accordance with the contract with the Japan International Cooperation Agency (JICA).

During the Study, our Study Team carried out field surveys two times in the period between February 1998 and July 1998. The Team held sufficient results of the field surveys and study activities In Japan, and drew up plans for contributing to the rehabilitation of NATRON Maglaj d.d.

Regarding these plans in close cooperation with the BH side, the Team then researched subjects such as the overall policies and practices of the BH industrial sector, the overall condition of NATRON, the production processes, the production management, the financial management and the outside factors such as the market and pursued technology transfer for concrete improvements in the factory, and then prepared this report.

We would like to express our heartfelt gratitude to the Government of B H and the organizations concerned in the country for the kind cooperation they extended to our Team regarding the implementation of the Study as well as for their warm hospitality provided during our stay in BH.

Our thanks are also due to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Japanese Embassy in Austria, the Japanese Embassy in BH, and the JICA Austria office for their valuable advice and support rendered to us throughout the Study.

Yours faithfully.

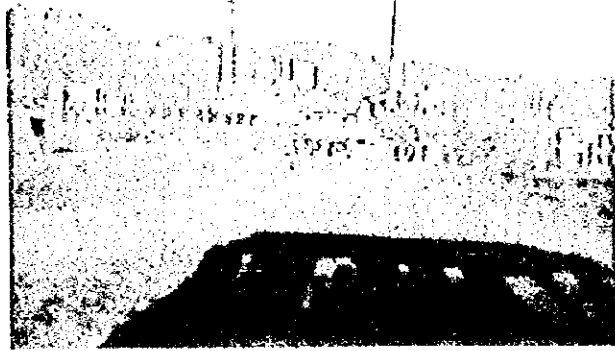


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Masatoshi Midzuno  
Leader of the Japanese Study Team  
for the Study on the Feasibility Study  
on the Rehabilitation of a Pulp, Kraft  
Paper and Paper Packaging Factory  
in Bosnia and Herzegovina







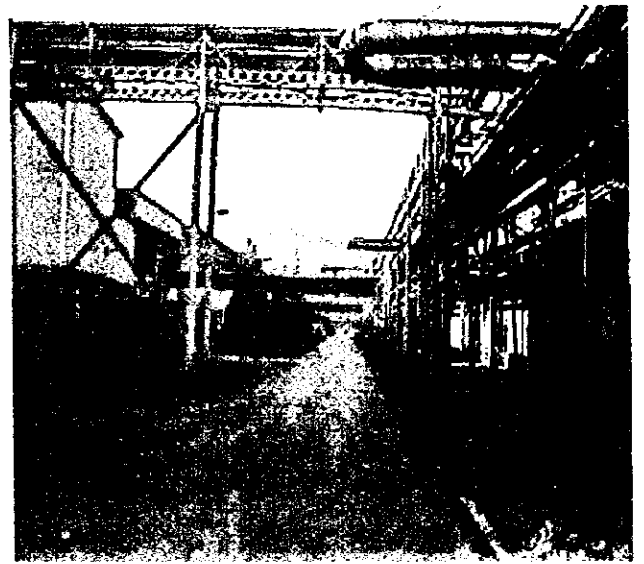
1) Entrance to the mill site



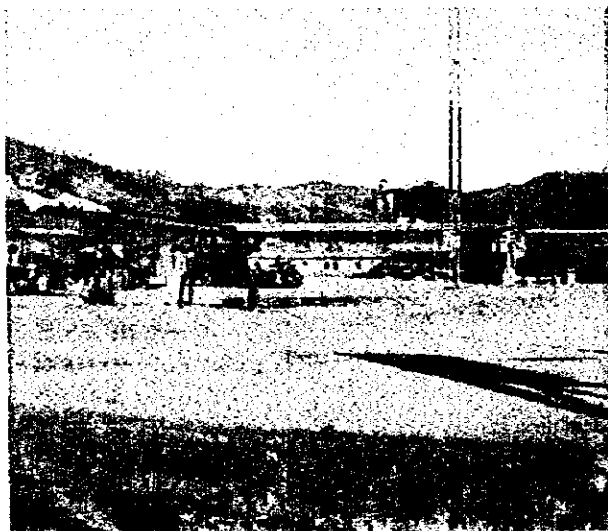
2) Entering management building



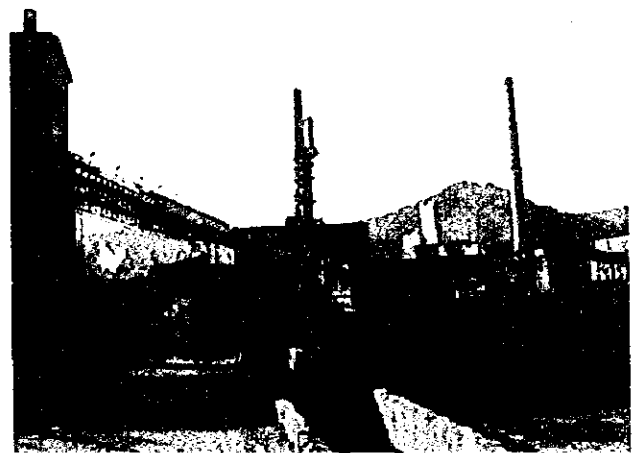
3) Management building



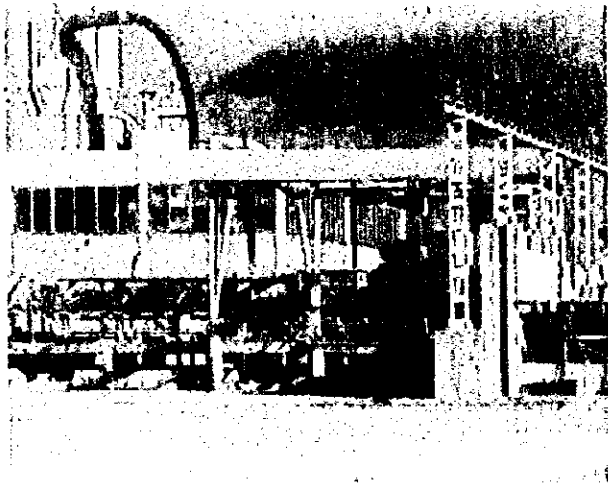
4) Main road on mill site



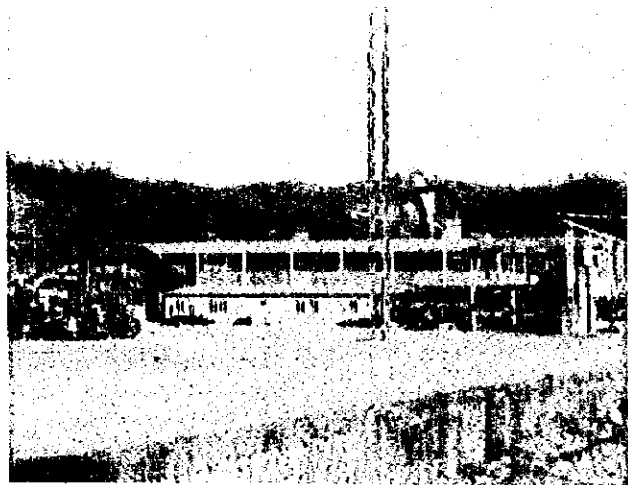
5) Wood handling area



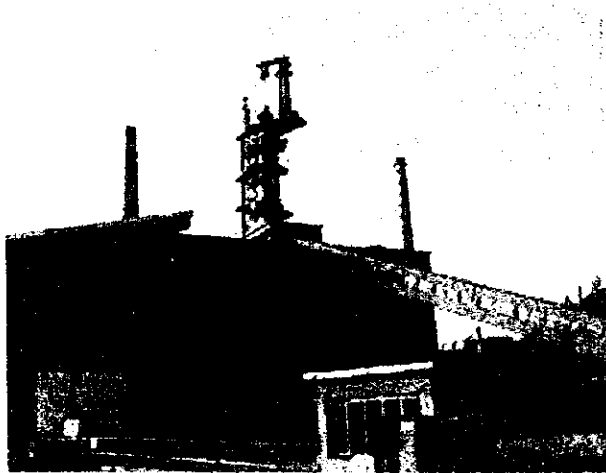
6) Woodyard, floating chanal and pulp mill



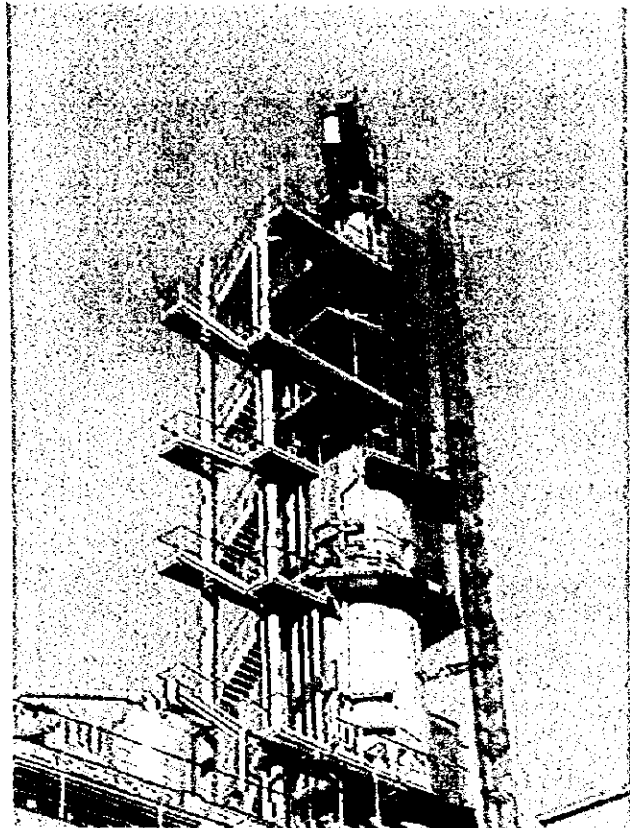
7) Ring debarker and chipping plant



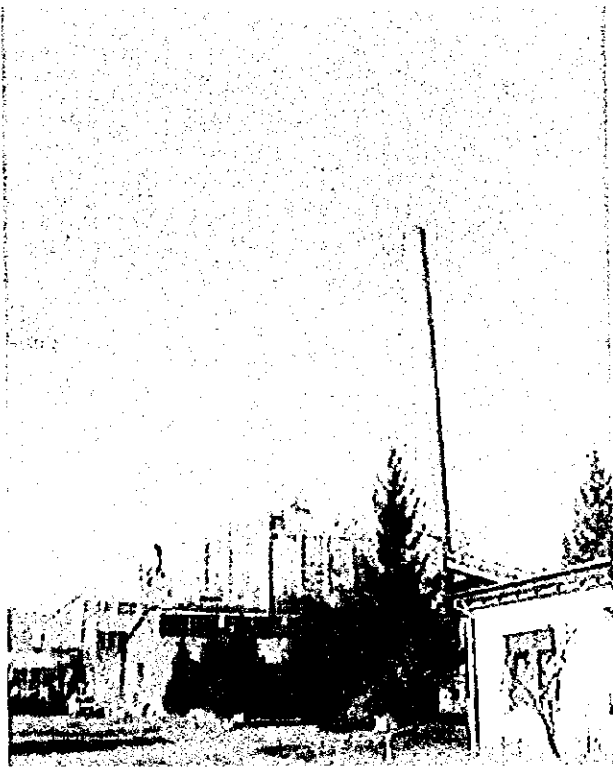
8) Ring debarker, chipping plant and chip conveyor



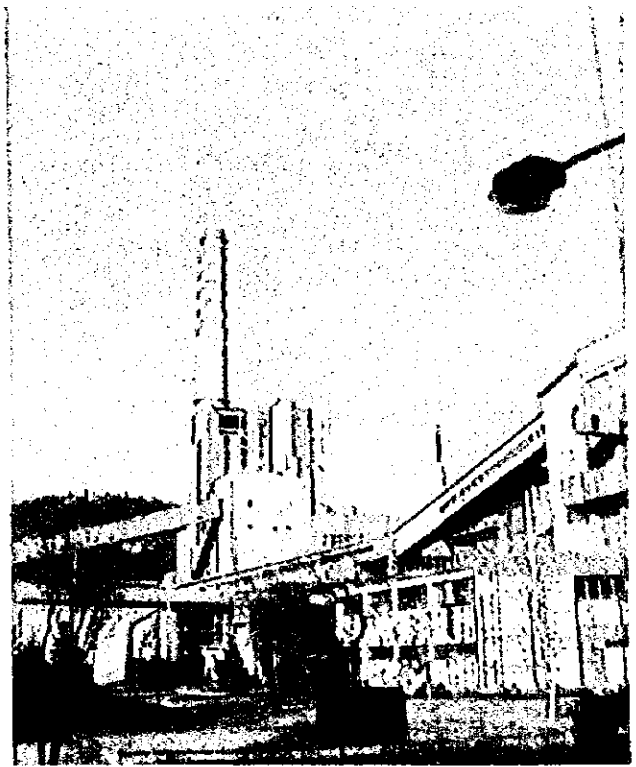
9) Chip conveyor, storage and kamyr digester



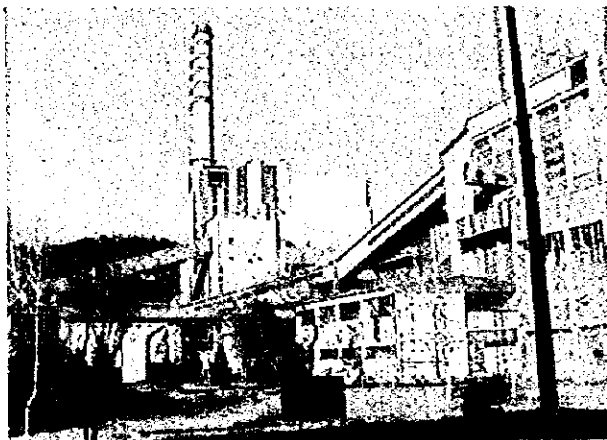
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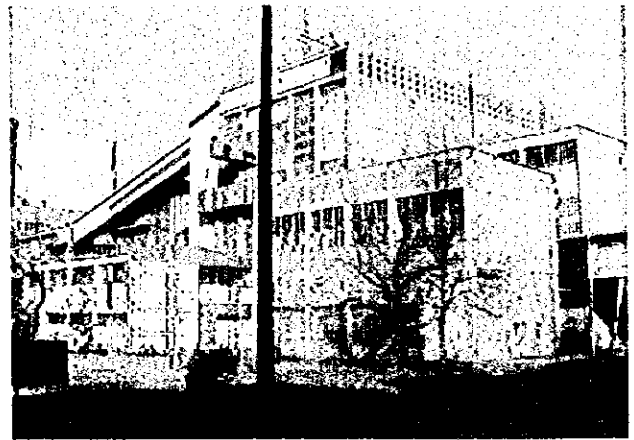
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12) Power plant



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14) Butch pulping line facilities



15) Paper machine PM1 stock preparation



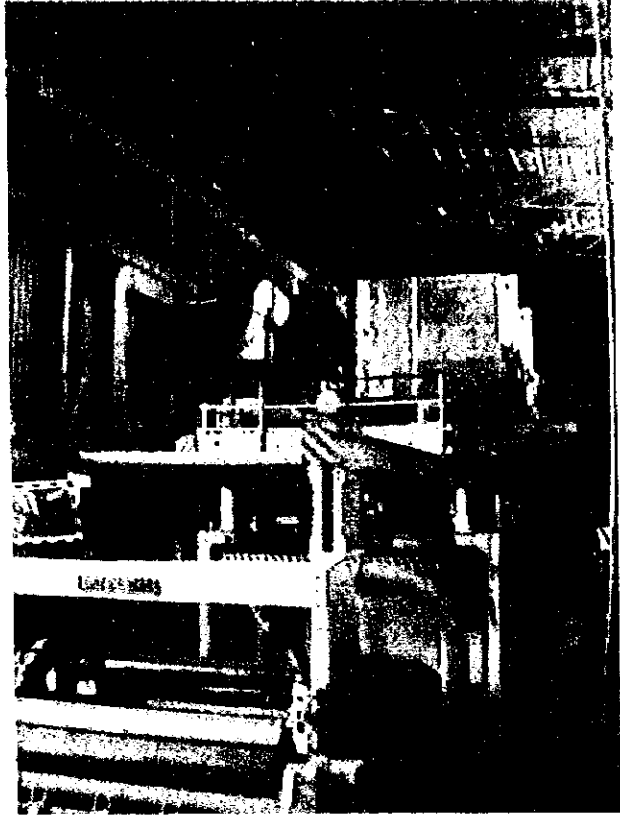
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17) Paper machine PM1 head box



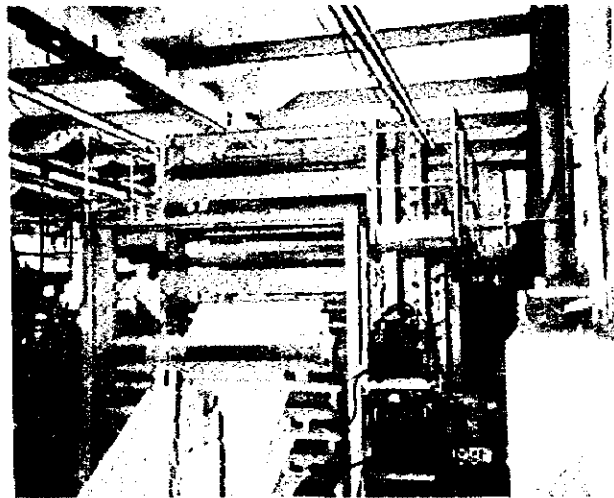
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18) Paper machine PM3



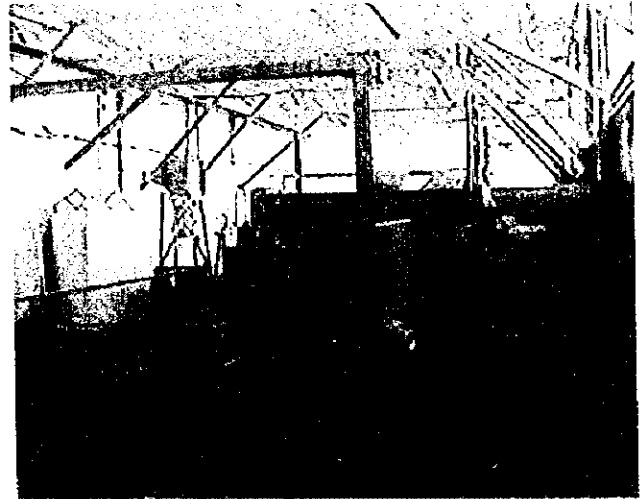
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22) Sacks machine



