

9. Analysis of Industry and Structure of Industrial Production in FBiH for the Chemical and Pharmaceutical Industry Sector

9.0 Achieved Level of Development of Chemical and Pharmaceutical Industry in BiH and FBiH Until 1992

Chemical industry

The main characteristic of the concept, structure and dynamics of the development of chemical and pharmaceutical industry in BiH shares the fate of the overall development of the former Yugoslavia with an emphasized decline in relation to the other former republics, which could easily be confirmed from the appropriate reviews that were confirmed in the **Study of Long-term Development of Chemical Industry of Bosnia and Herzegovina until 2000.**

The share of chemical industry of BiH in the total chemical industry of the former Yugoslavia dropped from 15.1% in 1965 to 9.2% in 1990. All other republics achieved a significant increase, which suggests that the same gave adequate importance to the development of chemical industry, while Macedonia has more than doubled, and Croatia more than tripled its share. This confirms that the planning of the chemical industry and everything else that accompanied the development of this sector was not done objectively at the level of the former Yugoslavia.

This is possible to explain in the way that neither Yugoslavia, and especially not Bosnia and Herzegovina had in the previous period sufficient knowledge, and even experts of certain profiles that would connect the chemical industry within various sectors and branches, especially after the Second World War, when the foundation of the chemical industry was laid. As the chemical industry was not on the priority list of economic activities, lack of investments caused a considerable decline below average development of chemical industry of the former Yugoslavia.

Although it was also known then, that there was a solid base of chemical industry of inorganic nature, which current capacities clearly demonstrate that little was done on diversification of the represented production for the past 50 years.

In the seventies of the last century, due to increasing prices of oil and oil derivatives, the model of development of petrochemical complex and production of petrochemicals was dropped, which were the basis for development of polymer industry, whereby there would be an improvement of production structure that favors the organic sector. Overcapacity of the commenced investments for construction of petrochemical centers must also be taken into account, at the time of former Yugoslavia, as well as the need to ensure the enormous resources for the development of petrochemical production. Oil Refinery in Bosanski Brod with the capacity of 200,000 tons/per year of basic petrol, but without a significant reorientation with the products of oil processing and processing of natural gas as initial raw material. The existing and probably future behavior of the uncontrolled price of oil and oil products require quick reorientation to the possible use of alternative raw materials in a certain period of time, and perhaps as a final commitment, giving the preference to no petrochemical paths of development and production of chemical products. For now, those are primarily coal, bituminous shale, agricultural produce that are rich with oils, as well as secondary raw materials.

Wartime events in BiH and the shutdown of all production activities that caused immeasurable devastation of economic capacities, interrupted the economy and economic development and led to poverty and survival to the level of social assistance.

Thus, the chemical industry of BiH, and now its part in the Federation has autarchic development, not ensuring its access to foreign markets with the valuation of its own raw materials. The development of such development model was neither expert-oriented nor was the development concept import-substituted.

9.0.1 Production and Consumption of Chemical Products in BiH and FBiH until 1992

Between the level of production and consumption demand needs there must be certain coherence and harmonization of a country or a particular market. Development of any industry including chemical industry must be associated with the degree of development and production level of its main consumers. This requires taking into account the harmonization of infrastructural spending of chemical industry - for example, cellulose and paper industry. Previous period is characterized by the fact that the demand was much higher than production, marketing of chemical products was never threatened, as a whole.

Structure of production of chemical industry in FBiH and BiH is also not satisfactory, because those are mostly inorganic chemicals which are not as competitive in the world market as organic products.

There are legitimate reasons to delay the production of nitric acid, ammonia and nitrogen fertilizers, because BH is limited by raw material base for this production, in relation to the environment that has natural gas at disposal.

Also, it should be stated that there was a significant lag in the field of agro chemistry, both in terms of fertilizers and in terms of production of pesticides, although there exists a raw material basis for it.