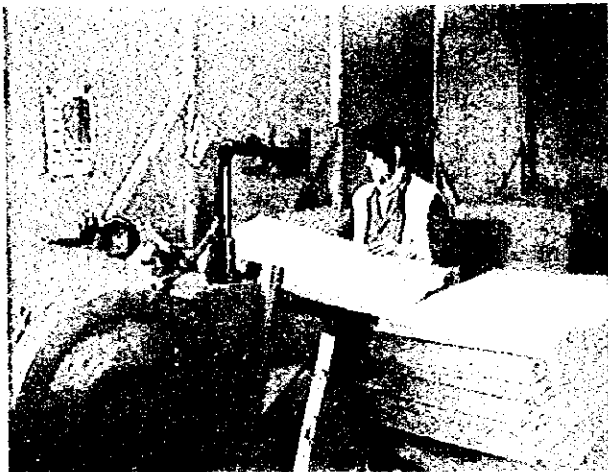
23) Corrugated box production unit



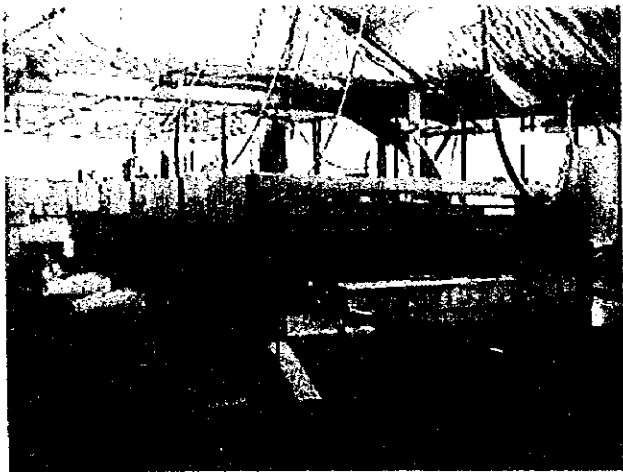
24) Corrugating plant



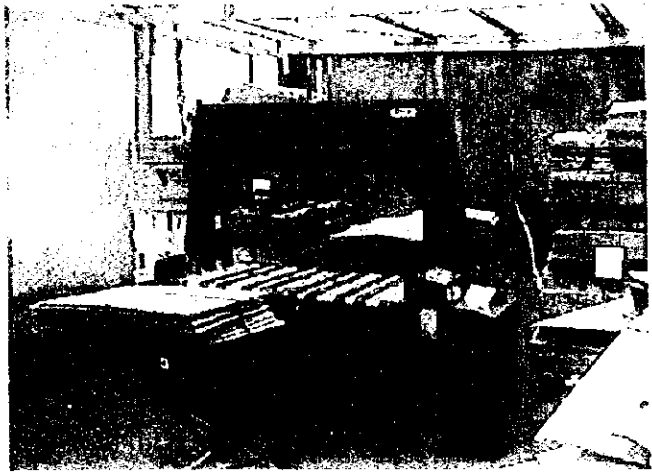
25) Corrugated box stitching unit



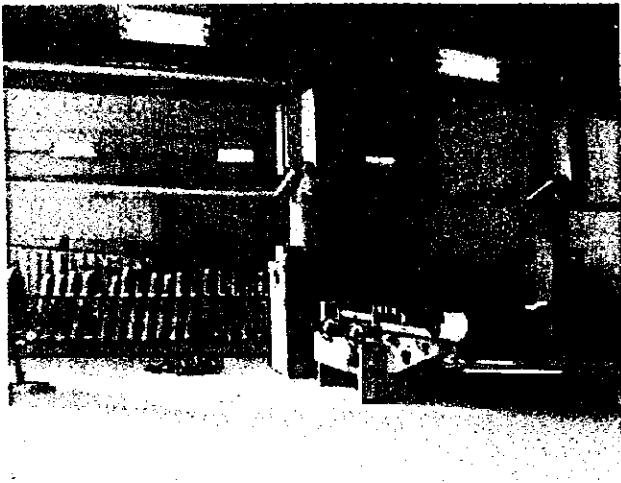
26) Corrugated board die cutting unit



27) Corrugated box production unit



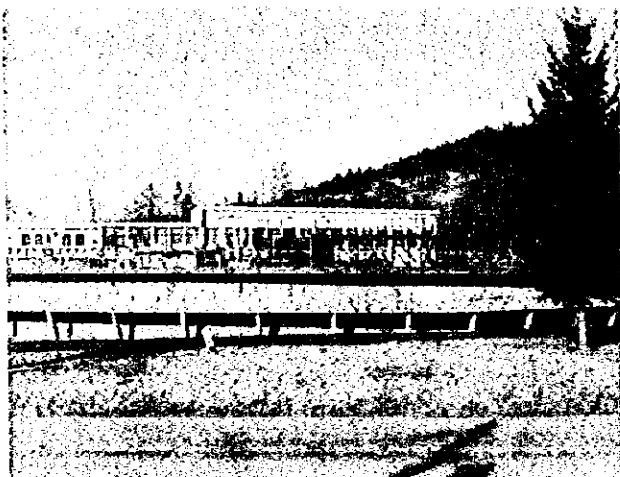
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## LIST OF UNITS TO BE USED

Quantity	Units to be used	Abbreviation
Acceleration	meter per square second	m/s <sup>2</sup>
Amount of substance	mole	mol
Angle	degree	o
Area	square metre	m <sup>2</sup>
	square centimetre	cm <sup>2</sup>
	square millimetre	mm <sup>2</sup>
Biological oxygen demand(BOD)	milligram per litre	mg/l
	gram per litre	g/l
	ton per day	t/d
Brightness	ISO degree	o ISO
Chemical oxygen demand (COD)	milligram per litre	mg/l
	gram per litre	g/l
	ton per day	t/d
Compression strength	newton per square millimetre	N/mm <sup>2</sup>
Concentration	mole per cubic decimetre	mol/l
	milligram per litre	mg/l
	gram per litre	g/l
Conductance	siemens	S
Conductivity	millisiemens per metre	mS/m
	siemens per metre	S/m
Consistency	percent	%
Content	milligram per kilogram	mg/kg
	kilogram per cubic decimetre	kg/l
	milligram per cubic metre	mg/m <sup>3</sup>
	gram per litre	g/l
	milligram per normal m <sup>3</sup>	mg/m <sup>3n</sup>
Currency	German mark	DM
	Japan yen	JPY
	USA dollar	USD
Density	kilogram per cubic decimetre	kg/l
Dry solids content	percent	%
Electric charge	coulombe	C
Electric current	ampere	A
	kiloampere	kA
	milliampere	mA
Electric potential (voltage)	volt	V
	kilovolt	kV
	millivolt	mV
Electric power	watt	W
	kilowatt	kW
- active power	megawat	MW
	voltampere	VA
	kilovoltampere	kVA
- apparent power	megavoltampere	MVA
	var	VAr
	kilovar	kVAr
- reactive power	megavar	MVAr

Quantity	Units to be used	Abbreviation
Electric power factor	cos phi	cos M
Electrical energy	kilowatt hour	kWh
	megawatt hour	MWh
	gigawatt hour	GWh
Energy, work	kilojoule	kJ
	megajoule	MJ
	gigajoule	GJ
Flow rate	litre per second	l/s
	litre per minute	l/min
	cubic metre per hour	m <sup>3</sup> /h
	cubic metre per day	m <sup>3</sup> /d
Force	tons per day	t/d
	newton	N
	kilonewton	kN
Freeness of stock	meganeutron	MN
	millilitre	ml CSF
Frequency	herz	Hz
	kiloherz	kHz
Grammage	gram per square metre	g/m <sup>2</sup>
Gravity	newton	N
Hardness of water	milliequivalent per litre	mval/l
Heat of reaction, enthalpy	kilojoule per kilogram	kJ/kg
	kilojoule per mole	kJ/mol
Heat transfer coefficient	watt per °C per square metre	W/(°C m <sup>2</sup> )
Heat capacity	kilojoule per kelvin	kJ/K
	specific heat capacity	kilojoule per kilogram and kelvin
Heat value	kilojoule per kilogram	kJ/kg
	megajoule per kilogram	MJ/kg
	gigajoule per ton	GJ/t
Humidity of air	- absolute	gram per cubic metre
		kg/kg dry air
- relative	percent	%
Illuminance	lux	lx
Kappa number	-	-
Length	millimetre	mm
	metre	m
	kilometre	km
Luminance, Y value	percent	%
Luminous flux	lumen	lm
Mass	ton	t
	kilogram	kg
	gram	g
	milligram	mg
Mass rate of flow	kilogram per second	kg/s
	air dry(90%) ton pulp per day	ADt/d, W/d
Modulus of elasticity	newton per square millimetre	N/mm <sup>2</sup>
Moisture content	percent	%
Moment of force	newtonmetre	Nm

Quantity	Units to be used	Abbreviation
Pressure (effective)	bar, kilopascal, megapascal	bar, kPa, Mpa
Pressure, absolute	bar(abs)	bar(abs)
Pressure, pumps	metre liquid column	mle
Production rate		
- paper	ton per hour	t/h
	ton per day	t/d
	ton per annum	t/a
- pulp	air dry ton per hour	ADt/h, t/h
	air dry ton per day	ADt/d, t/d
	air dry ton per annum	ADt/a, t/a
Resistance	ohm	ohm
	kilo-ohm	kohm
Rotational frequency	rounds per second	l/s
	rounds per minute	rpm
Shopper Riegler of stock	millilitre	ml SR
Sound pressure level	decibel (A)	dB(A)
Specific weight	kilogram per cubic decimetre	kg/dm <sup>3</sup>
	kilogram per cubic metre	kg/m <sup>3</sup>
Specific volume	cubic decimetre per kilogram	dm <sup>3</sup> /kg
Surface load	newton per square metre	N/m <sup>2</sup>
Stress	kilopascal	kPa
	megapascal	Mpa
	newton per square millimetre	N/mm <sup>2</sup>
Thermal conductivity	watt per oC and metre	W/(oC m)
Time	second	s
	minute	min
	hour	h
	day (24h)	d
	year	a
Velocity	metre per second	m/s
	metre per minute	m/min
Viscosity dynamic	millipascal second	mPa s
kinematic	square millimetre per second	mm <sup>2</sup> /s
Volume, general	cubic metre	m <sup>3</sup>
	litre	l
	millilitre	ml
Volume, wood	cubic metre solid over bark	m <sup>3</sup> ob
	cubic metre solid under bark	m <sup>3</sup> sub
Web tension	newton per metre	N/m

## **1. BACKGROUND AND OBJECTGIVE OF THE PROJECT**

## **1. BACKGROUND AND OBJECTIVE OF THE PROJECT**

Bosnia and Herzegovina (BH) suffered severe losses through a civil war (Apr. 1992 - Oct. 1995) after it gained independence in the beginning of 1992. Especially hard hit was the manufacturing sector, and output in August 1997 was only 15% of the level in August 1991, indicating the extent of the depression in industrial activity caused by the war.

"NATRON Maglaj d.d." (NATRON Pulp and Paper Mill in Maglaj city), which is the object of this project, developed following the end of World War II to be a representative member of former Yugoslavia's pulp and paper industry, located in a region rich in forestry resources. During the civil war, factory buildings and corrugated cardboard manufacturing facilities were badly damaged. The paper machines and pulp making facilities except wood preparation section were undamaged by war itself, but most equipment rusted or corroded while they have stopped working for about 4 years. Current operation levels for the production of corrugated cardboard and paper bags from product stock, recycled paper and purchased paper are currently 10% of their pre-war level.

NATRON, which with 70% government ownership is essentially a state run enterprise, which in January 1997 ranked 15th on a list of 76 priority projects in the economic recovery plan of a council of the BH cabinet. They hope that this project will serve to increase employment and be a great help in the region's economic recovery.

The goal of this study is to, based on the BH government's request, and placing the greatest emphasis on the privatization in 1998 of NATRON, examine feasibility for an "Immediate restoration plan" for NATRON to survive by improving management and strengthening the currently operational waste paper recycling division, and to make a "Mid to Long term plan" aimed at forming a step-wise restoration plan to restart pulp production and to prepare for the privatization of the company. Moreover, during the feasibility study the team will provide technical transfer in such areas as quality control, production management, and financial management.

We all, members of the study team of this project, hope that the result of our study will help improvement in NATRON's management and production to a model enterprise adapting to the market economy and privatization, and that it will help NATRON attract foreign investment. We also hope the Maglaj area will recover its prosperity through NATRON's restoration in near future.

## **2. SOCIAL-ECONOMIC SITUATION**



## 2. SOCIAL ECONOMIC SITUATION

The Republic of Bosnia and Herzegovina (hereafter BH) consists of the Federation of Bosnia and Herzegovina (hereafter the Federation or F M&C, Federation of Muslims and Croats) and the Republic Srpska ( hereafter RS ).

Basic information, facts and figures on the social-economic situation of this country, for the war period (1992 – 1995) is not available, and the disorder after the war has made it hard for institutions to equip themselves with necessary information. Information gap between the central and country sides is widely observed. The information on RS is very poor.

The Government of Bosnia and Herzegovina (BH) has to do a lot of things for social reform and economic reconstruction, of which the planned legal and institutional changes are most important. Although the government prepared key laws like the privatization, and related laws, banking law, etc. the legislative process has looked slow and the expected implementation of social and economic reforms seems hesitant due to political reasons.

After the Dayton Agreement, the USA and NATO led a 65,000 person army (at peak) deployed in the country as the Stabilization Force (SFOR) for peace keeping. Currently a 35,000 person SFOR presence is essential to keep peace in the region. USA and NATO have basically agreed and BH welcomed the extension of the SFOR stay in the region until they are confident that peace will be kept without SFOR. Many officials in the government and foreign institutions in BH believe that the SFOR stay in this country is a necessity for peace-keeping and stabilization of the society.

During the war years more than 1.2 million refugees evacuated from BH to neighboring countries or further afield. In the two years since the signing of The Peace Agreement over 200,000 refugees have returned. This is a much smaller number than UNHCR expected. Also it is said that more than 1 million people, representing over 30% of the population of BH, were displaced internally by the end of the war. According to UNHCR estimates, some 165,000 displaced persons returned to the places of their origin in 1996 and 1997. Both the repatriation of refugees and re-settlement of the displaced persons are very important for the stabilization of BH society.

During the four year war, the Federation suffered enormous damage. Direct damage is estimated to amount about US \$ 80 billions. A broad support for the reconstruction of BH has been initiated by the international community immediately after the Dayton Peace Agreement. By this support program led by the World Bank, the Europe Union, the European Bank for Reconstruction and Development, as well as 60 bilateral donors pledged some US \$ 5 billion to

be invested in the recovery of BH over 3 - 4 years. Furthermore at donor conferences at Brussels, international donors offered US \$ 2.9 billion for reconstruction in BH in years to come.

### **History in Chronicle**

6ct~7ct	The Slav moved to Balkan
1463	Osman Turk Empire conquered Bosnia
1878	Austria-Hungary Empire governed Bosnia
1914	Prince of Austria was assassinated and World War I broke out
1941	World War II began
1945.3	Federation of Yugoslavia is established
1953.1	Josip Broz Tito became the President
1980.5	Josip Broz Tito died
1991.6.25	Slovenia and Croatia declared Independence from Yugoslavia
1991.10	Bosnian Parliament Votes for Independence Bosnian Serbs vote to remain in Yugoslavia
1992.3.3	Bosnia and Herzegovina declare Independence
1992.4.8	Bosnian war begins
1992.4.27	New Yugoslavia becomes independent
1995.10.12	Cease-fire in Bosnia
1995.11.1	Peace Negotiation in Dayton, Ohio, USA
1995.12.14	Bosnia Peace Treaty is signed in Paris
1996.9.14	General Election in BH Three Members of Presidency are elected
1998.01	Joint passports and car-plates for three nationalities
1998.01	New flag for Republic BH
1998.02.26	First Coal train after the war passed through Federation of Muslims and Croats and Republic of Srpska (from Tuzla to Ploce)

### **Basic Data (EIU and others)**

- Land area 51,129 Km<sup>2</sup> (a bit smaller than Croatia)  
51% for Federation and 49% for Srpska  
21% arable for agriculture, 10% pasture, 46% forest  
Mostly mountainous with many rivers.

- Population 4.37 millions in 1991  
3.20 millions in 1996 (estimated)  
3.70 millions in 1997  
Many people evacuated from the country during the four years civil war are now slowly returning.
- Ethnical population (% in 1991) 43,5% Bosnian Muslims  
31,2% Bosnian Serbs  
17,4% Bosnian Croats  
This percentage is almost the same to 1998. (estimate)
- Climate Continental in north Bosnia and sub-Mediterranean in south
- Language Bosnian, Serbian, Croatian (they are almost the same)
- Currency German Mark is used throughout the country, but Bosnia Dinar, Croat Kuna and Yugoslav Dinar are also circulating.  
The new currency Convertible Mark (KM) has been fixed to the German Mark at the rate of 1:1
- Measures Metric system

## 2.1 Political Situation

Republic of Bosnia and Herzegovina has emerged from a war. The war over four years (1992-1995) left serious consequences on all segments of political and social life in the country. That period was the time of brutal destruction of the country. Thereafter the structures have been changed almost completely. The infrastructure, the main prerequisite for the normal life was paralyzed like as well industrial sectors over the country.

After Dayton Accord<sup>1</sup> signed among Muslims, Serbs and Croats, BH was divided in two entities, the Federation of Muslims and Croats (F M&C), and the Republic of Srpska (RS). there are forty-one municipalities in BH. The Federation part is split into ten Cantons and RS into two regions called Krajina and East Republic Srpska.

Bosnia and Herzegovina has the following limited responsibilities under the Basic Principles confirmed at Dayton: the establishment of a Constitutional Court, a Commission for displaced persons, a Human Rights Commission, a Central Bank, public corporations to manage and operate Transport and Telecommunications, a Commission to preserve National Monuments,

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<sup>1</sup> The peace Agreement in BH, which was officially signed at Dayton, Ohio, USA with the attendance of the President MR. Clinton on November 21, 1995, after the provisional signing at Geneva and New York in September, 1995.

and a system of arbitration between the two entities . Foreign trade is also to be managed by the government of BH. (EIU)

Bosnia and Herzegovina has a collective presidency of three, elected on September 14th, 1996, Alija Izetbegovic, Momcilo Krajisnik, and Kresimir Zubak, each of them represents his ethnic nationality.

There is a small Council of Ministers with two Co-chairmen (prime ministers) and a deputy prime minister chosen by the presidency. Three departmental ministers, each with two deputies, were elected by parliament on the 3<sup>rd</sup> January of 1997.

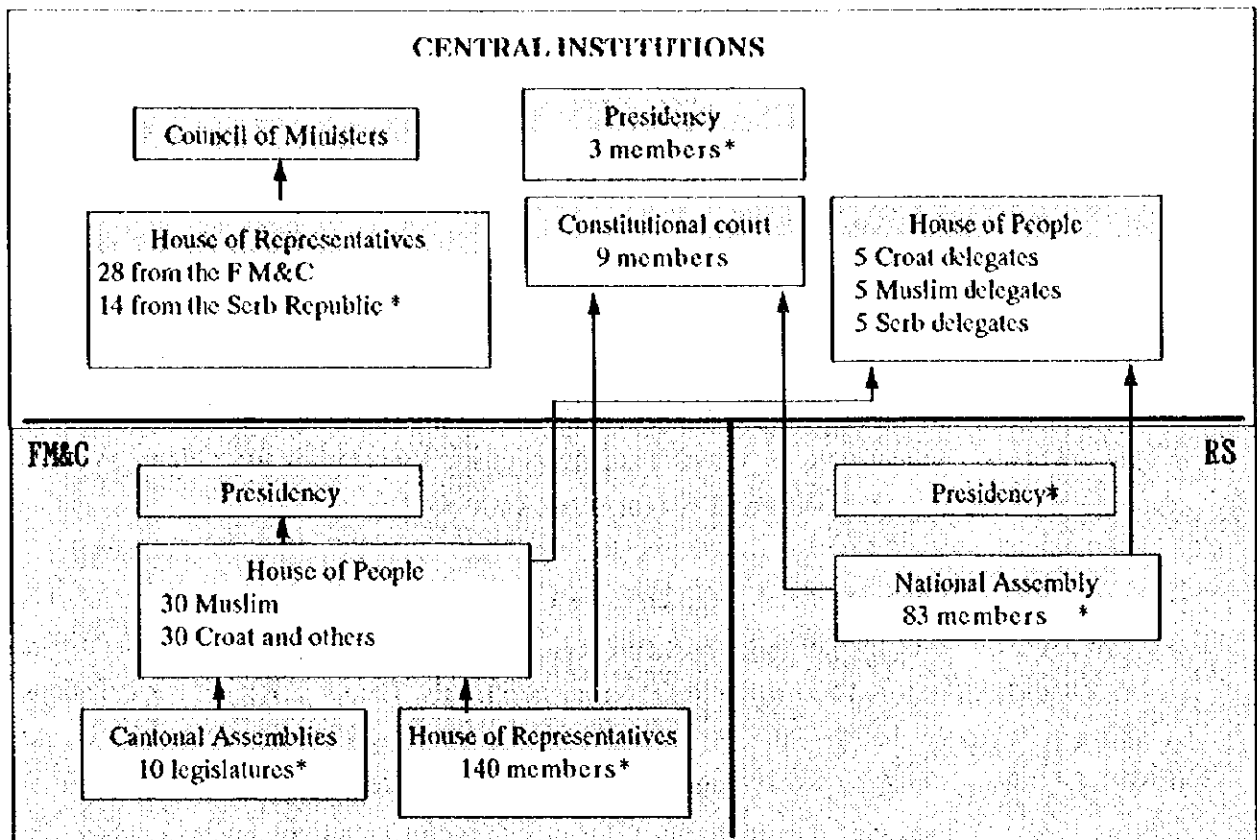
The two entities have a joint Ministry for Foreign Affairs, Ministry of Trade and Economic Relations, and Ministry of Civil Affairs and Communications. Each of the Ministries has one representative from each ethnic group.