Table 9.1 shows production of more important products of chemical industry in BiH until 1990, while Table 9.2 shows consumption of chemical products in industrial companies in BiH and FBiH. According to the review of these indicators, the consumption of chemical products was slowed down in the period 1975-1978, which led to the placement and supplies, and to some extent to the decline in production - Calcium soda, polyester filament and cellulosic fibers. Characteristic was the decline in spending cellulosic fiber, approximately 30% only for the domestic textile industry. Also, in 1980 there was a high conjuncture of chemical products, which was reflected on the demand increase for basic chemical products and petrochemical products.

Table 9.1 Production of major products of the chemical industry of BiH until 1990 (in tons)

Product	1970	1976	1980	1990
1. Salt acid	6,689	5,983	8,107	19,561
2. Nitric acid	84,632	86,932	92,358	100,735
3. Caustic soda	41,510	11,410	71,710	73,506
4. Calcium soda	113,361	137,232	129,069	183,374
5. CAN	94,000	88,000	96,000	97,812
6. Ammonium- nitrate	6,406	19,563	19,726	24,544
7. Ammonium- sulphate	11,266	12,666	11,072	6,642
8. Chlorine	14,316	15,773	28,197	36,933
9. Sodium– hypochlorite	10,924	17,488	31,386	33,747
10. Aluminum – sulphate	4,482	14,348	24,530	34,429
11. Compressed technical gases	7,190	11,579	122,795	121,027
12. Anhydride fetal acid	1,211	975	1,700	3,111
13. Anhydride malefic acid			5,884	7,188
14. Polylos			18,676	16,903
15. Benzene			15,124	17,065
16. Polyester fibres		810	3,717	3,336
17. Cellulose fibres	3,834	22,775	19,071	13,852
18. Detergents		326	42,798	45,983

Table 9.2 Consumption of chemical products in industrial companies in BiH and FBiH (in tons)

	Product	1970	1978	1980	1990
1.	Rock industry salt	-	43,272	59,912	63,506
2.	Salt acid	-	2,558	3,013	3,193
3.	Chlorine	-	22,319	41,939	44,455
4.	Sulphuric acid	8,910	33,502	35,207	37,319
5.	Nitric acid	70,455	82,415	92,358	97,899
6.	Sodium hydroxide	397	4,238	443	506
7.	Sodium hydroxide electrode	6,434	20,969	21,100	22,366
8.	Tallow and other technical fats	1,855	7,718	11,849	12,798
9.	Formaldehyde	7,310	20,969	24,990	26,200
10.	PVC – powder	4,742	6,900	6,700	5,900
11.	Aromatics	-	53,012	71,616	78,987
12.	Bleached cellulose for viscose	-	29,823	15,595	18,589

Data source: Statistical yearbook of BiH 1971, 1981, 1991.

9.0.2 Foreign Trade of Chemical Industry Until 1992

Characteristic of BiH foreign trade in relation to the foreign trade of the former Yugoslavia, which recorded a permanent deficit, was that chemical industry of BiH recorded a positive balance of exports until 1977, followed by deterioration and its deficit in the period between 1978 -1982. The reason for reduction of foreign trade of the chemical industry sparked the development of processing sector of chemical industry, as well as the development of other industry branches that consume chemical products. After 1983 it comes to a stronger export orientation with new surplus.

Main export products were: polyurethane components, cell-fibers, pharmaceuticals, polyols, TDI, detergents and alkalis. The structure of imports of the most important item is the import of raw materials and production materials.

Individual imported products were: liquid chlorine, propylene, ammonia, lye, benzene, urea, sulfuric acid, PVC powder and others. The fact is that most of these imported products were produced in the former Yugoslavia, the import dependency was high. Also, the structure of production of chemical industry of BiH is not satisfactory, since they are mostly inorganic chemicals in the world market that are not as competitive as various organic products.

Based on the considerations so far it can be stated that the chemical industry of BiH and today of the FBiH as its integral part, did not have a firm and realistic concept of development that complied with global trends and local available resources.

Concept development and techno-economic analysis did not adequately involve export-orientation of projects and business with global recognized prices, which led to a loss of competitiveness of the chemical industry of BiH on the world market in the pre-war period.

The absence of economic and technological criteria in evaluating development projects, resulted in the construction of a number of uneconomic capacities, which inflicted great damage on society. The presence of insufficient competition in the domestic market contributed to weakening of this branch under strong customs and tariff protection, which caused the loss of competitiveness in foreign markets.

Lack of true knowledge of product development, process and facilities and lack of development of chemical-laboratory research, pointed to the import of necessary technologies and equipment. Also, one must accept the fact that the chemical industry in general, including BiH, developed under circumstances of uncompetitive energy prices. This led to a higher energy content in the product price. No attention was paid to energy efficiency.

Under current circumstances when the evaluation a very expensive energy price is carried out, the need to examine the development and to correct inadequate price disparities of chemical products in the preceding period, presents the basis for the introduction of rational energy consumption.

These are some of the problems that followed the previous period of work and development of chemical industry of BiH.

9.0.3 The Achieved Level of Development of the Pharmaceutical Industry in BiH and FBiH until 1992

Former Yugoslavia covered 80% of the demand for drugs with its production in sixteen specialized companies out of which four are located in Bosnia and Herzegovina. Four large pharmaceutical firms were successful in 1991 on the market: "Bosnalijek" Sarajevo, "Sanofarm" Sarajevo, "Medic" Cazin and "Sanitex" Velika Kladuša. They employed over 2000 workers and serviced local and international markets. All four companies are located on the territory of the Federation, two in Canton Sarajevo and two in the Una-Sana Canton. They are still present with varying degree of success in the market. Some were able to overcome the consequences of war, modernize production, ensure quality and sell products on the domestic market, although they had to compete with strong competition from foreign pharmaceutical companies. The largest number of companies struggles with difficulties in business.

So far only the company "Sanofarm" was privatized, while others are still in the process of privatization through public sale of shares.

During the war the companies worked with a very reduced capacity or they did not have any production at all. War damage of industrial facilities is enormous. Modern plants were target of destruction, so that after the war a complete reconstruction would be necessary. However, investment funds are lacking. Due to the unregulated ownership relations the interest of investors is very much reduced.

The common conclusion is that the political and economic upheavals completely changed the image of the pharmaceutical industry in Bosnia and Herzegovina.

9.1 Cross-Section of the State of Production

Companies in the chemical industry sector:

Condition of production programs and the level of use of installed capacities of the representative companies in the sector of chemical industry is shown for 2008.

Table 9.3 List of identified companies in the chemical industry sector:

	List of companies in the chemical industry sector	Canton
	Name of the company	
1.	Salt factory „SOLANA“ d.d. Tuzla	Tuzla
2.	Detergent industry „DITA“ d.d Tuzla	Tuzla
3.	„SISECAM“ soda Lukavac d.o.o.	Tuzla
4.	„Global Ispat“ Coke industry d.o.o. Lukavac	Tuzla
5.	„POLIOLCHEM“ d.o.o. Tuzla	Tuzla
6.	„Buschenhaff – Plastik“ Kalesija	Tuzla
7.	„Hidrotehnika“ Kladanj	Tuzla
8.	„Hempro“ Gradačac	Tuzla
9.	„Graplast“ Gračanica	Tuzla
10.	„MESSER“ Sarajevo plin	Sarajevo
11.	Azotara „VITKOVIĆI“ Goražde	Bonian - Podrinje
12.	„TIPO“ Odžak	Posavina

Table 9.4 Companies in the sector of pharmaceutical industry:

	Company	Location	Activity	Ownership structure %	
				State	Private
1	„Bosnalijek AG"	Sarajevo	Production of pharmaceuticals	48.71	51.29
2	„Saniteks AG"	Velika Kladuša	Production of sanitation materials	62.93	37.07
3	„Medic AG"	Cazin	Medical products	33.00	67.00
4	„Astro AG"	Sarajevo	Soaps and beauty products	45.09	55.91
5	„Sanofarm AG"	Sarajevo	Production of pharmaceuticals	50.13	49.87
				Private	Investor
6	„DKS Loversan GmbH"	Cazin	Medical products	1.00	99.00
7	„Semikem GmbH"	Sarajevo	Medical aid products	100.00	-
8	„Pharmamed GmbH"	Travnik	Medical products	100.00	-

9.1.1 Production Programs of Companies in the Chemical Industry

Salt factory „SOLANA" d.d. Tuzla

Salt factory "SOLANA" d.d. Tuzla, except for production of salt as the main product, has won the production of various types of products based on salt, in the field of nutrition, pharmacy and hygiene by long-term development and research plans.

In this sense the production of the following products was explored and conquered:

- pharmaceutical salts (capacity 1.000 t/year),
- spicy food seasoning with dried vegetables „Do – do" (of the capacity 250 t/year),
- sodium sulphate (of the capacity 3.000 t/year) ,
- briquetted salt for cattle and fine game.

The largest volume of production of salt and other products d.d. Solana achieved in the period until 1992 and placed on the domestic market.

Review of production program on the basis of installed capacities is shown in Table 9.5.

Table 9.5 Review of basic products of Solana Tuzla in 1990

	Products	Measure unit	Annual amount	Domestic market %
1.	Kitchen salt	tons	200,000	100
2.	Spice Do- do	tons	250	100
3.	Pasta Olba	tons	100	100
4.	Sodium	tons	3,000	100

The degree of capacity utilization was 100%. With this production capacity, d.d. Solana Tuzla d.d. met 90% of the needs of former Yugoslavia for domestic salt. It was a market leader in salt production in the Yugoslav market during that time.

In 2008 d.d. Solana Tuzla entered into production plan of 150,000 tons, which made 75% of its designed capacity.

Detergent industry „DITA“ d.d. Tuzla,

Compared to the pre-installed technological capacities, which allowed the annual production level of 50,000 tons of powdered and 12,800 tons of liquid detergents and cleaning materials, the degree of utilization of the same in 2002 amounted to 17.8%, and after the privatization in 2005 it soon came to an increase in placements, which followed significant improvement in quality, and thus the degree of capacity engagement, and reduction of business losses.

In 2008 the detergent industry "DITA" d.d. Tuzla planned to produce 13,500 tons of powdered detergents, which comprise approximately 30% of installed capacities, with a substantial offer of improved and increased range of products of liquid detergents.

„SISECAM“ Soda factory Lukavac d.o.o.

In its production program, Soda factory "Sisecam" Lukavac has installed production capacities of 292,000 tons on basis of crude bicarbonate, or 800 tons/a day, calculated on the calcium soda - Na_2CO_3 .

The range of the production program in 1990:

- calcium soda, Na_2CO_3 , (light – heavy) – 210,000 tons,
- soda in production ranges - 35,000 tons,
- technical soda "B" – 21,000 tons,
- medical soda „MBB" – 14,000 tons,
- fire extinguisher powder.

„GLOBAL ISPAT“ coke industry d.o.o.Lukavac,

The basic production program of this company includes the manufacture of coke with installed capacities:

- two coke batteries by 700,000 t/year,

- production of maleic anhydride acid – AMK 9,600 tons,
- production of artificial fertilizers KAN – 90,000 tons,
- production of tar products 50,000 tons,
- crude benzyl - 6,500 tons,
- ammonium sulfate – 5,500 tons.

On the basis of coal tar, products and electrode pitch of about 12,500 tons, 1,600 tons of warm pressed naphthalene, easy oil of 150 tons and 1,000 tons a year of oil impregnation.