The F M&C and RS have their own assemblies. The Republic of Bosnia and Herzegovina has two parliamentary chambers. The House of Representatives and the House of Peoples. Two thirds are to be elected from the F M&C and one third from RS. A valid majority requires the support of at least one third of the members representing each entity.

The main political parties are :

Party of Democratic Action (SDA), Croatian Democratic Union (HDZ), Party for BH, Serbian Democratic Party (SDS), Serbian People's Alliance (SNS), Serbian Radical Party of the RS, Social Democrats of BH, Union of BH Social Democrats.

## Illustration of Republic BH Government Organization



source OSCI:

3 members Presidency - each one of three is a representative of one nationality

FM&C Presidency - one Muslim, one Croat representative

Select

Directly elected \*

## 2.2 Economic Situation

At present concrete economic and industrial programs are not observed in BH. But, it is said that these projects are currently studied in the Government on the basis of the report, "Strategy of Economic Development in BH" which was written at the request of the BH government in May, 1997.

This report was made and presented by the professors and scholars of universities in BH in cooperation with universities of Austria, Germany and England by the sponsorship of the

United Nations, and the strategy tells about the basic philosophy for the establishment of democracy and development of a market economy.

Up to now, the BH government has tried to work in line with the agreement in the Dayton Accord. They have managed to arrange one by one the basic national structures - general elections, setting-up of a Central Bank, issue of new currency, enactment of a series of laws and regulations for market economy etc.

In the financial sector, challenges for the reconstruction in BH are enormous. So far, the national budget is under the guidance of IMF and World Bank. Financial and legal infrastructure is still in disarray. Reconstruction in these fields is urgently needed. So called gray market and barter transactions in trade are quite popular. Preparation for rational taxation system and streamline of tax collection system are urgently needed.

Unemployment is still over 50%. More than 30% of the population depends on humanitarian aid, while some 75% of the housing stock still needs rehabilitation. Only 15% of the industrial facilities have been restored according to Government officials. The Government has intentions to shift its policy from the present emergency recovery system toward programs which would allow establishing a long-lasting sustainable economic system. That would include structural reforms aiming at improving the environment for private sector initiatives, sound banking and revival of industrial production, which would allow for new employment. Therefore investment priority is to be given in the following programs:

1. Facilitating return of refugees (housing, employment, basic social service, etc.)
2. Continued recovery of damaged infrastructure
3. Rehabilitation of social sector (school, health institutions)
4. New employment generation through private and financial sector development
5. Policy reforms to facilitate the Federation to move faster for transition to a market economy.

Among the reconstruction programs, priority is placed on peace-keeping, resettlement of refugees, relief to victims of the war and the unemployment, reconstruction of distracted infrastructure and damaged environment.

The huge amount of expense for reconstruction infrastructure and environment depends almost wholly on foreign aid. The amount of foreign aid in 1997 was US \$1,100 million and the same amount is also expected in 1998. The uses and allocation of funds are to be decided at the donor conference held once or twice a year in Brussels.

Upon the allocation of fund, as the donors usually select the donee and object subject to the progress of Dayton agreements, this sometimes causes delays on decisions relating to fund allocation.

Generally, the economic situation is better in the Federation than in the Republic Srpska. This fact is due to the following elements:

- The Federation receives more international help in rebuilding the country
- Headquarters of almost all international organizations are located in the Federation
- The connections with other countries are much more open than with the RS (reflected with situation in Yugoslavia - sanctions)

The political and social tensions between F M&C and RS still continues. Commercial business between F M&C and RS is only at the level of the "gray market" at entity borders. The currency accepted in both parts is the German mark.

Currently the World Bank, the European Bank for Reconstruction and Development and some other organizations give credits for private sectors to encourage people to stay in the country and develop the economy. Now, a lot of small private enterprises were established with aim to survive. The large companies are damaged by the war and many people lost their jobs.

### 2.2.1 GDP

GDP for the state as a whole showed a strong growth in the first two years after the war, although the growth was not as strong as in the federation. 1996 GDP at \$3.4 billion was 65% higher than the 1995 GDP. The projected 1997 GDP at \$4.5 billion represents growth 35% from 1996 (Federation Institute of Statistic).

Regarding BH GDP growth in the near future, IMF and IBRD expect 21% real growth rate per year on average from 1996 to 2000, and 8.4% from 2001 to 2005. They forecast it's GDP in 2002 will surpass US \$8,199m, the GDP in 1991. In this report hereinafter this forecast is used for NATRON's business plan.

The two institutions also forecast the income per capita of BH. The real income per capita declined in 1995 to US \$524 from US \$1,872 in 1991. This then recovered to US \$726 in 1996. IMF and IBRD forecast it will smoothly recover in the near future, and will reach US \$1,150 on average between 1996 and 2000, US \$2,123 between 2001 and 2005.

### State GDP (in millions of US dollars)

Year	1990	1995	1996	1997
GDP	10,663	2,029	3,350	4,522
% change from previous period		-81%	65%	35%

Source: Federation Institute of statistic.

### Entities GDP

ENTITIES COMPARED	Muslim-Croat Federation 1996	Serb Republic 1995
Population, m	2.4	1.3
GDP per head, \$	1,000	585
GDP growth, %	37	19

Source: National statistic

The rate of inflation in F M&C was - 0,25 % in 1996, and 10,8 % in 1997.

### 2.2.2 Employment

In the Federation, the extremely high unemployment rate of around 50% is a legacy of the war. A major priority of the government policy is to create the conditions for rapid reduction of unemployment. Also the international donors supporting the reconstruction program consider employment generation as one of the first major objectives. The unemployment rate is currently very difficult to determine. However some international organizations estimate it as around 50% on average.

### Employment in main sectors

Activity / year	1990	1991	1996	1997
Industry and Mining	464,000	426,400	108,678	105,711
Education and Culture	64,000	62,500	22,427	23,384
Health & Social welfare	53,000	62,500	19,409	20,191
Construction	74,900	67,900	20,101	19,023

Source: National Statistic and World Bank

No employment figures are available for Republic Srpska.



Although the unemployment rate on average in the Federation is said to be about 50%, the rate in Maglaj city is 68%. In the other words every working person has to sustain 8 unpaid persons. On the other hand NATRON, the only the major industry in the city cannot pay tax and rent to the city. The city of Maglaj is in a crucial situation according to city officials.

### 2.2.3 Banking System

Currently, the currency used by both entities is the German mark. In F M&C there exist three currencies namely the German mark (DM), Bosnian Dinar (BD) and Croatian Kuna (KN). In the Central and North-western parts people usually use DM and BD, and in West Bosnia DM and KN. In RS they use DM and Yugoslavian Dinar.

One of the most significant events in the banking sector was the establishment of the Central Bank of Bosnia and Herzegovina (CBBH). This was in line with the Dayton Agreement and at the same time the National Bank of Federation and National Bank of Republic Srpska ceased to act as Central Banks.

The parliamentary Assembly of Bosnia and Herzegovina passed the Law on June 20, 1997, and the Law entered into force on July 28, 1997. The Central Bank of BH started its operations on August 11, 1997. The Central Bank consists of a Head Office and three Main Units. At the top, the Governing Board, chaired by the Governor (Mr. Peter Nichol) and consisting of the representatives of the three constituent nations, has board policy responsibility. Governor for Central Bank in cooperation with European Union (EU) has a new currency for whole country called Konvertibilna Marka (KM). Its convertibility into German marks is guaranteed, on demand and without restriction, at the rate of 1 KM for 1 DM. This would be made possible by a 100% backing of German Marks kept as foreign exchange reserve by the CBBH. It will also be the sole currency used in the budget of BH for revenues and expenditures. The new money is designed by EU and now is printed in France.

In the commercial banking sector, there were 57 banks as of September 1997, 46 of them in Federation, 11 in the RS. Privately owned banks account for 60% of the total number and in the remaining 40% of banks, the State is the majority shareholder. Due to the easy regulation on setting up, most of the private banks mushroomed in the chaos during and after the war. They are usually very small and weak. The commercial banking sector is now insolvent and burdened by non-performing assets mainly to state owned enterprises. Therefore the banking sector is not strong enough to support the reconstruction of the industry sector. No foreign banks exist in the country.

### 2.3 Industrial Situation

Although the domestic and export market for BH industrial products will recover in the near future, the restoration of the former Yugoslavia markets on which BH has largely depended is not observed at this stage. Before the war, the exports of BH to the former Yugoslavia countries was DM 251m, 74% of total BH exports. This declined to only 7% in 1996.

Generally speaking the industry of this country has excess capacity, at the same time as acknowledged by the government officials, the most enterprises have kept excessive work force and its labor productivity is very much below Western standards. They also point out that the management capability of most enterprises is not adequate to carry on business in the coming market economy. Financial and technical improvement is strongly needed for many enterprises. In this area foreign assistance has been requested.

It is said the disintegration of the former Yugoslavia into five independent states has radically altered BH's trade partners, increasing rather than diminishing its export potential. BH used to enjoy the preferential trade status with former Yugoslav republics, however so far few constructive trade agreements with these countries have been implemented. The exports to western Europe have been slow.

Industrial production, which grew by 80% in the first months after the war now, experiences large monthly fluctuations. Trade, which had grown rapidly in the first year after the war, now appears to have shrunk with January 1997 figures 40% below figures for January 1996. Large monthly fluctuations are frequently seen also in employment wages and prices in general.

Today, exports involve primarily industrial products, machinery and transportation equipment. Fluctuations in industrial output are largely affected by movements in production of electric power, which accounts for a third of total industry output. Other sectors showing a significant rapid economic growth are ferrous metals, wood - processing, mining, electric power generation and textiles. After the electricity industry, the best developed is the wood - processing and furniture sector.

Foreign investors enjoy wide-ranging guarantees under BH Foreign Investment Law. These include : free expatriation of profits, free return of capital invested, respect of acquired rights, and recognition of the legal regime in force at the time of establishment of the company. Foreign investments are limited to 49% control only in the military industry, production and trade of weapons and military equipment, telecommunications, public information media, international railroads, international air transport and communications, except as otherwise

specified by a special law. Foreign investments are granted significant tax and custom benefits, as well as political risk guarantees (Source: Foreign Investment and Trade Promotion BH, Oct. 97).

Imports of raw materials, which will be used in producing the final products that can be exported, are free of duties.

#### Import-export situation

Industry Sector 1996	EXPORT B&H in %	IMPORT B&H in %
Manufacturing and Mining	83	21
Trade	11	66
Agriculture and Fisheries	2	1
Forestry	1	0
Others	3	12

Source: Institution of Statistic of B&H, June 1997

#### 2.3.1 Pulp and Paper Industry

Blessed by its rich forest, wood, pulp and paper industries in this country have historically flourished as they are in a good position in terms of raw materials compared to other industrial sectors. These sectors have potential to develop their export market.

The pulp and paper industry, although the number of companies in this sector is limited to 6 headed by NATRON Maglaj, is very important for the country as an enterprise that provide employment, export and pay taxes. Furthermore their importance is that the pulp and paper industry sustains wide-spread skirt industries such as timber industry , publishing, transportation, chemicals, machinery etc. Everyone knows the paper (industry) supports the culture of a nation . It should also be noted that the industry can maintain the forest as a national heritage in good condition and regenerate the forest through tree farming and forest maintenance.

In the recent years, environmental concern and recycling of natural resources have strongly been emphasized in Western countries. Pulp and paper industries have a very important role especially in the field of recycling of wasted paper in respect of natural resource protection.

Wood is potentially a strong sector with good export prospects. Currently the sector is surviving almost solely on the quality of its raw material. Bosnian beech, spruce and pine enjoy

strong demand in Europe, especially Italy. However, the average length is declining due to lack of forest management during the war and over-cutting of the more accessible forest areas.

### 2.3.2 Infrastructures Situation

International organizations and a lot of countries have helped the reconstruction of BH's infrastructure which is extremely important for economic recovery.

#### 1) Water

According to Water Law PWME "Vodoprivreda" executes activities of special social interest for the Federation, in the following sectors:

1. Water use
2. Water protective measures from harmful acting
3. Protection of water from pollution

During and after the war (i.e. the period 1992-97) main activities focused on water supply systems have already been rehabilitated. Over 60,000 meter of water pipelines, 12,000 m<sup>3</sup> of reservoir space, 14 pumping stations of various capacities and many water intakes have been reconstructed or newly constructed.

Ongoing sanitation project in Sarajevo is the only one of the kind for the time being. (Source Public Water Management Enterprise "Vodoprivreda").

#### 2) Electricity

Currently in Republic BH they have enough electrical energy for their consumption.

Electricity Bosnia now receives electricity from Electrical Central located in Tuzla, Gacko, Kakanj, and more on Neretva river (Federation entity), Ugljevik (RS entity). Hydro central BH have on Neretva (Federation) and Drina (RS) rivers.

Because BH have enough electricity to cover domestic needs, they are exporting electricity to the Republic of Croatia and Republic of Slovenia, and before the war even to Austria, Italy, and neighboring counties.

### 3) Telecommunications

Telecommunication business in BH is divided and carried on by each PTT in three districts of RS, Eastern Bosnia and Central Bosnia.

Reconstruction of telephone and telegram network has been remarkable, however recovery of the telecommunication service is not adequate. Telephone and facsimile circuits are still in shortage. In some areas Internet service is now available. The number of telephones is still insufficient both in offices and homes.

### 4) Railways

The railway system in BH was established over 125 years ago and consists of 2,752 kilometers of lines. Traffic peaked 1985 with 19.1 million passengers, and with 32.1 million tons of freight. As of March in 1998, recovery of the railway transport system is not realized except in few local lines. Especially regular railways operations across the countries are not served.

During the war, infrastructure damage estimates (civil and electrical engineering) was around US \$87 million. For rolling stock, damage is estimated at around US \$767 millions. Many railway stations and premises were destroyed. As of March 1998, the stations in Sarajevo and Mostar were not in operation. How much is repaired it is hard to say, but the first steps after the war has been to clean mines around tracks, and that process took over two years. On February 26, 1998, the first train passed from Federation through RS and that is a large step for further recovery of industry in this country.

#### Transportation of passengers and goods

Year	1989	1991	1993	1995
Passengers in million	8 m.	7 m.	0,5 m.	2.3 m.
Tons of goods in million	19 m.	11 m.	0,2 m.	0,6 m.

Source: B&H Railways

### 5) Road

Due to its geographical features, BH's road transportation situation is rather poor. In F M&C there are about 7,000km roads from the national level to local communities and some 40 damaged bridges which are now partly repaired (Federal Ministry of Telecommunication & Transport). Construction of highways is much inferior compared to other countries in Central Europe due to the war. A good and well maintained transportation system is essential for an efficient market economy. Urgent reconstruction and repair of roads and bridges are needed. On the other hand, the number of car holding in this country is said to have surpassed the level before the war.

## 2.4 Privatization Program

Process of privatization will be in both entities, but the response of international community to the plans of the two entities has been different.

RS was first to frame a privatization law. Under the legislation adopted last year, 38% of shares are supposed to be distributed to citizens who register to participate; 44% are supposed to go to state privatization's funds, which will distribute them for the benefit of groups such as war veterans, pensioners and large families; others are to be sold for cash. The RS authorities declared their intention to go ahead with sale of over 200 state-owned enterprises in November despite Western appeals for the plan to be canceled. The progress in RS is said to be stranded (Source EIU).

The Federation adopted a privatization law in October 1997. In the Federation of M&C, there exists a specialized organization (institution) for privatization called Federal Agency for Privatization. This Agency has its under control ten Agencies at the Canton level. Process of privatization has three phases. First for apartments, second for enterprises and third for claims and compensation.

There are seven relevant laws:

- The Law on Privatization of Enterprises
  - Process of privatization of enterprises will be in three phases:
    1. Small enterprises with property below 500 000 DM, less than 50 employees
    2. Middle and big /enterprises with property above 500 000 DM, above 50 employees
    3. State strategic important companies as water supply, electric company, PTT, etc.
- The Law for the Banks
  - describes process and requirements for the privatization of state owned banks.
- The Law on Opening Balance Sheet of Enterprises and Banks
  - describe what will be privatized, defines active balance sheet to be included in process.
- The Law on Sale of Apartments with Existing Tenancy Right
  - describes how and to whom apartments will be sold
- The Law on Determination and Realization of Citizens Claims
  - describes compensatory and general claims that will be used as tender in the privatization process
- The Law on Restitution

- describes basis for the return of assets to former owners who were deprived of property by forceful acts of the state.
- The Law for Private Investments Funds
- establish the framework for collecting vouchers from citizens and investing in appropriate enterprises.

#### 2.4.1 Present Situation of Privatization

The privatization in the Federation has been initiated by the Federal Agency for Privatization which was set up in October 1997. But the Proceeding is apt to be behind by the lack of staff in the Agency and delay of legislation of related laws. The schedule for privatization is as follows:

1. Sale of collective apartments throughout the country.
2. At the same time, start of privatization in canton level of small size business with assets below 500,000 DM and workers below 50 persons.
3. To proceed next in the Federal level the Privatization for medium and large enterprises (about 2,300 companies ) with assets over 500,000 DM and workforce over 50 persons. Banks' privatization also starts at the same time.
4. The final privatization will be for the state owned enterprises like public utilities as electricity , gas and armaments industries.

At the last stage the government will utilize the funds gained through privatization for compensations and claims for restitution.

As with effectiveness of the related laws for the privatization for apartments and small size companies, the Agency has practically ordered the district Agencies in canton level to start the initial work for privatization like confirmation of applicable assets, asset appraisals, confirmation of ownership and present management etc.

Regarding the privatization for medium and large enterprises, they are already required by the Law on Opening Balance Sheets to submit to the Agency for it's investigation their financial statements made to European standards within 6 months of legislation of the related law i.e. by the end of September 1998.

The Agency will estimate the share price of each enterprise on the basis of its financial statements. Hotels, restaurants and apartments for the employees within the large enterprises and subsidiaries or affiliated companies not directly related to the parent company's operation

are to be separated from the parents balance sheets. They are to be privatized by sale for cash to employees or public. The government promotes this procedure to develop the small enterprises in the country.

There are two aspects to privatization in the Federation. The first is the positive side where, just like successful cases in Central Europe, the government wishes to realize a market economy as soon as possible through privatization and modernization of enterprises by introducing foreign capital and technology. In the passive side comes the government financial situation. The government aims to utilize the funds to be received through privatization for compensations before and during the war.

The compensations the government proceeds are as follows.

1. The foreign currency (mainly DM) bank deposit which was frozen and kept by the former Yugoslavian Central Bank. The deposits totaling over 100 DM will be compensated.
2. The unpaid salaries during the war for soldiers and policemen.
3. Restitution for property taken by force before the war.

The government wish to give the citizen the fruit of privatization by promoting the "Voucher System", which has been quite popular in Central Europe. This is to give each citizen a voucher with value of 100 points (1point = 1DM) which will be increased by 10 points for each fully paid working year. The voucher will later be changed upon request to shares to be privatized. The registration of voucher system started at local administration offices.

The government along with promotion of privatization is preparing to establish a Stock Exchange and some 10 investment funds by utilizing their savings and developing the securities market.

#### 2.4.2 NATRON and Small Privatization

The popular pattern of privatization in the former socialist countries in Central and Eastern Europe is to start, first of all, improvement of management structure of state owned enterprises, and next to try to sell to inventors the company's shares at market price as high as possible. In the Federation the government seems to promote improvement of management and privatization at the same time or for a very short period. It naturally needs for the government a strong and powerful leadership. For the enterprises quick action for tough management reformation is required



USAID (Price Waterhouse in core) have helped the government as advisors at every stage of procedure of privatization in the Federation. The key to successful privatization is the participation of foreign capital. The government officials are very much concerned that foreign investors show interest even in the troubled state enterprises. Foreign capital is already flowing into BH as expected.

The management of NATRON Maglaj is willing to privatize the Company in line with the government policy and is now preparing the initial procedure. There will be many difficulties for the privatization of this large state enterprise. NATRON in its present poor situation is not in a position to be privatized by the ordinary privatization process. First the reconstruction of management should be implemented, then privatization can be forwarded.

The Government and the management of NATRON are considering privatization by direct sale to foreign strategic investors. Judging from the current situation of NATRON, this method may be preferable.

International institutions like the IBRD, EBRD, USAID and others, and some bilateral agencies in Sarajevo have shown a keen interest in NATRON Maglaj and the JICA study. Especially they are interested in the Government attitude to NATRON, NATRON's management, its technical level, environmental situation and rehabilitation plan including its privatization program.

The present difficult situation of NATRON Maglaj has obviously become the critical problem for the local community of Maglaj. In January of 1998 the municipality Council of Maglaj together with other parties concerned resolved unanimously to make a special appeal to the Federal Government to request strong support to rescue NATRON. In reply to this appeal the Government showed strong intention to help NATRON and the municipality.

It is quite reasonable and not contradictory to the spirit of free economy to help a troubled state owned enterprise like NATRON which has been damaged by the war. Furthermore it is proper for the Government to support the management reform until the transfer to the private sector.

**3. PUIP AND PAPER INDUSTRY OF BOSNIA  
HERZEGOVINA/FORMER YUGOSLAVIA**

### 3. PULP AND PAPER INDUSTRY OF BOSNIA HERZEGOVINA /FORMER YUGOSLAVIA

#### 3.1 General

In 1991 prior to the civil war in Bosnia Herzegovina the country had five pulp and paper mills producing in total 160,000 tons of pulp and 230,000 tons of paper. This production drastically declined due to the war to about 45,000 tons of pulp and 70,000 tons of paper the following year.

The five mills have the capacity to produce various packaging grades, tissue as well as printing & writing paper. The situation of those mills was unclear at the time of preparing this report and it was possible to obtain information from only one mill other than the NATRON mill.

#### (1) "Cazin-Tvornica Kartona i Ambalaze"

Cazin is a paper board mill capable of producing duplex and triplex board based on waste paper. The machine has the following specification:

PM 1 Fourdrinier 3.2 m, max. speed 200 m/min.

The total capacity is 45,000 t/a. The factory was attacked several times during the recent civil war which caused some damage, particularly on the energy supply installations. At the time of preparing this report, the paper machine was not yet in operation.

#### (2) "CELPAK, Fabrika Celluloze i Papira"

Celpak has a total bleached pulp capacity of 40,000 t/a of which 10,000t/a sulphate and 30,000 t/a sulphite. The waste paper plant consumes 5,000 t/a wood-free waste paper and 4,000 t/a filler and coating pigments can be used in the paper production. The company produces printing & writing, coated wood-free, packaging and tissue grades.

The total paper and paper board capacity is 55,000 t/a divided to four paper machines.

PM 1 Fourdrinier 3.2 m with a size press; 30,000 t/a.

PM 2 Fourdrinier 3.2 m ; 15,000 t/a

PM 3 Cylinder machine 3.2 m; 10,000 t/a

PM 4 Cylinder machine 3.2 m; 10,000 t/a

The situation after the war is not clear.

(3) "Dvar Papir"

Dvar has the capacity to produce 35,000 t/a printing and writing papers as well as industrial grades on two paper machines.

PM 1 Fourdrinier 3.2 m; max. speed 400 m/min

PM 2 Cylinder machine 3.2 m; max. speed 250 m/min

The situation after the war is not clear.

(4) "INCEL - Banja Luka"

The total pulp capacity of INCEL is 76,000 t/a of bleached softwood sulphite, fluff pulp and dissolving pulp from beech. The tissue paper capacity is 33,500 t/a on two paper machines.

PM 1 2.5 m; max. speed 500 m/min

PM 2 5.0 m; max. speed 1,500 m/min

The mill has been damaged during the war and is only operating at 10-20% of its capacity. It is estimated by the mill that DEM 5 million is required to repair war damage and DEM 3 million for working capital before it can increase production.

(5) "NATRON Maglaj"

NATRON has two pulping lines, one batch digester line of 50,000 t/a and a continuous digester line with a capacity of 70,000 t/a. Additionally, NATRON can process 50,000 t/a waste paper. The five paper machines have a nominal combined capacity of 165,000 t/a:

PM 1 Fourdrinier 4.2 m; max. speed 350 m/min

PM 2 Fourdrinier 3.2 m; max. speed 350 m/min

PM 3 Cylinder machine 2.8 m; max. speed 250 m/min

PM 4 Fourdrinier 5.4 m; max. speed 400 m/min

PM 5 Fourdrinier 2,2 m; max. speed 150 m/min

The mill has a paper sack plant of capacity 180 pieces million per day and corrugated box plant with a capacity of 120 million square meters per year

The pulp mill ceased operation in during the spring 1992 as a result of the civil war. During the spring of 1998 only PM 1 was in operation producing schrenz and test liner based on waste paper and purchased pulp. The operation is intermittent on one paper machine only due to shortage of both raw material and customers.

The converting operation was, during the spring of 1998, at 5-10% capacity utilisation.

### 3.2 Manufacture and Trade of Paper and Paper Products

Because of insufficient official statistics, we could obtain only the following figures (from the Institute of Statistics of BH)

- Manufacture of paper and paper products (index)
 

Average 1991	Jan/91	Dec/91	Dec/97	Jan/98
100.0	107.9	56.7	5.3	1.5
- Trade of paper and paper products for Jan. 1 to Dec. 15 (US\$1,000)
 

Export		97/96	Import		97/96
1996	1997	%	1996	1997	%
539	357	66.2	1,903	14,340	753.5

(Note: Ton-kilometre = Tonnage transported \* Kilometre transported)

### 3.3 Demand Forecast

Through interviews with main customers of NATRON, it is found that their present operating level is about 30% to 40% in comparison with pre-war level and that they plan to increase production to 30%-50% of capacity in 1998 year comparing with 1997.

Sales of NATRON's corrugated board and boxes are to be increased (by quality improvement) using own pulp and by marketing promotion.

Transportation condition has gradually improved and freight transportation has been increasing as follows: (Institute of Statistics BH)

Metric ton-kilometre(1,000)	1996	1997	
Vehicle freight	129,917	222,477	171%
Rail freight	17,827	46,539	261%

#### **4. POTENTIAL EXPORT MARKETS**

## **4. EXPORT MARKET**

Considering the fact that the domestic market in BH has contracted and even at full capacity is limited in its size, export of production is very important for revival of NATRON.

The study team investigated the present situation of neighbouring countries of BH for potential export quantities and sales prices for sack paper and NSSC fluting. The potential export quantities is used in the development plan.

The objects of the investigations are as follows:

- (1) Product specification and quality requirements: to clarify product specification and quality requirements for NATRON so as to produce suitable commodities matching markets' demand.
- (2) Demand: to identify market size by studying consumption volume and demand trends.
- (3) Production: to identify quantity to be imported by studying local production and trade balance, and then make forecast of the future demand by calculating GDP growth.

At the same time the investigation covered the production capacities of main local manufacturers, who could be competitors or potential partners, and also, projects for increasing capacities.

(4) Prices: Analysing price trends in the last ten years in the German market, which is a price setter in Europe, forecast market prices for the future are to be calculated.

(5) Based on the output from (1)~(4) above, quantities and prices for use in long term plan have been estimated.

### **4.1 SACK PAPER**

#### **4.1.1 Product Definitions and Quality Requirements**

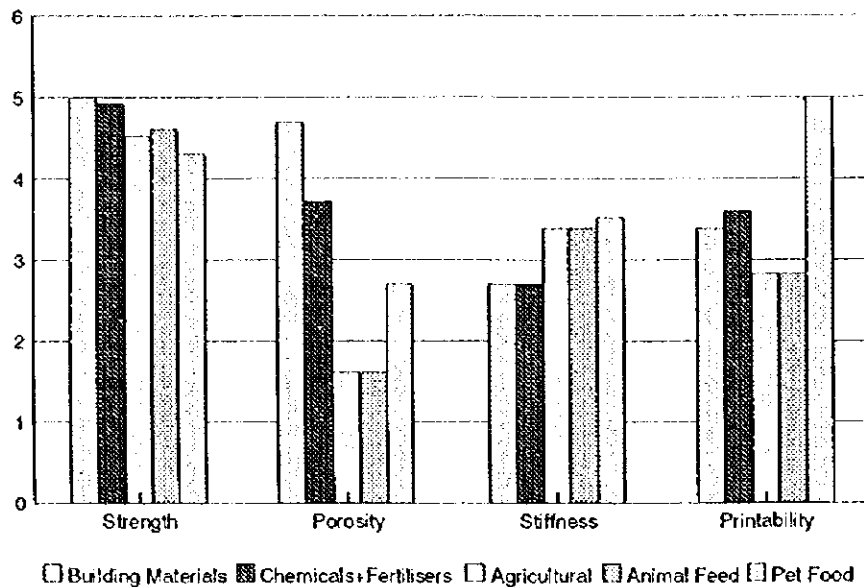
##### **(1) Product Definition**

Sack paper is normally produced from 100% unbleached kraft pulp, but it can also be produced using recycled fibre (mainly OCC, Old Corrugated Container). Sack paper may be produced in one to four layer structures, depending on the end use and other applied packaging materials. The weight is typically over 60 g/m<sup>2</sup>. The main end uses are cement and chemicals packaging, agricultural end uses, animal feed and pet foods packaging, and as refuse bags.

##### **(2) General Quality Requirements**

Quality requirements by end use are as follows:

**FIGURE 4.1**  
**SACK PAPER QUALITY REQUIREMENTS BY END USE**  
 (5=very important, 1=not important)



**4.1.2 Demand**

**(1) Demand by market**

The largest single sack paper consuming countries in the study area are Italy, Turkey, Russia/CIS, France, and Spain. Altogether they account for 67% of the total consumption among the countries examined.

*Western Europe:* France, Spain, Italy, Greece, Austria

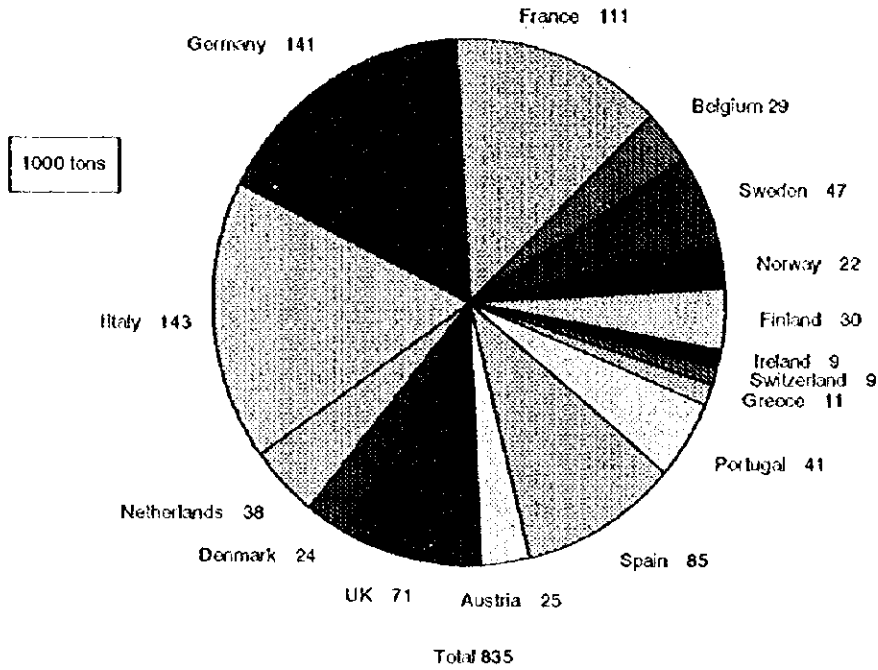
*Eastern Europe:* Hungary, Slovenia, Croatia, Bosnia, Yugoslavia, Bulgaria, Albania, Romania, Russia

*The Near Middle East:* Turkey, Syria, Lebanon, Jordan, Israel, United Arab Emirates, Saudi-Arabia, Kuwait

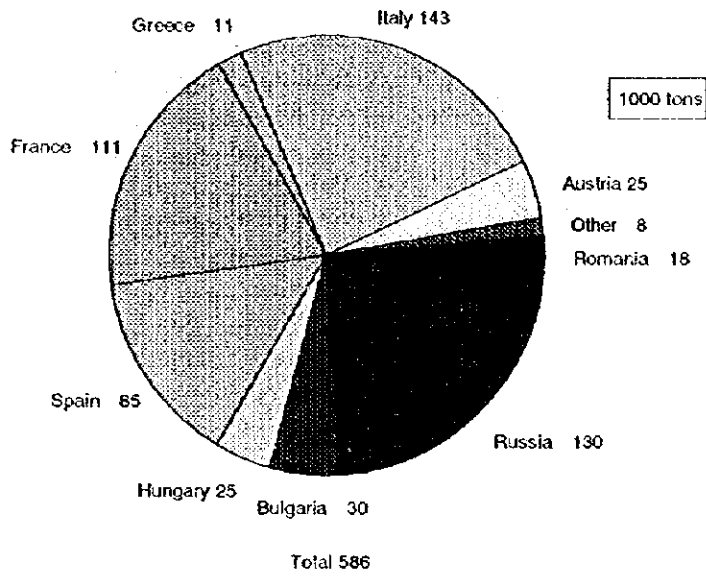
*North Africa:* Egypt, Algeria, Tunisia, Morocco



**FIGURE 4.2**  
**SACK PAPER CONSUMPTION IN WESTERN EUROPE (1996)**

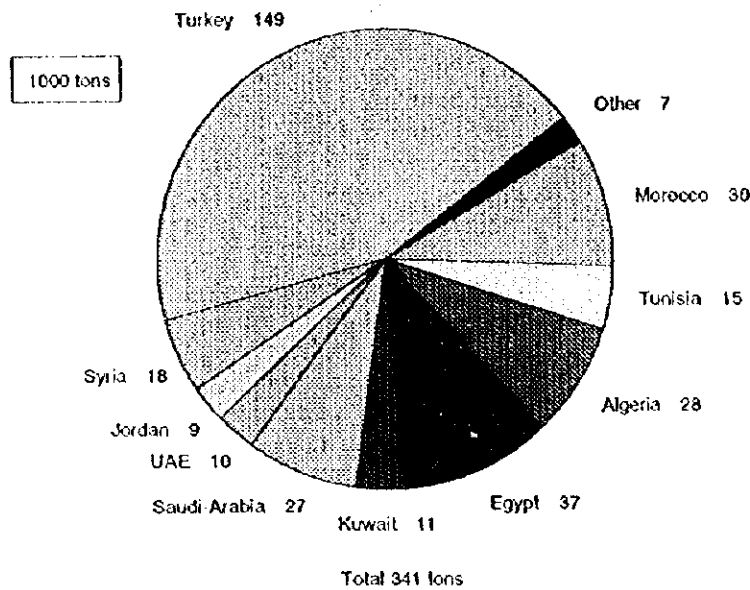


**FIGURE 4.3**  
**SACK PAPER CONSUMPTION IN SELECTED WESTERN AND EASTERN EUROPEAN COUNTRIES (1996)**



**FIGURE 4.4**

**SACK PAPER CONSUMPTION IN SELECTED EAST AND NORTH AFRICAN COUNTRIES (1996)**



**(2) Main Demand Trends**

**1) Substitution Trends.**

Trends to other packaging materials by quality and form from sack papers are as follows:

**FIGURE 4.5**

Building Material	Chemical Fertilizer	Agricultural Products	Animal Feed	Pet Food
Paper Sacks	Paper Sacks	Paper Sacks	Paper Sacks	Paper Sacks
↓	↓	↓	↓	↓ ↑
Silos, Bulk deliveries	Plastic Sacks, Big Bags, Bulk deliveries	Silos, Big Bags, Tank Cars	Silos, Plastic Sacks	Plastic Sacks

→ **Strong Change**

→ **Moderate Change, Considerations**

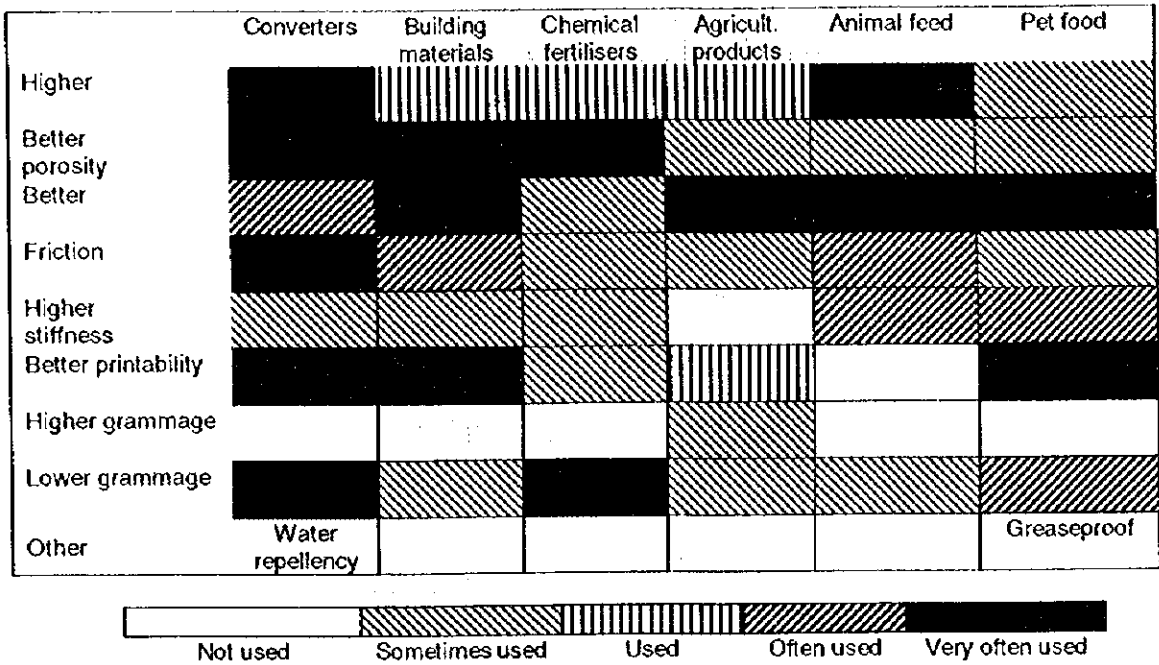
**2) Main Product Development Issues**

Product development issues in sack paper end uses differ:

- higher TEA, better porosity, better tear, friction and lower grammage are the main product development issues.
- better porosity and better tear are the most important aspects in building materials packaging.
- in chemicals and fertilisers, better porosity and lower grammage are important.
- agricultural products packaging requires better tear.
- higher TEA, better tear, friction and higher stiffness is needed in animal feed packaging.

f. pet food packaging requires higher stiffness, better tear, better printability and lower grammage. In addition, greaseproof characteristics are important.