The new coke battery is in operation, which gives the design capacity of 700,000 tons of high quality coke, which is placed in the export market in the largest percentage.

„POLIOLCHEM“ d.o.o Tuzla,

In its production program until 1992 this company had a production range:

- | | |
|-----------------------|----------------|
| – industrial salt | 72,000 t/year, |
| – sodium chlorate | 4,000 t/year, |
| – chlorine gas | 27,500 t/year, |
| – sodium hydroxide | 28,500 t/year, |
| – hydrochloric acid | 27,000 t/year, |
| – sodium hypochlorite | 4,000 t/year, |
| – propylene oxide | 18,000 t/year, |
| – polylos | 20,000 t/year, |
| – pur – systems | 7,000 t/year. |

After closure of electrolysis plant, current production program is based only on:

- polylos 20,000 tons.

„HEMPRO“ d.d.Gradačac,

Company „Hempro“ Gradačac has the following range of products:

- hydro insulation band,
- bituminous mass,
- cold coatings,
- adhesive,
- solvent – petroleum,
- travel emulsion,
- cleaning materials.

9.1.2 Production Programs of Companies in the Pharmaceutical Industry

Groups of products from pharmaceutical sector are linked to other areas, particularly with the chemical industry, textile industry and agriculture. Pharmaceutical sector includes production, trade and development of pharmaceutical product group. Definition of

pharmacy sector, in this analysis differs from the standards used in the EU countries. We concentrated on the following companies or groups of products:

- Medical products (medicines),
- Medical aid products (among other things, also medical supplies),
- Homeopathic products,
- Cosmetic products.

Wider consideration of this sector shows that the international trend in the pharmaceutical industry is moving, today, in the direction of research and development of drugs, medical aid products and homeopathic devices for modern diseases, cardiovascular diseases and diseases of the immune system. Contested field of research is genetic techniques. Number of private companies in the pharmaceutical market is growing. Their concept of strict market-economic orientation shows already first successes. Although in relatively small numbers, these companies are in the profit area. These are firms with less capacity and fewer numbers of employees. They have more flexible production programs and can easily adapt to market conditions. The trend in the area of services indicates an increase in the number of private pharmacies and wholesaler of drugs.

Pharmaceutical market of Bosnia and Herzegovina is ruled by the naturally strong competition. Besides the biggest producer of drugs "Bosnalijek", all the major world companies are represented. So far there are over 32 registered representations of pharmaceutical companies with over 500 approved preparations. In Republika Srpska there are over 60 pharmaceutical representations - with more than 1,000 approved products. "Bosnalijek" is present in the market with 92 approved products.

As shown in the tabular view, the production of cosmetic and pharmaceutical products mainly takes place in two corporations:

The company Bosnalijek AG Sarajevo produces, among others, the following preparations:

- for high blood pressure,
- for bloodstream,
- for the cardiovascular system,
- for urology,
- for skin,
- against infection,
- against anti-nerve disease.

In addition, selling products and preparations from non-pharmaceutical areas.

Company Sanitek, Velika Kladuša produces hygiene products and cosmetic products for care for adults and children.

In accordance with the production activities as approved by the Ministry of Health of the Federation of Bosnia and Herzegovina, the companies that produce pharmaceutical and cosmetic products have a product range:

- pharmaceutical finished products,
- disinfection means.

Pharmaceutical product range of these companies is mainly composed of:

1. drugs with effects on the cardiovascular system,
2. drugs with effects on the digestive system and metabolism,
3. drugs with effects on the digestive system,
4. drugs for the treatment of systemic infections,
5. drugs with effects on the bone – muscle system,
6. drugs with effects on blood and hematopoietic organs,
7. drugs with effects on urinary system and sex hormones,
8. drugs with effects on the skin,
9. systemic hormonal medications other than hormones,
10. drugs for the treatment of malignant disease and immune modulators,
11. drugs for the treatment of infections caused by parasites,
12. drugs with effects on the respiratory system,
13. miscellaneous.