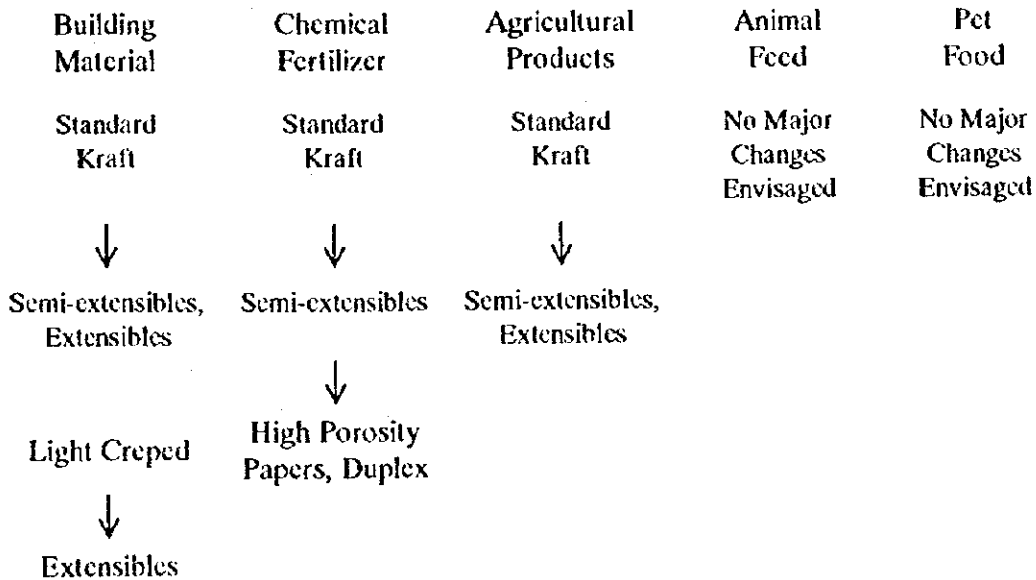
**TABLE 4.1**  
Main Product Development Issues by End Use



### 3) Paper Grades Used

Special treatment is required by end use to absorb shock in handling:

**FIGURE 4.6 SPECIAL TREATMENT BY END USE**



4) Trends in Sizes, Material Constructions and Basis Weights

FIGURE 4.7

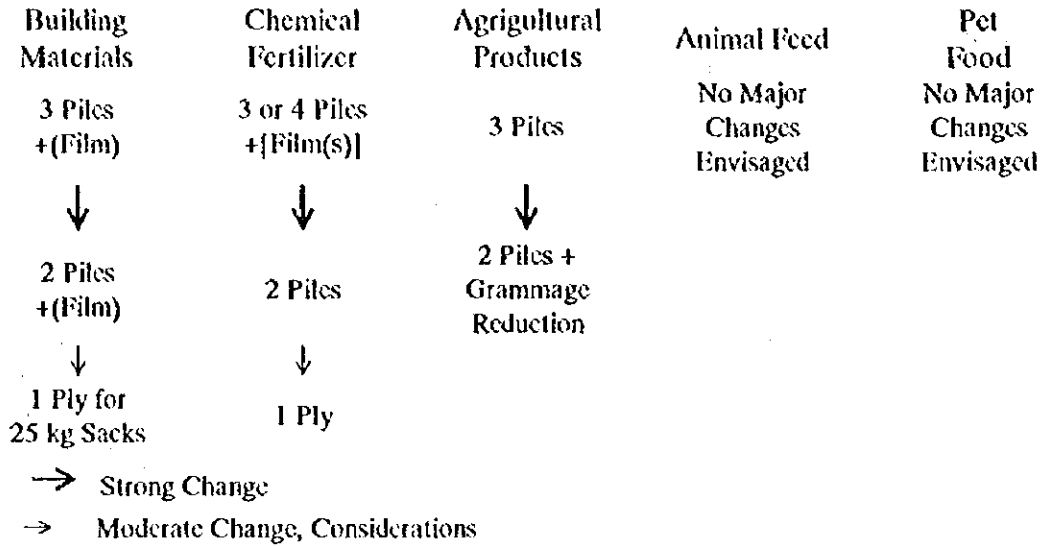
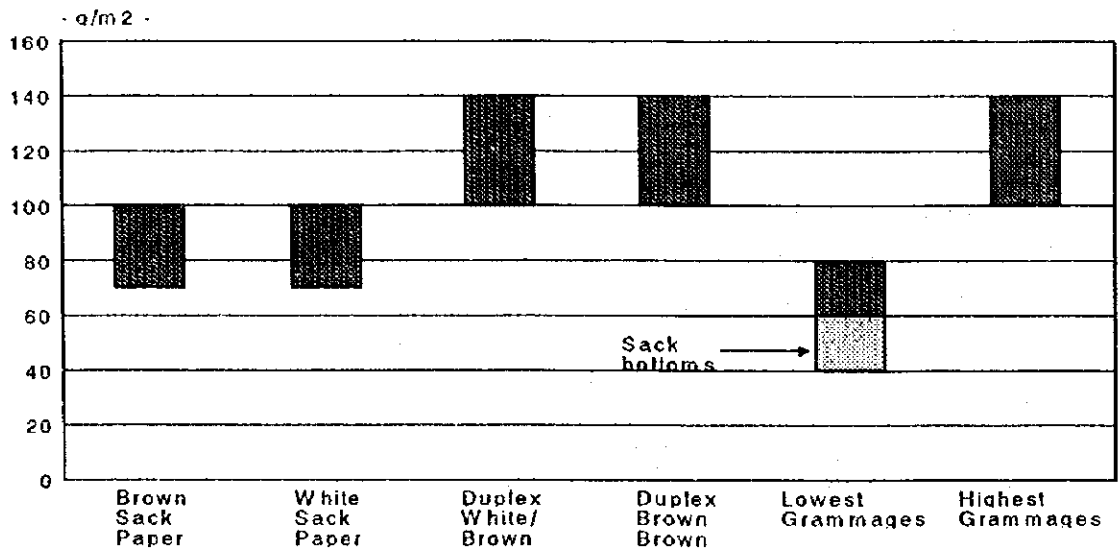


FIGURE 4.8 PAPER WEIGHT PER PRODUCTS



5) Demand Outlook For Sack Paper

Judging from actual demands in the past and GDP growth forecast (cf. 4.2.2(2)), market potential has been estimated.

TABLE 4.2  
Sack Paper Production, Trade and Consumption in Western Europe 1996

Country	Production	Import	Export	Trade balance	Consumption
- 1000 tons -					
Finland	120	1	91	91	30
Norway	10	12	0	-12	22
Sweden	501	1	455	454	47

Belgium	0	35	6	-29	29
Germany	0	149	8	-141	141
Netherlands	0	61	23	-38	38
Denmark	0	24	0	-24	24
Ireland	0	9	0	-9	9
UK	0	74	3	-71	71
Switzerland	0	9	0	-9	9
Portugal	52	17	29	12	40
Austria	145	3	123	120	25
Spain	148	42	105	63	85
France	60	75	24	-51	111
Italy	15	138	10	-128	143
Greece	0	11	0	-11	11
<b>WEU TOTAL</b>	<b>1051</b>	<b>660</b>	<b>878</b>	<b>218</b>	<b>835</b>

**TABLE 4.3**  
**Long-term Demand Forecast for Sack Paper in Western Europe 1995-2005**

Country	1994-96	1996	2005	Growth	%/a
	- 1,000 tons -				
Finland	29	30	24	-5	-1.8
Norway	22	22	21	-1	-0.7
Sweden	51	47	47	-4	-0.9
Belgium	32	29	32	-0	-0.1
Germany	152	141	145	-7	-0.5
Netherlands	48	38	48	0	-0.1
Denmark	20	24	20	0	0.0
Ireland	13	9	12	-1	-0.7
UK	101	71	96	-5	-0.5
Switzerland	9	9	9	0	0.0
Portugal	27	40	27	0	0.0
Austria	27	25	27	0	0.0
Spain	103	85	101	-2	-0.2
France	122	111	114	-8	-0.7
Italy	167	143	157	-10	-0.6
Greece	11	11	11	0	0.0
<b>TOTAL</b>	<b>934</b>	<b>835</b>	<b>891</b>	<b>-43</b>	<b>-0.5</b>

**TABLE 4.4**  
**Long-term Demand Forecast for Sack Paper in the Middle East and North Africa 1995-2005**

Country	1995	2005	Growth	%/a
	- 1000 tons -			
Turkey	142	185	43	2.7
Saudi Arabia	22	26	4	1.7
Kuwait	20	24	4	1.8
UAE	22	26	4	1.7
Rest of Middle East	24	27	3	1.2
Egypt	70	80	10	1.3
Algeria	22	24	2	0.9
Tunisia	19	22	3	1.5
Morocco	33	38	5	1.4
<b>TOTAL</b>	<b>374</b>	<b>452</b>	<b>78</b>	<b>1.9</b>

#### (4) Demand Outlook by End-Use Sector

##### 1) Western Europe

**TABLE 4.5**

**Major End-use Trends in the Western European Paper Sack Markets**

End-use segment	Major trends
Building materials	<ul style="list-style-type: none"><li>▪ The Western European construction industry is slowly recovering from the recession</li><li>▪ Strong change from paper sack usage to silos and bulk deliveries</li><li>▪ From standard and light creped kraft to semi-extensibles and extensibles</li></ul>
Chemicals/fertilizers	<ul style="list-style-type: none"><li>▪ Strong change from three-ply to two-ply composition</li><li>▪ Strong change from paper sack usage to plastic sacks, big bags and bulk deliveries</li><li>▪ From standard kraft to semi-extensibles and high porosity papers/duplex grades</li><li>▪ Strong change from three- or four-ply to two-ply composition</li></ul>
Agricultural products	<ul style="list-style-type: none"><li>▪ Moderate change to/introduction of one-ply sacks</li><li>▪ Moderate change from paper sacks to silos, big bags and tanks cars</li><li>▪ From standard kraft to semi-extensibles and extensibles</li><li>▪ Strong change from three ply to reduced grammage two-ply composition</li></ul>
Animal feed	<ul style="list-style-type: none"><li>▪ Moderate change from paper sacks to silos and plastic tanks</li><li>▪ No major changes in sack paper grade patterns and material compositions</li></ul>
Pet food	<ul style="list-style-type: none"><li>▪ Moderate substitution between paper- and plastic-based sacks (both ways)</li><li>▪ No major changes in sack paper grade patterns and material composition</li></ul>

##### 2) Russia/CIS

The main end uses for paper sacks in Russia are construction materials (nearly 50% of the total markets) and chemicals, including granulates and fertilisers (35% of the total). The demand for cement sacks in Russia is forecast to resume a growth trend due to the growth in small-scale construction and private building projects, and the lack of modern infrastructure for bulk transportation.

#### 4.1.3 Production and Competition

Competition by country and supplier are as follows:

(1) Main Producer Countries

FIGURE 4.9

SACK PAPER PRODUCTION IN SELECTED WESTERN EUROPEAN COUNTRIES (1988)

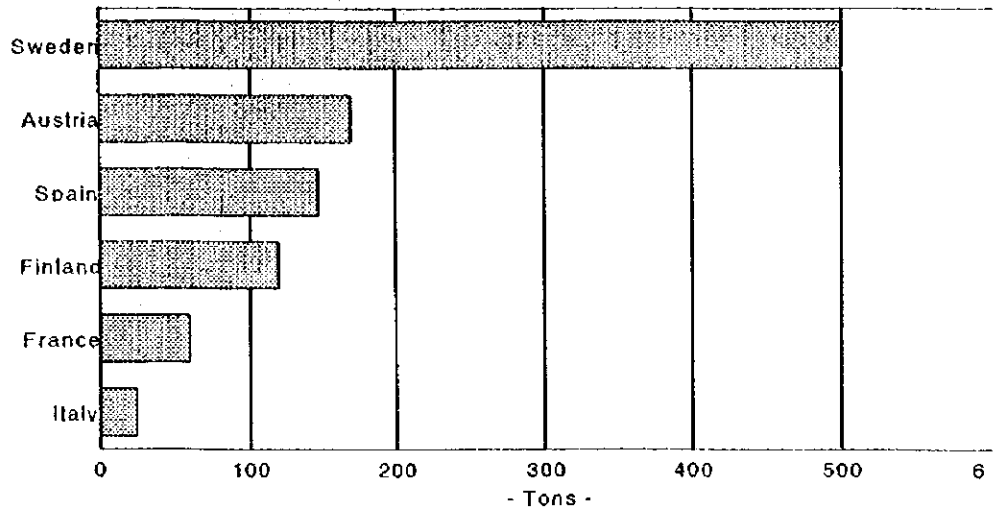
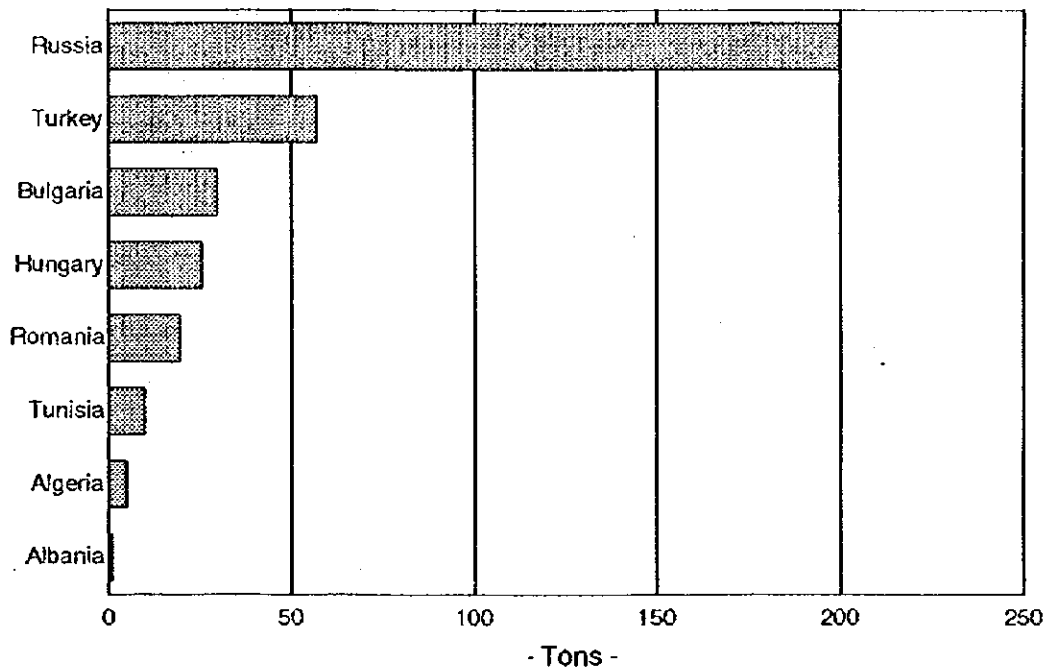


FIGURE 4.10

SACK PAPER PRODUCTION IN EASTERN EUROPEAN, MIDDLE EAST AND NORTH AFRICAN COUNTRIES (1996)

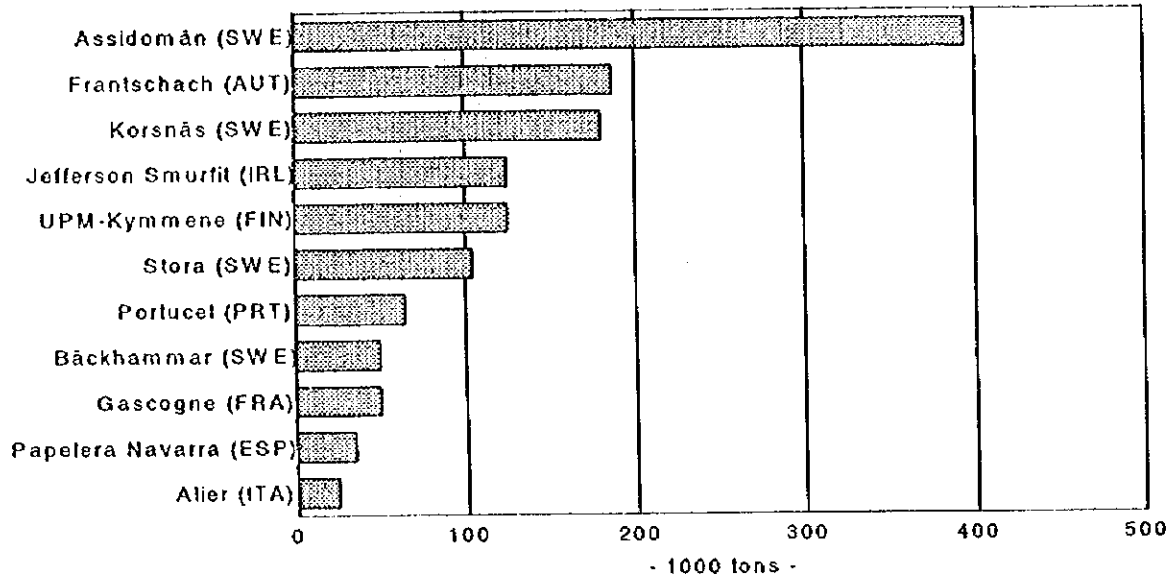


(2) Major Sack Paper Producing Companies

1) Western Europe

FIGURE 4.11

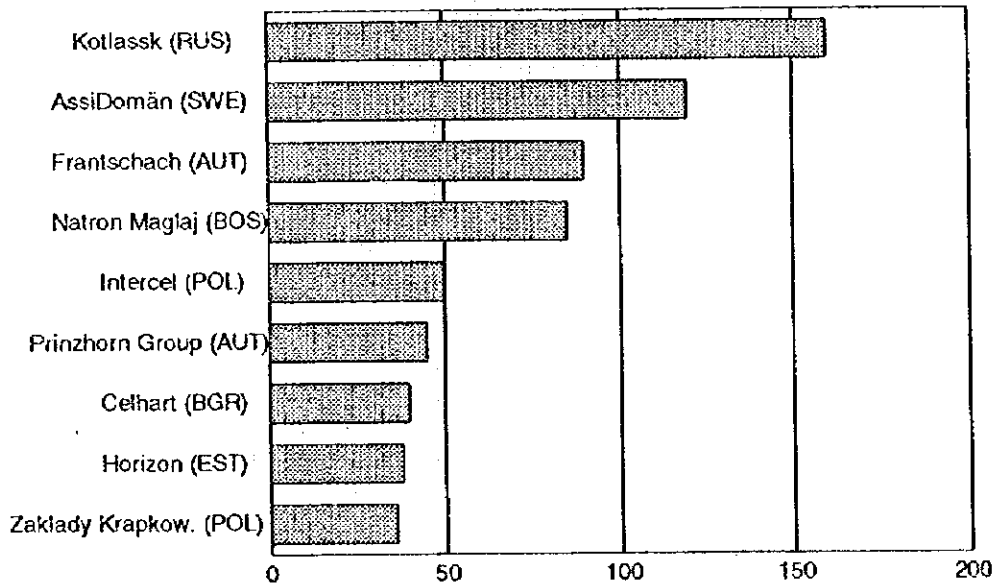
MAJOR SACK PAPER PRODUCERS IN WESTERN EUROPE (1998)



2) Eastern Europe

FIGURE 4.12

EASTERN EUROPE (1997)

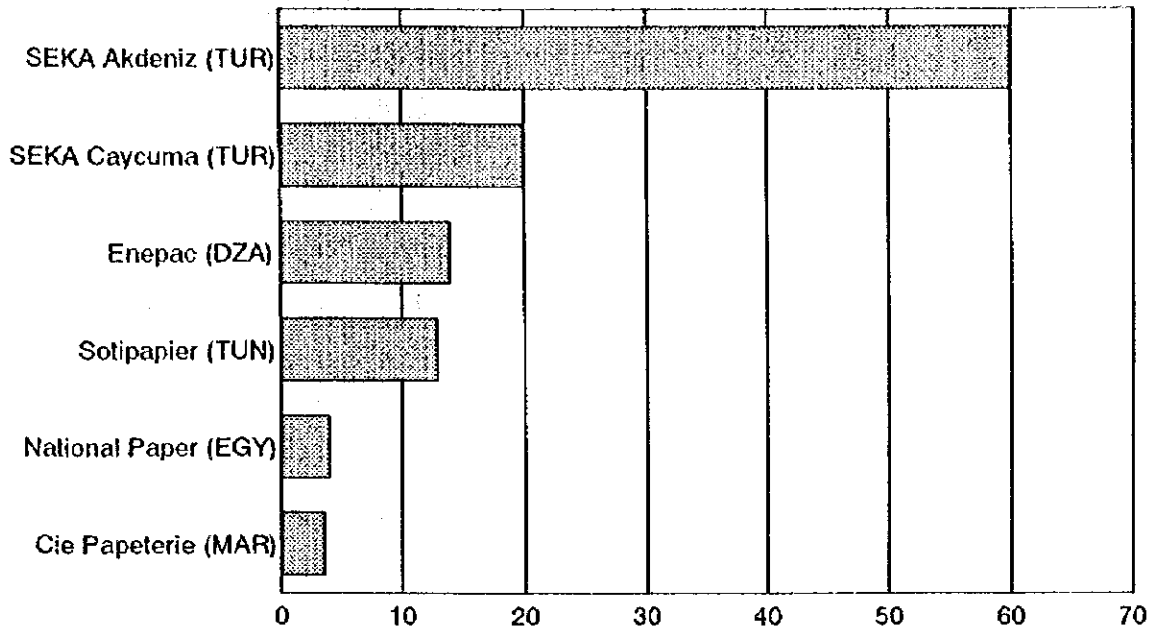




3) Middle East and North Africa

FIGURE 4.13

Major producers in M/East and N/Africa

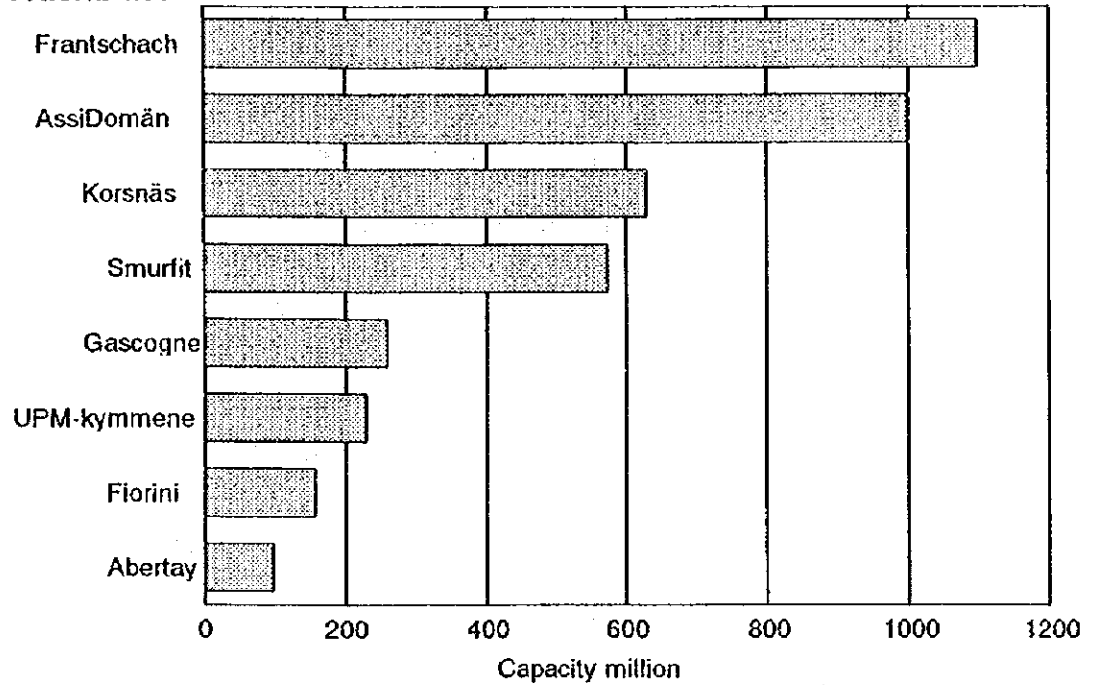


(3) Major Sack Paper Converters in the Study Region

List of converters who buy paper materials from others and convert to bags as follows:

1) Western Europe

FIGURE 4.14



**TABLE 4.6**  
**Major Independent Italian Paper Sack Producers**

Company	Location	Capacity	Products
Gruppo Fiorini - Fisi - Sacart S.p.A.	Senigallia	60 million pcs/a 100 million sacks and 150 million bags/a	Paper sacks Paper sacks and bags
Industria Italiana Imballaggi S.p.A.	Vazia	100 million pcs/a (24,000 t/a)	Paper sacks
Genca S.p.A.	Gorizia	45 million pcs/a (10,000 t/a)	Paper sacks
Safisarda	Porto Torres (Sassari)	40 million pcs/a	Paper sacks
Sacchettificio Nazionale Corazza S.p.A.	Ponte S. Nicolo	35 million pcs/a	Paper sacks
Cartiera G.I.C. Srl	Francavilla di Sicilia	3,000 t/a	Heavy paper bags
Sacchificio Veneto S.p.A.	Grezzana	20 million pcs/a (5,000 t/a)	Paper sack for industrial end- uses
Eursacco S.p.A.	Brunello-Azzate	20 million pcs/a (5,000 t/a)	Paper sacks
Sacchificio Dolomiti	Bolzano/Bozen	12 million pcs/a (3,000 t/a)	Paper sacks
Sacchettificio do Corregio "Il Canguro"	Corregio	12 million pcs/a (3,000 t/a)	Industrial paper sacks
Saccarta S.p.A.	Lentate sul Seveso (Milano)	10 million pcs/a (3,000 t/a)	Paper sacks
Valfer Italia S.p.A.	Bergamo	n.a.	Paper sacks
Sacchettificio Romanese S.d.f.	Romano di Lombardia (Bergamo)	n.a.	Paper sacks, bags
Cartiera del Chiese	Montichiari (Brescia)	n.a.	Kraft papers, paper sacks
SIS	San Marino	n.a.	Paper sacks

## 2) Eastern Europe

The Eastern European paper sack industry is highly integrated.

**TABLE 4.7**  
**Major Eastern European Paper Sack Producers**

Company	Location	Capacity	Products
AOOT Segezhabumprom	Segezha, RUS	600 million pcs/a (by 2006)	Pulp, paper, paper sacks
Ambro S.A. Suceava	Suceava, ROM	225 million pcs/a	Pulp, paper, paper sacks, corr. board
Novolyalinskiy Zellyulozno Bumazhny	Novaya Lyalya, RUS	131 million pcs/a	Paper, paperboard, paper sacks
Sepap Steti "Stefan Kiradjiev" Kombinat	Steti Stambolijski, BGR	130 million pcs/a 60 million pcs/a	SC-pulp, fluting, printing and writing paper, kraft pulp, envelopes, paper sacks
Dunapak Nyiregyhazi Papirgyar	Nyiregyhaza, HUN	100,000 t/a	Paper bags and pouches, paper sacks, corrugated boards

SC Hartia S.A.	Bustemi, ROM	2 million pcs/a	Paper, paperboard, paper sacks
Poronayskiy Zellyulozno Bumazhny	Poronaysk, RUS	46,000 t/a	Sack paper, corr. medium, wrapping paper, paper sacks
Bulpaper GmbH	Sofia, BGR	n.a.	Tissue paper, paper sacks
Celpak Prijedor	Bosanska Dubica, BOS	n.a.	Tissue, packaging papers, paper sacks
Papiroti Krsko d.o.o	Krsko, SLO	n.a.	Paper bags, paper sacks, pouches

### 3) Middle East and North Africa

The Turkish Isiklar dominates the sack paper converting business in the region. The company has a paper sack production capacity of about 550 million sacks/a (estimated 70 000 tons). Since spring 1996, Isiklar has a joint sales venture with AssiDomän.

### (4) Trade Flows in the Study Region

#### 1) Western Europe

**TABLE 4.8**

**Sack Paper Production and Consumption in Selected Western European Countries 1996**

Country	Production	Import	Export	Trade Balance	Consumption
	- 1,000 t/a -				
France	60	75	24	- 51	111
Italy	25	138	10	- 128	153
Spain	148	42	105	63	85
Austria	170	3	123	120	50
Greece	0	11	0	- 11	11
<b>TOTAL</b>	<b>403</b>	<b>269</b>	<b>262</b>	<b>- 7</b>	<b>410</b>

#### 2) Eastern Europe

**TABLE 4.9**

**Sack Paper Production and Consumption in Selected Eastern European Countries 1996**

Country	Production	Import	Export	Trade Balance	Consumption
	- 1,000 t/a -				
Hungary	26	2	3	1	25
Slovenia	0	3	0	- 3	3
Croatia	0	3	0	- 3	3
Bosnia-Herzeg.	0	0	0	0	0
Yugo-slavia	0	1	0	- 1	1
Albania	1	0	0	0	1
Bulgaria	30	0	0	0	30
Romania	20	0	2	2	18
Russia	200	0	70	70	130
<b>TOTAL</b>	<b>277</b>	<b>9</b>	<b>75</b>	<b>64</b>	<b>211</b>

### 3) Middle East and North Africa

**TABLE 4.10**  
**Sack Paper Production and Consumption in the Middle East and North Africa 1996**

Country	Production	Import	Export	Trade Balance	Consumption
	- 1,000 t/a -				
Turkey	57	95	3	- 92	149
Syria	0	18	0	- 18	18
Lebanon	0	3	0	- 3	3
Jordan	0	9	0	- 9	9
Egypt	0	37	0	- 37	37
Tunisia	10	5	0	- 5	15
Algeria	5	23	0	- 23	28
Morocco	0	30	0	- 30	30
<b>TOTAL</b>	<b>72</b>	<b>206</b>	<b>3</b>	<b>- 203</b>	<b>289</b>

### (5) Capacity Changes

Projects for new factories or increase of capacities which may have influence on future demands are as follows:

**TABLE 4.11**  
**Decided Sack Paper Projects**

Company / Mill	PM	Year	Change 1,000 t/a	Grades	Remarks
UPM-Kymmene, Tervasaari, FIN	6	early 1999	20	Sack paper	PM6 rebuild
Wisaforest Oy, Pietarsaari, FIN	1	Oct 98	25	Sack paper	PM1 rebuild
AssiDomän Väja, SWE	6	April 1997	10	Sack paper	PM6 rebuild
Assidomän Skärblacka, SWE	9	Dec 1997	5	Sack paper	PM9 rebuild
Patria AG, Frantschach, AUT	6	1997/9 8	20	Sack paper	PM6 rebuild
Papelera Navarra, Sanguesa, ESP	2	Aug. 1998	- 25	Sack paper	PM2 partial conversion
Sepap Steti, CZE	5	Aug 1997	10	Sack paper	PM5 rebuild
S.C. Ambro, Suceava, ROM	2	1997	17	Sack and kraft paper	PM2 rebuild
Kotlassk, Korjazma, RUS	2	1997	12	Sack paper	PM2 rebuild
Amir Paper Mills, Dubai, UAE		1998	35	Sack paper	Second hand machine
<b>TOTAL</b>			<b>129</b>		

**TABLE 4.12**  
**Planned Sack Paper Projects**

Company / Mill	PM	Year	Change 1,000 t/a	Grades	Remarks
Natron Maglaj, BOS	-	Mid 2000	28	MG/MF kraft, sack paper	Restart of five PM's, planned capacity expansion to 160 000 t/a
Horizon Pulp & Paper, Kehra, EST	1	Dec. 1997	3	Sack paper	PM1 rebuild
	2	3 <sup>rd</sup> qtr 1998	3	Sack paper	PM2 rebuild
Celuloza Swiecie, POL	1	n.a.	25	Sack paper	PM1 rebuild
<b>TOTAL</b>			<b>59</b>		

#### 4.1.4 PRICING

##### (1) Quality Aspects in Sack Kraft

**Typical quality ranking of European sack kraft producers:**

- |  |   |
|--|---|
| 1. Highest ranking   | Korsnäs   |
| 2. High ranking extensible quality producers                               | most of the Swedish machines, one machine in Finland and Austria  |
| 3. Medium ranking, extensible standard producers, high grade natural kraft | all the other machines of Scandinavia, some more machines in Western Europe                             |
| 4. Other producers   | poorly developed machines in Western Europe, many of the Eastern European machines as they were in 1995 |

- 1) About 60% of the production in Western Europe falls into the categories 1 and 2, and minority to category 4. The new Eastern European entrants have considerably increased the supply of the lowest category.
- 2) The machine in Natron Maglaj will have basic capabilities to enter group 3 after the planned investments. The final position will be specified after the stabilisation of the operations, when also the other parameters affecting in the quality have been established, e.g. quality of wood raw material, pulp quality, finishing degree and stability of the quality.
- 3) Most of the non-European sack paper machines can produce paper which belongs to the above quality categories three and four. Only three paper machines in Canada produce paper which is competitive with the European paper in quality two.

##### (2) Paper Prices

**TABLE 4.13**  
**Prices for Semi-extensible Sack Paper**

Semi-extensible sack paper (DM/ton)	1998	Trend
Western Europe	1 400	1 280
Eastern Europe	1 300	1 240
Turkey	1 210	1 120
Middle East	1,350	1,240

CIS	1,120	1,040
North Africa	1,300	1,200

### (3) Price Outlook

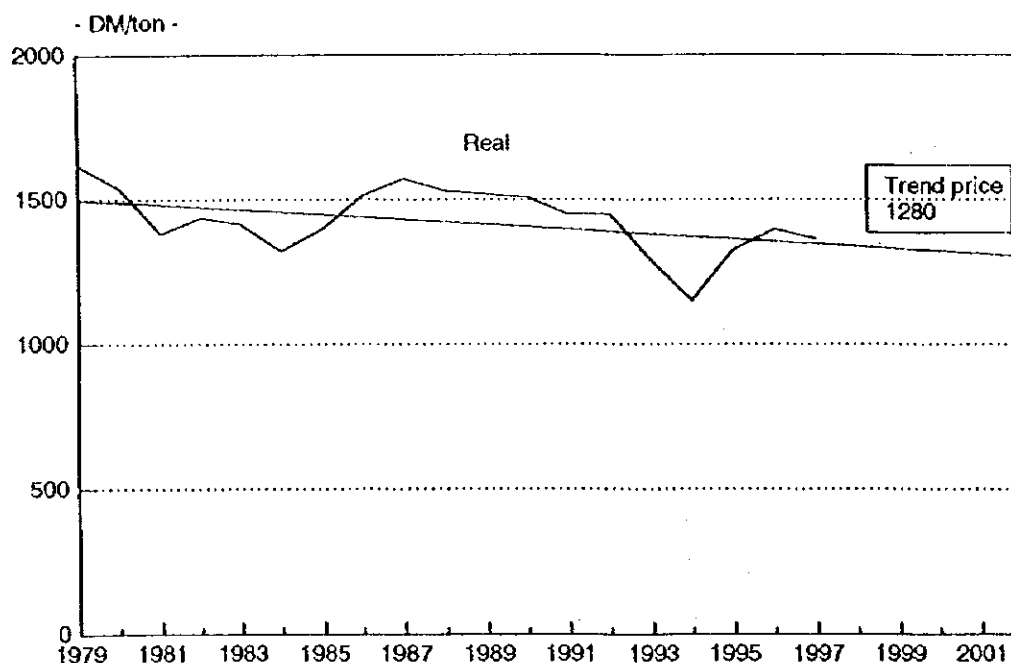
From historical perspective, the real prices have shown a declining trend. As no global shortage of sack paper supply is foreseen in the future, the declining real price trend is expected to continue in the long term.

The overall cycles of the world pulp and paper industry also suggest that sack paper prices will recover from the recent lows and continue to improve throughout the year 1998. However, assuming that the announced expansions in the European and Russian sack paper capacity will materialise as scheduled, the expected price recovery starting in 1997 can be relatively small. Much will depend on the recovery of the world kraft linerboard industry, which has significant swing capacity with sack and other kraft papers (and vice versa).

Figure 4.15 shows the real price development of sack paper in Germany from 1979 to 1997. This price development illustrates also the overall Western European trend where the real prices have been gradually declining. The estimated trend price level beyond year 2001 would be DM 1,280/ton.

**FIGURE 4.15**

#### SACK PAPER IN GERMANY REAL PRICE 1997



## 4.2 NSSC FLUTING

### 4.2.1 Product Definitions and Quality Requirements

#### (I) Product Definitions

Corrugated raw materials are used in manufacturing of corrugated boxes for transportation packaging; these boxes are usually large in size and may contain a single product such as TV, computer, refrigerator, VCR etc. or a number of smaller products (separate sales packaging). Corrugated box consists of several layers, typically two linerboards and one fluting, but 5- and 7-layer constructions are also common.

Corrugated raw materials consist of linerboards and fluting (corrugating mediums). Linerboards are mainly used as outer layers in corrugated board packages and fluting as corrugating medium (between linerboards). NSSC (semichemical corrugating medium) fluting is one of the main corrugating mediums but recycled fibre-based grades are also common.

Typical weight for NSSC fluting are 127, 150 and 112 g/m<sup>2</sup> in Europe and 26, 31 and 40 lb. in the USA.

**TABLE 4.14 Fluting Definitions in Western Europe**

Grade/subgrade	Fibre furnish	Most common grammages (g/m <sup>2</sup> )	Main use
Semichemical corrugating medium	60-100% semichemical hardwood pulp, rest waste paper or high-yield softwood pulp	127, 150, 112, 175, 210	Middle corrugating layer of corrugating board
Recycled corrugating medium	OCC and mixed waste	150, 120, 127, 112	Middle corrugating layer of corrugated board

**TABLE 4.15 Kraftliner Definitions in Western Europe**

Grade/Subgrade	Fibre furnish	Most common grammages (g/m <sup>2</sup> )	Main use
Unbleached kraftliner	Unbleached softwood sulphate pulp, a maximum of 20% other pulps	125, 150, 175, 200, 225, 300	Outer and inner facing of corrugated board
Fully bleached kraftliner	Bleached softwood sulphate pulp	125, 140, 150, 175	Outer facing of corrugated board
White top kraftliner	Top layer of bleached softwood sulphate, bottom layer of Unbleached softwood sulphate	150, 140, 125, 175, 200	Outer facing of corrugated board
White mottled	Unbleached softwood sulphate added with bleached pulp in the top layer	150, 125, 175, 200	Outer facing of corrugated board

**TABLE 4.16 Recycled Linerboard Definitions in Western Europe**

Grade/subgrades	Fibre furnish	Grammages (g/m <sup>2</sup> )	Main use
Unbleached recycled linerboards	Combinations of OCC, mixed waste, de-inked waste, sulphate pulp	125, 140, 150, 175, 200	Outer and inner facing of corrugated board
White top recycled linerboards	White waste paper in the top layer, OCC, etc. in the bottom layer	140, 150, 175, 200	Outer facing of corrugated board
Mottled recycled linerboards	OCC, mixed waste	140, 150, 175, 200	Outer facing of corrugated board

**(2) Quality Requirements**

**1) General**

Fluting (and linerboards) used for corrugated boxes have two basic functions:

- a) to protect the goods packed in a corrugated box during handling, warehousing and transport  
Good strength has traditionally, and will continue to be, the main quality requirement for corrugated board and boxes.
- b) to provide a printing surface to promote the packed goods and/or the packing/manufacturing company.

The printability of the corrugated board has become increasingly important during the 1980s and 1990s when the promotional function of the box has been emphasised. This development has led to an increasing use of white-surfaced linerboards, such as mottled and white-top liners. Because corrugated board is often printed by flexographic means, smoothness of the surface is a desired quality requirement set by the box converter.

Virgin fibre based grades are preferred in a number of end-uses as:

- they have initial higher crush and puncture strength
- moisture and adverse climate do have less effect on strength decrease compared to a waste based material.

**2) Quality Requirements for Fluting**

Runnability is the most important quality requirement for corrugating mediums. To ensure good runnability on a modern high-speed corrugator, a certain minimum Machine Directions (MD) strength is required. With sufficient long fibre in the furnish, this has not proved to be problematic.

The mechanical quality requirements of NSSC fluting are based on CMT (Concora Medium Test) and CCT 60 tests.

**TABLE 4.17**

Weight (g/m <sup>2</sup> )	CMT (N)	CCT 60 (kN/m)
112	210	1.50
127	250	1.80



NSSC fluting (112, 127 g/m<sup>2</sup>) is in all characteristics better than lower quality fluting. NSSC fluting is mainly replaced by recycled fluting of heavier weight (>127 g/m<sup>2</sup>), compensating the loss in quality.

Both virgin-based and recycled fibre-based fluting grades have found suitable applications thanks to a wide variety of end-uses for ready-made boxes. The substitution of recycled grades for virgin fibre-based grades will frequently result in the production of a more cost-effective box. From the corrugated box manufacturer's point of view, the following changes in box quality and composition are expected:

- a) Edge crush test (ECT) will become the main quality requirement
- b) Weight of fluting are likely to increase
- c) Greater flexibility of the mills create new box designs through differentiation and potential for fibre savings and higher levels of recycling
- d) Increased frequency of ring crush testing (RCT) at the mill.

In the study region, the increased quality requirements and decreasing trade barriers will force the local producers to improve quality and minimise production costs. Companies with foreign partner may have better changes to invest the capital required, whereas the smaller players may be forced to specialise or operate in local niche markets, change grade or even shut-down.

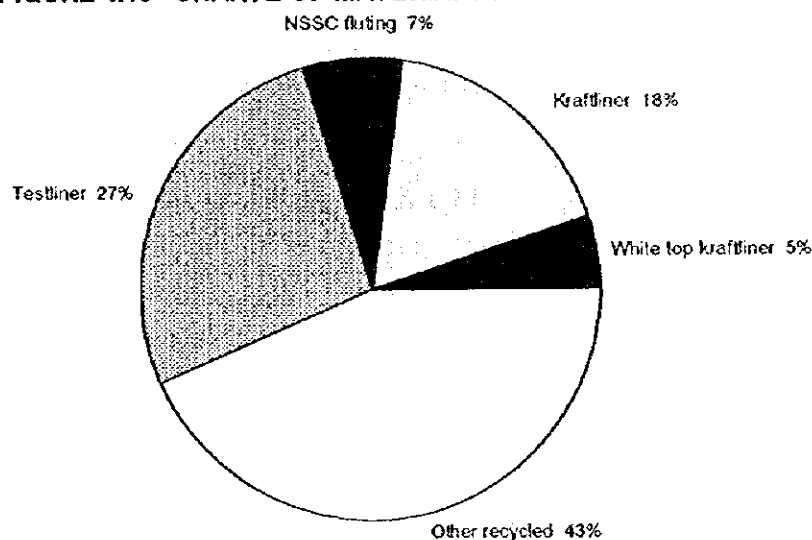
#### 4.2.2 Demand

##### (1) Demand by Market

##### 1) Western Europe

Total corrugated board raw material market in Western Europe amounted to 16.6 million tons in 1996. Recycled grades dominate the consumption with a share of 70%. The share of NSSC fluting was 7% of the total consumption.