Production and sale of product range of these companies and of the companies that are engaged in this activity can be divided into:

1. Pharmacy program includes more than 90 generic names, 160 products of different shapes and intensities, for per oral, per enteral and topical application.
2. Production companies produce sterile and non-sterile pharmaceutical forms. Sterile pharmaceutical forms are produced as a solution (thermal sterile or aseptic), and non-sterile forms are produced as liquid, semisolid and solid forms.

9.2 State of Technologies and Technological Systems

9.2.1 General State in the Sector of Chemical and Pharmaceutical Industries

Using existing and new technologies and technological systems depends on the technological and technical equipment of chemical and pharmaceutical industry in the use of installed facilities at the usual and global - competitive level, but also on the ability to provide the necessary raw materials and on the placement of manufactured products.

Qualification for entering competitive world markets has a direct impact on the use of capacities and production volume, because for a large number of chemical products from the base sector, the domestic market has too narrow frames, and this fact must be taken into account on future work and development. Of course, planning of the construction of new capacities from the sector of chemical and pharmaceutical industry and its further development directly affect the use of both existing and future facilities. Therefore, the development plan for this sector should be determined on the level of sectoral needs and related raw material entities, on the whole BiH market, and market environment. When studying the development of chemical and pharmaceutical industry in the area of strengthening the technical potentials, it is very important to see what are the realistic opportunities of their own increase by their own efforts, especially in terms of mechanical industry and project - engineering organizations.

Processing equipment that is usually represented in this sector are comprised of: chemical reactors, absorption and distillation columns, range ventilation hoods, crystallizers, extracts, electrolyzes, dialysis machines etc. - in the chemical industry; whereas in the pharmaceutical industry - wet-granulation in ultra-rapid mixer and fluid bed, dry granulation in fluid bed and oscillating granulator, and the preparation and filling, sterilization of perenteral forms of medication. State of technology and technological systems can be monitored by opportunities and training for maximum use of available installed and projected production capacities. This ability is closely related to the development of technological resources, i.e. with appropriate knowledge and skills in handling the high-tech facilities with growing complexity (large pressure, high or low temperature, explosiveness, toxicity, inflammability, the use of IT systems, etc.). The current utilization of installed capacities in the chemical industry amounted to 62.30%, while in the pharmaceutical industry it amounted to 60%.

Former development of technical resources in the chemical and pharmaceutical industry can be most easily monitored via the value of fixed assets, whose parameters are given in Table 9.5. **Present situation of these companies are characterized by outdated and mostly depreciated equipment, which is subject to revitalization and modernization with the introduction of a high degree of automation after being overtaken by the majority owner.** Therefore, it is necessary to take this into account for the future development, and provide a more intensive growth rate of fixed assets of the chemical industry, at least at the level of the dynamics that the whole BiH has. In this way the state of technologies and technological systems will also grow, as an important factor for the development of this sector in the FBiH. Based on the insight into the amount of investments in fixed assets one also obtains a significant additional information about the state of development of the technical potentials of this sector.

Table 9.5 Financial Indicators

Financial indicators of companies engaged in chemical industry			
	2006.	2007.	2008.
Total income	242,488,361	325,503,955	467,739,080
Total costs	252,479,600	308,185,241	365,307,712
Profit/loss	- 9,991,235	1,319,667	18,273,848
Net book values of assets	249,834,293	248,895,681	-
Value of equity	113,748,176	121,492,161	-
Value of total production	192,813,333	227,214,590	319,417,438
Production costs	190,563,368	229,140,972	359,312,185
Administrative costs	44,530,954	48,945,055	57,483,896
Depreciation costs	15,924,824	18,037,901	18,602,560
Gross salary	26,234,572	28,819,748	33,029,061
Net salary	15,569,994	17,102,696	19,599,446
Total export	128,702,451	243,727,995	388,743,037
Total import	270,466,502	254,474,446	311,447,000