**FIGURE 4.16 SHARE OF MATERIALS FOR CORRUGATED BOARD**

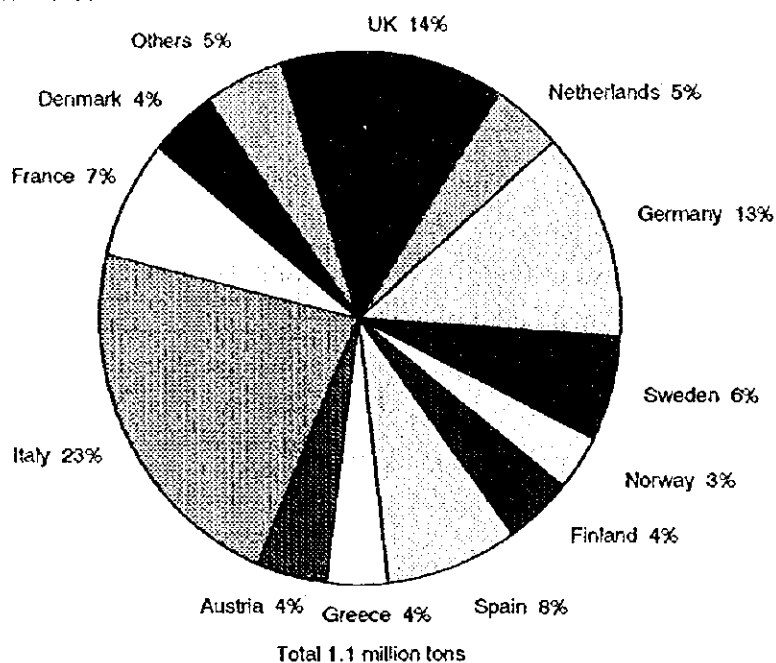


Total 16.6 million tons

Total demand of NSSC fluting in Western Europe amounted to 1.1 million tons in 1996 and in selected markets (Austria, Greece, France, Italy and Spain) to 507,000 tons. The main markets for NSSC fluting in Western Europe are Italy, UK, Germany and Spain.

NSSC fluting markets in Western Europe have decreased in most countries whereas the demand for recycled fluting has been growing. There are, however, a few countries, especially in the Mediterranean region that are growing markets for NSSC fluting.

FIGURE 4.17



Food and beverages is the biggest end-use sector for corrugated boards in most Western European markets, accounting for 40-60% of the total consumption. As a whole the market outlook is positive with the most rapidly growing products including branded food products, fruit and vegetables and beverages (multi-packs of bottles and cans).

#### Italian Markets

Italy is the largest Western European market for NSSC fluting. Consumption in 1996 reached 246,000 tons which was 23% of the total Western European consumption that year.

The Italian NSSC fluting demand has grown steadily averaging 1.3%/a since 1990. Italy is among the growing markets in Western Europe. This is mainly due to a rapidly growing fruit business (similar to Spain).

Italy's own production covers only 20% of the consumption. Total imports amounted to 218,000 tons in 1996 and they originate mostly from other EU countries (144,000 tons) and Eastern Europe (38,000 tons). Main Western European importers are Sweden, Belgium and Finland. Imports from Eastern Europe originated mainly from Croatia and Russia.

**TABLE 4.18**  
**Imports to Italy from Western and Eastern Europe In 1996 (1000 tons)**

Sweden	Belgium	Finland	France	Austria	Russia	Croatia	Total (incl. others)
60.5	24.9	24.2	14.8	14.8	7.3	23.3	182.1

Italy exported some 23,000 tons of NSSC fluting in 1996. This was the highest export volume in the 1990s. Among the main export markets are France and Greece.

NSSC fluting production capacity in Italy totals 60,000 t/a. The only producer is Industria Chimica Legno. There are no confirmed or planned NSSC fluting projects presently but several recycled fluting projects have been decided and planned, totalling some 100,000 t/a.

In Italy there are some 60 corrugated board companies. Their total production was 2.9 million tons in 1996. Several board companies have been acquired by the dominating corrugated raw material manufacturers, like Assi Domän, SCA and Jefferson Smurfit but there are nevertheless numerous independent converters.

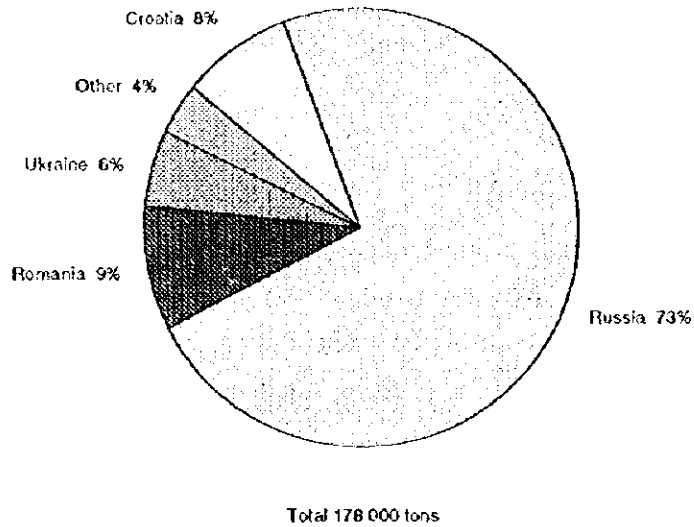
**TABLE 4.19**  
**Selected Independent Converters in Italy**

Company	Location	Number of Corrugators
Adda Ondulati	Annone Brianza	1
Mauro Benedetti	Carnate	4
Big Timoe Givers	Castelmartini	1
Cartiera Ondulato Umbro	Narni	2
Cartonificio Fiorentino	Sesto Fiorentino	2
Cartonstrong Italia	Monza	4
Centralcarta	Monsagrati	2
Ondulato Maranello Industrie Cartarie	Maranello	1
E. Siani	Milan	4
Ondulati Giusti	Altopascio	4

## 2) Eastern Europe

In Eastern Europe NSSC fluting consumption amounted to 180,000 tons in 1996. The main markets are Russia, Romania and Croatia. The consumption development has been unstable due to political and economical instability in the region during the 1990s. Demand in Russia and Hungary has collapsed whereas in Croatia it has remained in 1992 level. Romanian, Bulgarian and Slovenian markets have been growing.

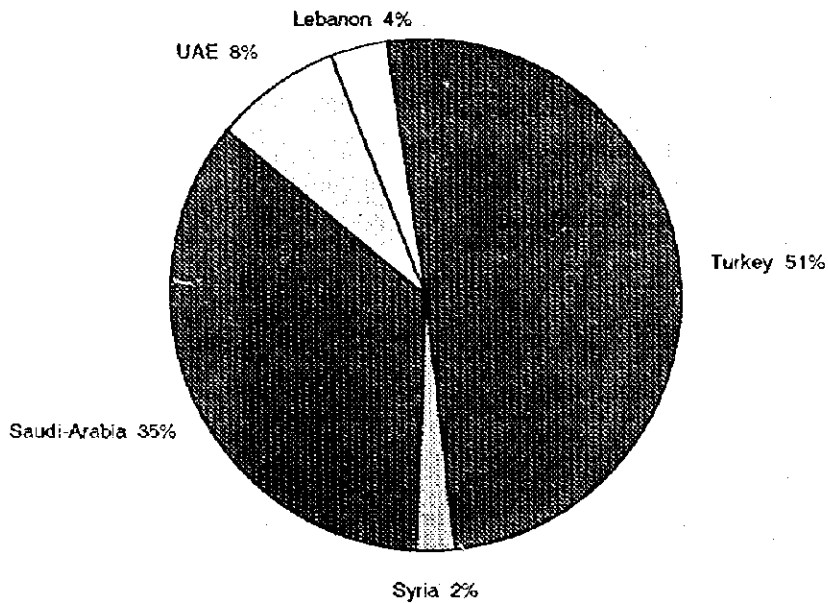
**FIGURE 4.18 CONSUMPTION IN EASTERN EUROPEAN COUNTRIES 1996**



### 3) Middle East

Consumption in Middle East is estimated at 85,000 tons in 1996. The dominating markets are Turkey and Saudi Arabia. The Middle Eastern market has been a growing market since 1992 although there are countries having no NSSC fluting consumption. The Turkish market has been the most dynamic.

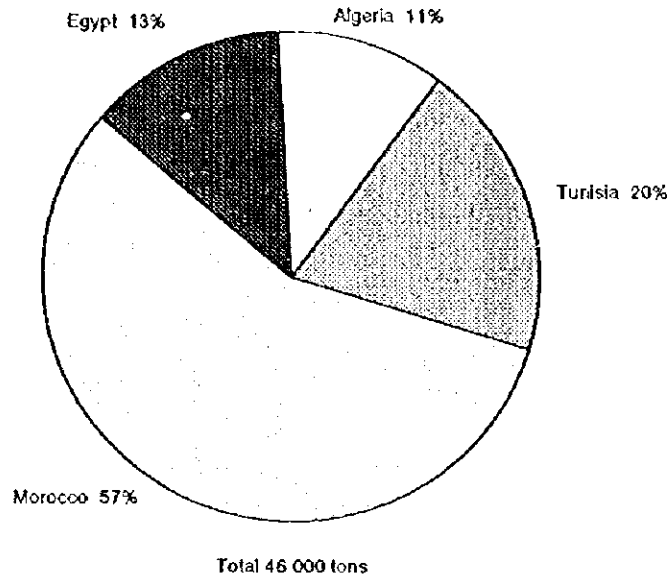
**FIGURE 4.19**



### 4) North Africa

In North African countries the consumption of NSSC fluting amounted to 46,000 tons in 1996. Morocco has traditionally been the largest NSSC fluting market. The NSSC demand has been growing from 1992, especially in Tunisia and Morocco.

**FIGURE 4.20 CONSUMPTION IN NORTH AFRICA 1996**



**(2) Main Demand Trends**

Economic growth rates and growth of industrial production, combined with an analysis of end-uses and grammage trends are among the main factors for forecasting the demand for corrugated board and corrugated board raw materials.

The main driving forces for demand for corrugated raw materials in general are:

- Economic growth prospects and the implications for the demand for corrugated board
- Environmental issues
- Developments within the end-use applications for corrugated board and what they will mean in terms of board demand and raw material requirements
- Printing trends and the implications for raw materials
- Converting trends
- Developments in retail trade and their impact on the corrugated box business
- Reusable packaging systems.

**1) Economic growth**

**TABLE 4.20  
Real GDP Growth for Selected Western European Countries (%/a)**

Country	1998	1999
Italy	2.4	2.7
Greece	3.0	3.4
Spain	3.5	3.3
France	2.9	2.8
Austria	2.7	2.9
EU	2.7	2.8

*Source: OECD*

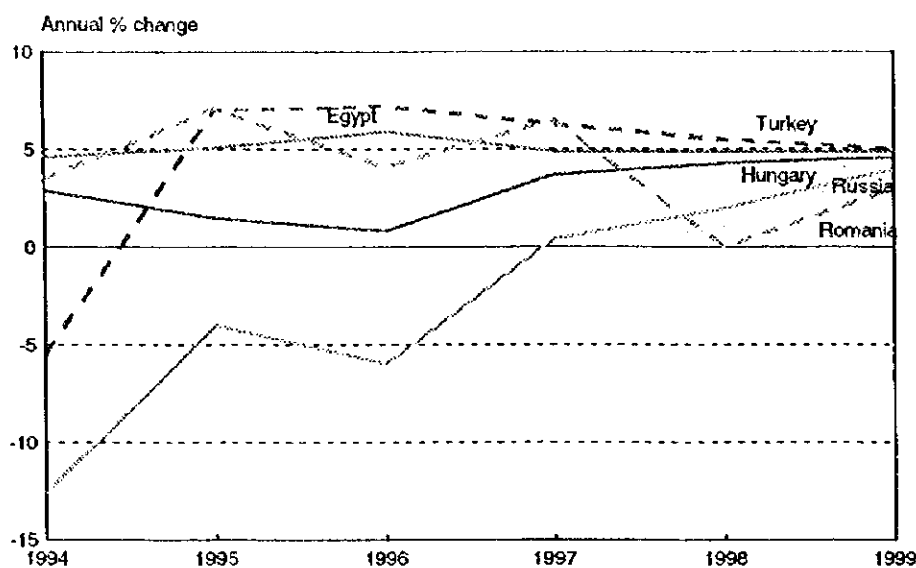
The Balkan war split the Yugoslavia into several countries. Although the war ended in 1996, the newly formed Yugoslavia and Bosnia-Herzegovina have barely functioning economies. The economic outlook is however mostly positive, 3-5% GDP growth for the next two years, but there are still notable differences between the countries.

Turkey is a member of NATO but its application for the EU-membership has not been approved so far mainly due to country's treatment of minorities and human right infringements. The economic outlook is positive as GDP growth is estimated to be 5.5% in 1998 and 5.0% in 1999. The economic growth in Middle East is expected to be 3.0-3.5% in 1998-1999.

The average real GDP growth in North Africa is projected to be some 4.0% in 1998-1999. The most rapid growth is expected for Egypt.

FIGURE 4.21

REAL GDP GROWTH IN SELECTED COUNTRIES OF THE STUDY REGION 1994-1999



Source: OECD

### (3) Demand Outlook

The total demand forecast for corrugated board raw material in Western Europe average 2.1 %/a up to the year 2005. In Eastern Europe the growth is estimated at 5.3 %/a.

NSSC fluting growth in Western Europe will be low, 1.2 %/a. In 2005 the total would thus reach 1.2 million tons. In Italy and Spain the growth will be steady.

Eastern European demand growth will depend on the economic and political development of these countries. The demand growth will average 3.1 %/a and it will increase from the current 178,000 tons to 234,000 tons in 2005.

Along with establishment of consumer product industries in Middle East and North Africa, the packaging materials consumption will rise. In addition, the opening up of the relatively closed economies will also add paper and board consumption. Both in Middle East and North Africa the

average growth is estimated at 3.0 %/a. The total consumption would thus amount to 110,000 tons in Middle East and to 60,000 tons in North Africa in the year 2005.

**TABLE 4.21**  
**Demand Outlook for the Study Region up to 2005**

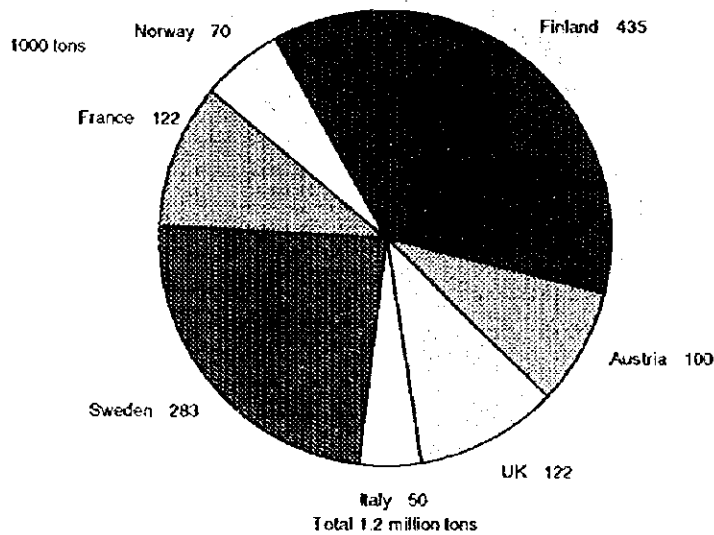
Region/Country	1996	2005	%/a
- 1,000 tons -			
Western Europe	1 101	1 225	1.2
• France	81	83	0.3
• Italy	246	276	1.3
• Spain	92	103	1.3
• Greece	40	45	1.3
Eastern Europe	178	234	3.1
• Hungary	1	1.5	4.5
• Bulgaria	3	3.3	1.1
• Romania	16	20	2.5
• Russia	130	150	1.5
Middle East	85	110	3.0
• Turkey	43	64	4.5
North Africa	46	60	3.0

#### 4.2.3 production and competition

##### (1) Main Producers

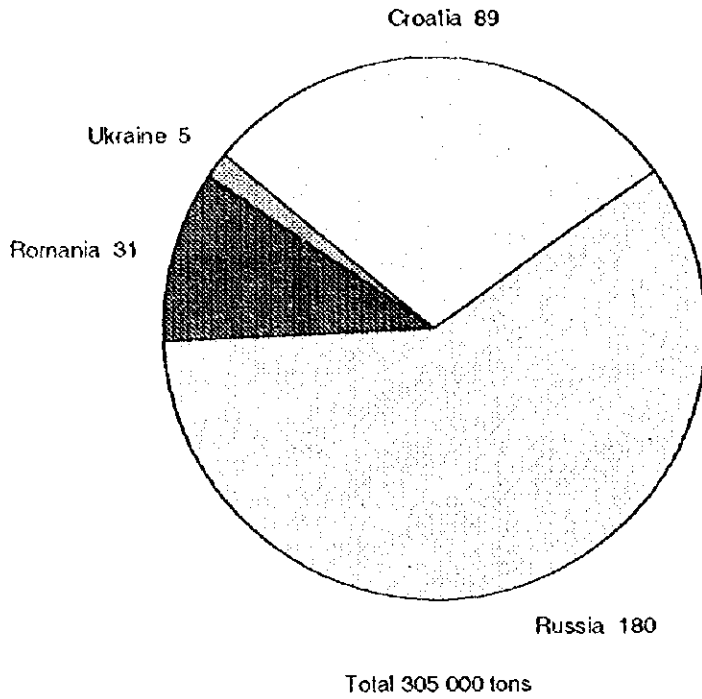
##### 1) Western Europe

**FIGURE 4.22**  
**NSSC FLUTING PRODUCTION IN WESTERN EUROPE 1996**



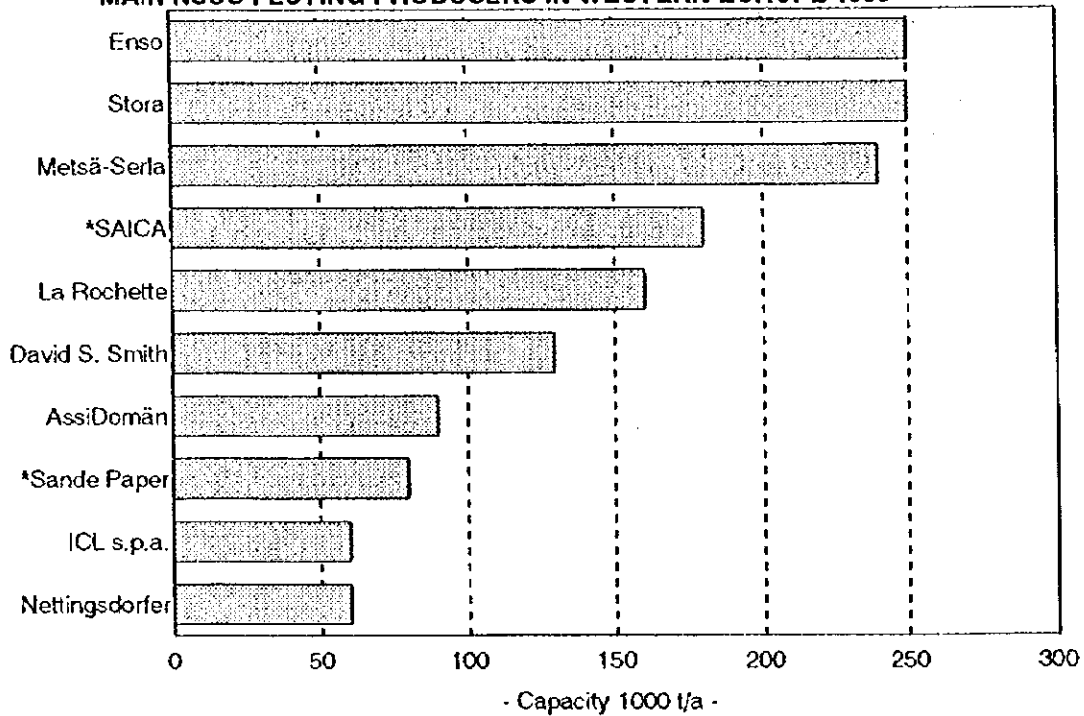
2) Eastern Europe

**FIGURE 4.23**  
**NSSC FLUTING PRODUCTION IN SELECTED**  
**EASTERN EUROPEAN COUNTRIES 1996**



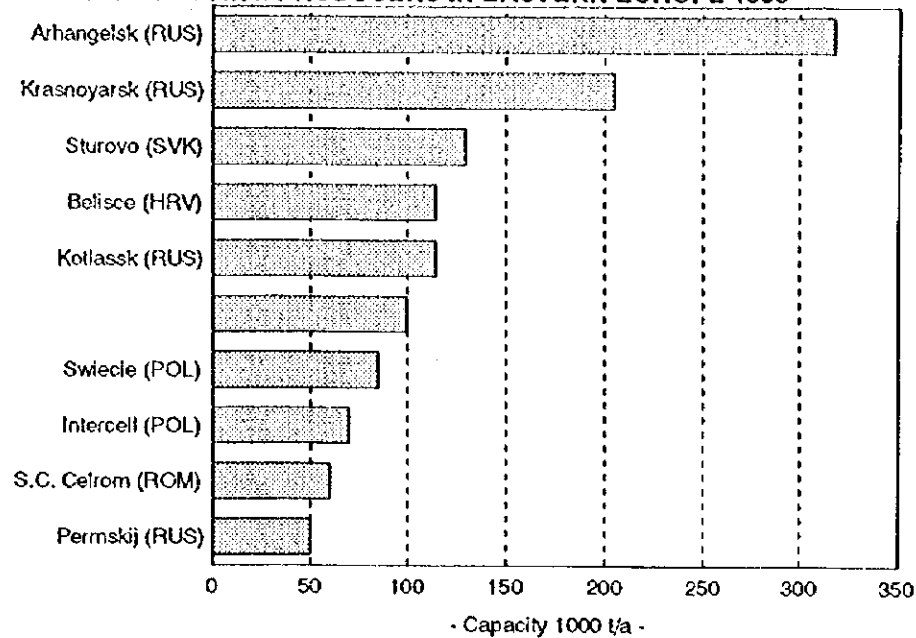
(2) Main Producers

**FIGURE 4.24**  
**MAIN NSSC FLUTING PRODUCERS IN WESTERN EUROPE 1998**





**FIGURE 4.25  
MAIN NSSC FLUTING PRODUCERS IN EASTERN EUROPE 1998**



1) Converting in Eastern Europe

Several foreign companies have entered the Central and Eastern European corrugated raw material converting business by acquiring and modernising local companies. Other forms of operations in these countries are partial ownerships or joint ventures. The most active Western European companies in entering the converting business have been KNP BT, David S. Smith, AssiDomän, Otor and Nettingsdorfer. It can be assumed that this converter acquisition trend will continue as the Western European producers are focusing on the emerging markets.