Data from the table show that, in addition to investing in new facilities, the future development period there will have to see adequate replacements, reconstructions and modernizations of plants in chemical and pharmaceutical industry of the FBiH especially in its base sector. Such a high degree of depreciation of capital assets in the base sector of the chemical industry of the FBiH shows an insufficient investment activity in the previous developmental period. The fact that the capital assets are significantly worn out will have to be considered more carefully in the next period.

9.2.2 State of Technology and Technological Equipment in These Companies of the Chemical Industry

„Solana " d.d. Tuzla

In the nineties the reconstruction of salt production facility was carried out by replacement of a part of the equipment of foreign technology - Escher Wyss Switzerland, by local equipment. This made the production of salt from the technical-technological point of view reliable and it gave the product of high quality. Today it organizes production of salt with minimal financial investment and effort on equipment and plant facilities of different technical and technological equipment, which are obsolete and worn out.

The general assessment that it is difficult to achieve the company's operations with the regular servicing of obligations incurred without obtaining certain benefits; favorable loans or the ability for longer reprogramming to fulfill the current commitments. For stable and safe operation, as well as for the settlement of obligations it is necessary to

have incentive measures to revive and revitalize the production of the long-term sources of funding within the business.

For the purpose of more successful business operation and market conditions for the next period d.d. SOLANA TUZLA mapped out the following development plans:

- provision of technical and technological conditions for salt production capacity of 200,000 tons per annum, for which it expects a favorable placement;
- Realize development programs of production of various kinds of products in the field of nutrition, hygiene and pharmacy-based salts.

Detergent Industry „DITA" Tuzla

In the production of detergents in Tuzla, operational since 1977, based on technology and project documentation of Ballestra company from Milan, that still enjoys a reputation as a manufacturer of processing equipment in detergent industry. It is assessed that the contemporary European technological trends still use this type of processing equipment, which Dita modernized after the war, by introduction of automatic control of production. Vital parts of the equipment do not, therefore, need innovation, but only replacement in cases of obsolete equipment.

Surely, it is necessary to innovate the processes for packaging of detergents, where modern machinery is introduced, new packaging and packaging sizes. Standards of consumptions of raw materials and packaging are defined by formulations of finished products whose realization or deviation is constantly monitored. Terms of development and the continued improvement of operations, is what this company must create from anew, by removing many restrictions that currently exist.

„Sisecam" Soda Factory Lukavac

Lukavac soda factory - now a joint venture SISECAM SODA Lukavac is operational since 1893 by Solvay (ammonia) production process of soda. Due to complex business conditions, the condition of technical equipment of the company was at a very low level of production, which, after cessation of work due to the war in BiH, was very much questionable to make a decision about the possibility of its revitalization and operation. Thanks to the efforts of the Government of Tuzla Canton, after considering all requirements including the risk, again, with enormous effort, initiated production of the soda factory in 2003, to the level of 500 t/day. Due to insufficient funds for modernizing, lost markets it was any production was questionable without entering of the Turkish strategic partner - the company "Soda Sanayi", which assumed the future modernization of approximately 50 million KM.

„Global Ispat" Coke Industry Lukavac

Manufacture of coke and coke products, based on gas and tar, began in 1952 with the then-known technologies from these activities. It applies to the production of coke by

Russian technology "GIPROKOKS" with the technology of distillation of tar from 1918, the technology for the production of technical naphthalene in 1936 and the production technology and electrode pitch from 1962. The new coke battery with the capacity of 700.000 tons, which was interrupted by the end of 1992, and the completion was activated and finished in 2003 with the arrival of Indian-English company "Global Style Holding" and formed joint venture "Global Ispat" Coke Industriy Lukavac.