2) Middle East and North Africa

NSSC production in North Africa reached 10,000 tons in 1996. The production is estimated to be non-wood fibre-based. In Middle East the production amounted to 20,000 tons supplied by Turkey. Turkey is the only country in Middle East having NSSC fluting production capacity. The combined capacity of mills Olmuksa and SEKA amounts to 50,000 t/a.

(2) Trade Flows in the Study Area

Possibility of sales is to be judged by the trade balance.

1) Western Europe

**TABLE 4.22 Trade Balance of NSSC Fluting in Selected Western European Countries 1996**  
(1,000 tons)

Country	Production	Imports	Exports	Trade balance
France	122	62	103	41
Italy	50	218	23	-195
Austria	100	14	66	52
Greece	-	40	-	-40
Spain	-	99	7	-92
<b>TOTAL</b>	<b>272</b>	<b>433</b>	<b>199</b>	<b>-234</b>

2) Eastern Europe

**TABLE 4.23**

**Trade Balance of NSSC Fluting in Selected Eastern European Countries 1996**

Country	Production	Imports	Exports	Trade balance
		- 1,000 tons -		
Hungary	-	1	-	-1
Bulgaria	-	3	-	-3
Slovenia	-	3	-	-3
Romania	31	4	19	15
Russia	180	-	50	50
Croatia	89	-	74	74
Ukraine	5	5	-	-5
<b>TOTAL</b>	<b>305</b>	<b>16</b>	<b>143</b>	<b>127</b>

3) Middle East

**TABLE 4.24**

**Trade Balance of NSSC Fluting in Middle East 1996**

Country	Production	Imports	Exports	Trade balance
		- 1,000 tons -		
Lebanon	-	3	-	-3
Syria	-	2	-	-2
Jordan	-	-	-	-
Albania	-	-	-	-
Turkey	20	25	2	-23
Kuwait	-	-	-	-
United Arab Emirates	-	7	-	-7
Saudi Arabia	-	30	-	-30
<b>TOTAL</b>	<b>20</b>	<b>67</b>	<b>2</b>	<b>-65</b>

4) North Africa

**TABLE 4.25**

**Trade Balance of NSSC Fluting in North Africa 1996**

Country	Production	Imports	Exports	Trade balance
		- 1,000 tons -		
Morocco	9	17	-	-17
Tunisia	-	9	-	-9
Algeria	-	5	-	-5
Egypt	-	6	-	-6
<b>TOTAL</b>	<b>9</b>	<b>37</b>	<b>-</b>	<b>-37</b>

### (3) Capacity Changes

There are no planned NSSC fluting projects in the study regions. The last NSSC project was in 1997 when a PM2 of Celrom in Romania was rebuilt increasing the capacity by 20,000 t/a.

There are numerous recycled fluting projects instead, totalling 685,000 t/a in Western Europe (incl. testliner), 125,000 t/a in Middle East (incl. testliner) and 30,000 t/a in North Africa (incl. testliner).

**TABLE 4.26**  
**Decided Fluting Projects In Western Europe 1997**

Company / Mill	PM	Year	Change 1,000 t/a	Grades	Remarks
Oudegem, Den- dermonde, BEL	6	1997	-65	Recycled fluting	Conversion to testliner
Danisco, Grenaa, DNK	1	1997	10	Recycled fluting	Speed-up
Lacaux, Aiguille, FRA	1	1997	10	Ubl. testliner, recycled fluting	Rebuild
Otor, St. Etienne-du- Rouvray, FRA	3	1998	80	Recycled fluting, ubl. testliner	Restart
Sachsen Papier, Eilenburg, DEU	5	1998	270	Recycled fluting	Conversion
Hermes, Düsseldorf, DEU	1	1998	35	Recycled fluting	Rebuild
Mauro Benedetti, San Leonardo, ITA	1	1997	10	Ubl. testliner, recycled fluting	Rebuild
Cartiera Cardella, San Pietro/Vico, ITA	4	1997	10	Recycled fluting	Rebuild
Cartiera/Polesine, Rovigo, ITA		1998	80	Recycled fluting	New mill
SCA Packaging Lucca, Porcari, ITA	1	1997	n.a.	Recycled fluting, white surface and ubl testliner	Rebuild
SAICA, Zaragoza, ESP	7	1997	10	Recycled fluting	Rebuild
SAICA, El Burgo/Ebro, ESP		2000	250	Ubl. testliner, recycled fluting	Two new PM's
Danisco, Holcombe, GBR		1997	10	Recycled fluting, ubl. testliner	Rebuild
East Lancashire, Radcliffe, GBR		1997/ 99	15	Ubl. testliner, recycled fluting	Conversion
SCA Packaging, Maidstone, GBR	2	1997	-55	Recycled fluting	Shut down
Smith, Stone & Knight, Birmingham, GBR	4	1997	17	Ubl. testliner, recycled fluting	Rebuild
<b>TOTAL</b>			<b>685</b>		

TABLE 4.27

## Decided Fluting Projects in Eastern Europe 1997

Company/Mill	Year	Capacity 1,000 t/a	Grades	Remarks
S.C. Celrom, Dropeta, ROM	1997	20	NSSC fluting	Rebuild

TABLE 4.28

## Decided Fluting Projects in Middle East 1997

Company / Mill	Year	Change 1,000 t/a	Grades	Remarks
Kahraman Maras Kagit, TUR	1997	45	Recycled fluting	New PM
Selkasan, Manisa, TUR	1998	20	Ubl. testliner, recycled fluting	Capacity expansion
Tire Kutzan, Izmir, TUR	1997	60	Rec. fluting, ubl. testliner	Second-hand machine
<b>TOTAL</b>		<b>125</b>		

TABLE 4.29

## Decided Fluting Projects in North Africa 1997

Company/Mill	Year	Change 1,000 t/a	Grades	Remarks
Papeterie Beendriss, Blida, DZA	1998	30	Recycled fluting, ubl. testliner	Second hand machine
<b>TOTAL</b>		<b>30</b>		

TABLE 4.30

## Planned NSSC and Recycled Fluting Projects in Western Europe 1997

Company / Mill	PM	Year	Change 1,000 t/a	Grades	Remarks
Oudegem, Den- dermonde, BEL	7	1998	15	Recycled fluting	Capacity expansion
Otor, St. Etienne-du- Rouvray, FRA	n.a.	n.a. by 2000	65 150	Recycled fluting Ubl. testliner, recycled fluting	Rebuild Mill capacity expansion
Sachsen Papier, Eilenburg, DEU	n.a.	2000	280	Rec. fluting, ubl. testliner	Planned new PM
AssiDomän Ania, ITA	3	late 1990's	20	Wh. surf. testl., recycled fluting	Rebuild
Portucel, Mourao, PRT		n.a.	- 75	Ubl. testliner, recycled fluting	Planned mill shut down (two PM's)
<b>TOTAL</b>			<b>455</b>		

**TABLE 4.31**  
**Planned NSSC and Recycled Fluting In Eastern Europe from 1997**

Company/Mill	PM	Year	Change 1,000 t/a	Grades	Remarks
Karton Morava, Zimrovice, CZE	n.a.	by 1999	20	Ubl. testliner, recycled fluting	Mill capacity expansion
Staskie Zaklady, Tychy, POL	n.a.	1998	8	Ubl. testliner, recycled fluting	Planned capacity expansion
S.C. Ambro, Suceava, ROM	1	1998	100	Ubl. testliner, recycled fluting	PM1 conversion
AO Majkop Kartonara, RUS	1	n.a.	50	Ubl. testliner, NSSC fluting	Rebuild
<b>TOTAL</b>			<b>178</b>		

**TABLE 4.32**  
**Planned NSSC and Recycled Fluting Projects In Middle East from 1997**

Company/Mill	PM	Year	Capacity 1,000 t/a	Grades	Remarks
Arab Company for Paper Products, Aleppo, SYR	1	1998	30	Ubl. testliner, recycled fluting	PM1 rebuild
Dentas Kagit, Denizli, TUR		n.a.	9	Recycled fluting	Planned PM rebuild
Sanayi Ticaret, Corlu, TUR		n.a.	200	Rec. fluting, ubl. testliner	Planned new PM
Olmuxsa Mukavva, Findikli, TUR		n.a.	100	Recycled fluting, ubl. testliner	Planned new PM
<b>TOTAL</b>			<b>339</b>		

#### 4.2.4 pricing

##### (1) Average Sales Prices

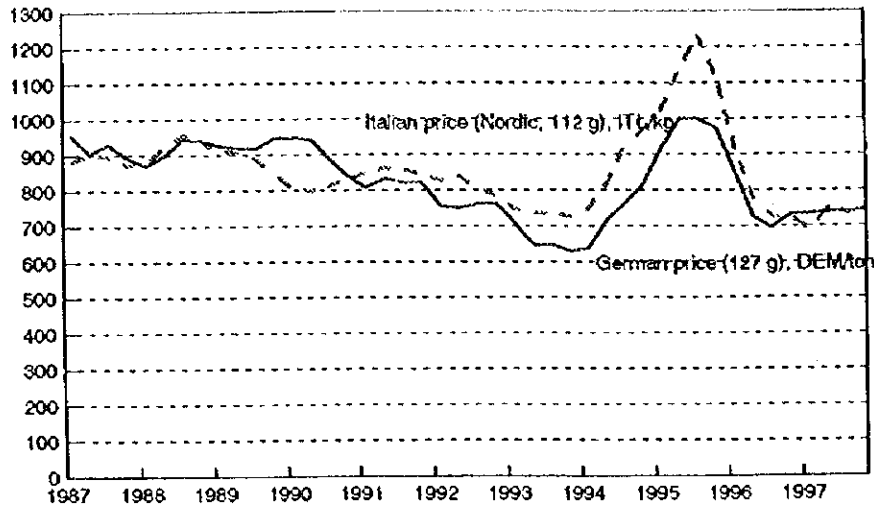
##### 1) Western Europe

Containerboard prices tend to fluctuate according to business cycles. NSSC fluting prices are, however, more stable than other corrugating grades. Limited number of suppliers and differentiated product types have kept the prices at a more constant level.

Currently the Western European price averages DM 760/ton. Italian price level is ITL 750/kg for Nordic NSSC fluting.

The trend of a rather stable price development should continue in the future.

**FIGURE 4.26**  
**REAL PRICE DEVELOPMENT OF NSSC FLUTING IN WESTERN EUROPE**  
**1987-1997**



## 2) Other Regions

NSSC fluting prices in other target regions follow international prices, mainly those in Western Europe.

Presently NSSC fluting price averages DM 750/ton in Middle East, DM 720/ton in North Africa and DM 700/ton in Turkey.

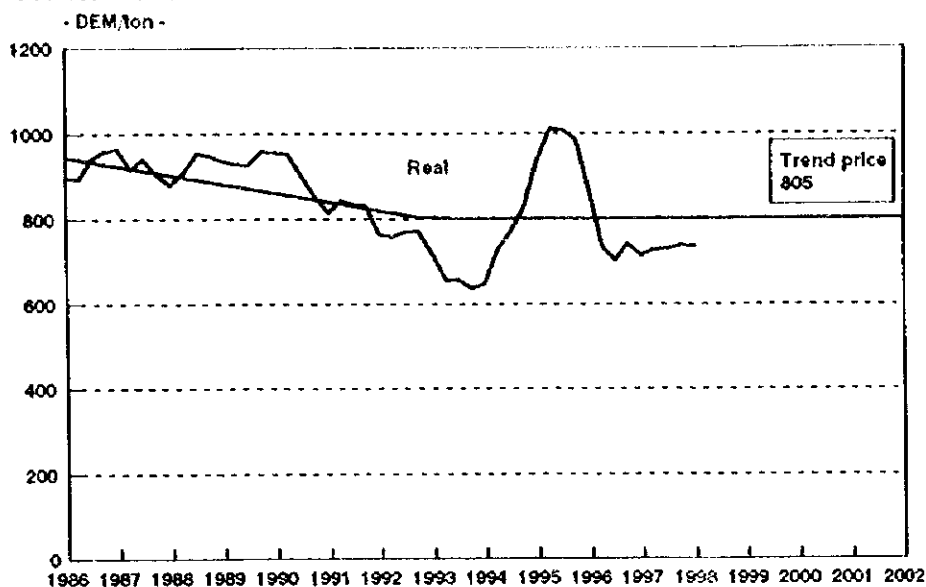
The trend prices vary from DM790/ton in Middle East to DM750/ton in Turkey.

**TABLE 4.33**  
**Present and Trend Prices in the Study Regions**

	1998 price	Trend price
Western Europe	760	805
Middle East	750	790
North Africa	720	760
Turkey	700	750

(2) Price Outlook

FIGURE 4.27



4.3 MARKET POTENTIAL AND OPPORTUNITIES

Following the analysis in sections 4.1 ("Sack Paper") and 4.2 ("NSSC Fluting"), export quantities of production items are estimated as follows and used in the long-term plan:

Sack Paper	37,000 t/a	at DM1,200~DM1,280/t
NSSC Fluting	50,000 t/a	at DM760 ~ DM805/t

(1) Sack Paper

As basic for the long-term plan, market potential in quantity and price level have been estimated.

TABLE 4.34  
Market Potential in Selected Western European Countries (1994-1996)

Country	Consumption	Production	Import	Potential for Natron Maglaj	
				1,000 tons	Market Share
Italy	167	21	151	13	8
Spain	103	162	43	-	-
France	122	55	91	4	3
Austria	27	145	25	-	-
Greece	11	0	11	2	18
<b>Western Europe</b>	<b>430</b>	<b>383</b>	<b>321</b>	<b>19</b>	<b>4</b>

**TABLE 4.35**  
**Market Potential In Selected Eastern European Countries 1996**

Country	Consumption	Production	Import
	- 1,000 tons -		
Russia/CIS	130	200	0
Bulgaria	30	30	0
Romania	20	20	0
Hungary	25	26	2
Albania	1	1	0
Yugoslavia	1	0	1
Croatia	3	0	3
Slovenia	3	0	3
<b>Eastern Europe</b>	<b>213</b>	<b>277</b>	<b>9</b>

**TABLE 4.36**  
**Market Potential In Selected Near Middle East Countries 1996**

Country	Consumption	Production	Import	Potential for Natron Magla]	
				1,000 tons	Market Share
Turkey	149	57	95	5	3
Syria	18	0	18	2	11
Jordan	9	0	9	-	-
Lebanon	3	0	3	-	-
Israel	4	0	4	-	-
Saudi-Arabia	27	0	27	3	11
Kuwait	11	0	11	-	-
UAE	10	0	10	-	-
<b>Near Middle East</b>	<b>231</b>	<b>57</b>	<b>177</b>	<b>10</b>	<b>4</b>

**TABLE 4.37**  
**Market Potential In Selected North African Countries 1996**

Country	Consumption	Production	Import	Potential for Natron Magla]	
				1,000 tons	Market Share
Egypt	37	0	37	3	8
Algeria	28	5	23	2	7
Tunisia	15	10	5	-	-
Morocco	30	0	30	3	10
<b>North Africa</b>	<b>110</b>	<b>15</b>	<b>95</b>	<b>8</b>	<b>7</b>



2) Table 4.38 shows for sack paper, the estimated quantities and prices in potential markets. These estimates have been incorporated in the long-term plan.

**TABLE 4.38**  
**Natron Maglaj sack Paper Sales Plan and Forecasted Trend Market Prices**

Market	1,000 tons	Trend Price DM/ton
Italy	13	1 280
France	4	1 280
Greece	2	1 280
Turkey	5	1 120
Syria	2	1 240
Saudi-Arabia	3	1 240
Egypt	3	1 200
Algeria	2	1 200
Morocco	3	1 200
<b>TOTAL</b>	<b>37</b>	

**(2) NSSC Fluting**

In the study region, recycled grades are mostly produced locally and used for local packing. Higher qualities such as NSSC fluting are imported, mainly from Nordic countries. These materials are used for export packages and for food packaging.

1) The international trade is marginal in recycled fluting, although trade between neighbouring countries may grow. As there are no NSSC fluting capacity changes, the market balance favours higher grades. Natron Maglaj's NSSC fluting could be directed to following markets:

- Western Europe: Italy, Spain, Greece
- Middle East: Turkey, Saudi Arabia
- North Africa: Morocco, Tunisia, Egypt.

**TABLE 4.39**  
**Criteria for Market Potential of Selected Countries**

	1996 Imports 1000 tons	1996 Trade balance 1000 tons	Growth 1996-2005 1000 tons	Market Growth %/a	Economic Outlook 1998-1999 %/a
<b>Western Europe</b>					
• Italy	218	20 -195	246→276	1.3	2.4-2.7
• Spain	99	5 -92	92→103	1.3	3.5-3.3
• Greece	40	5 -40	40→45	1.3	3.0-3.4
<b>Middle East</b>					
• Turkey	25	5 -23	43→64	4.5	5.5-5.0
• Saudi Arabia	30	5 -30	30→39	3.0	1.9-1.9
<b>North Africa</b>					
• Morocco	17	5 -17	26→34	3.0	3.0-3.0
• Tunisia	9	3 -9	9→12	3.0	4.0-4.0
• Egypt	6	2 -6	6→8	3.0	4.9-4.9

2) Table 4.40 shows for NSSC Fluting, the estimated quantities and prices in potential markets. These estimates have been incorporated in the long-term plan.

**TABLE 4.40**  
**Natron Magiaj NSSC Fluting Sales Plan and Forecasted Trend Market Prices**

Market	1,000 tons	Trend Price DM/ton
Italy	20	805
Spain	5	805
Greece	5	805
Turkey	5	750
Saudi-Arabia	5	790
Morocco	5	760
Tunisia	3	760
Egypt	2	760
<b>TOTAL</b>	<b>50</b>	