Now, the majority owner has a detailed work plan with the dynamics of full revitalization and the started activity in the overall modernization and introduction of new technologies in all aspects of technological processing.

„POLIOLCHEM“ Tuzla

According to plans, the company intends to make a modern membrane technology for the electrolysis of salt water, and expand the product range for production of chlorine and alkali, the production of propylene oxide, polyols, chlorate and polyurethane systems, for which, according to current estimates, around 100,000,000 KM would be invested. The current equipment enables the production of propylene oxide and propylene.

9.2.3 State of Technology and Technological Equipment in the Aforementioned Companies in the Pharmaceutical Industry

Available technologies used by companies in their production program are:

- Wet granulation in the ultra-fast mixer and fluid bed,
- Dry granulation in the fluid bed and oscillating granulator,
- Tablet compression and tablet coating,
- Filling of powders, pelega and granules in hard gelatin capsules,
- Machine primary and secondary packaging,
- Preparation and filling of semi crude and liquid forms of medicine,
- Preparation and filling, sterilization of parenteral forms of medication.

The Company has ISO 9001 certificate, ISO 14001, OHSAS, but there is no CE marking for their products.

9.2.4 Financial Indicators of Surveyed Companies

An overview of financial indicators for 2007 made on the basis of analyzed financial indicators was given in table 9.6:

- total revenue per employee in KM,
- net exports per employee in KM,

- profit per employee in KM,
- value of net assets per employee relates to companies that submitted data.

Overview of financial indicators of surveyed companies

Table 9.6 Overview of financial indicators per employee

Company	Total revenue per employee in KM	Net export per employee	Profit per employee	Value of net assets per employee in KM
	2007	2007	2007	2007
Salt factory "Solana" Tuzla	41,877	15,696	119,760	94,855
Detergent industry "Dita" Tuzla	74,320	2,866	- 2,565	112,999
"Sisecam" Soda Lukavac	99,555	91,427	2,587	7,656
"Global Ispat" Coke Industry Lukavac	322,562	25,751	19,224	113,669
"Poliolchem" Tuzla	460,872	-50,297	290	263,845
"Bosnalijek" Sarajevo	152,165	-24,043	14,011	203,977

In order to compare the surveyed companies among each other, it is necessary to calculate absolute indicators from the Questionnaire into relative indicators. On the basis of relative indicators it is possible to compare all the sectors in this project.

The total income of the surveyed companies engaged in chemical industry in 2006 amounted to: 245,488,361 KM, and in 2007 325,503,955 KM. Exports of surveyed companies of the chemical industry in 2006 amounted to 174,375,228 KM which makes 4.54%, and in 2007 316,294,494 KM or 8.02% of total exports in the FBiH in the same year. Total imports of surveyed firms in this sector in 2006 amounted to 219,328,159 KM or 2.79%, and in 2007 230,007,078 KM which makes 2.75% of total imports in the FBiH in the same year.

Growth of total exports in 2007 compared to 2006 amounts to 81%. At the same time the imports in 2007 increased compared to 2006 for an amount of 0.5%.

Total exports of surveyed companies in this sector increased by 37.37% of total imports in 2007 with a tendency of further increase.

Based on the data of net asset value per employee one estimates the value of the technical equipment of the workplace. The value of the job in 2007 is in the range of 7,656 KM – "Sisecam" Soda Lukavac, and 263,845 KM – "Poliolchem" Tuzla. Differences in values of the workplace are primarily determined by the type of production, degree of automation and achieved the degree of restructuring.

Dividing the total income, net exports and net profit with the value of assets per employee are obtained by three indicators to assess business performance of the company.

Based on these three indicators the most successful surveyed companies surveyed in

2007 were as follows: "Sisecam" Soda Lukavac, and "Global Ispat" coke industry Lukavac.

Company "Sisecam" Soda Lukavac achieved 13 KM of total revenue per each 1 KM of asset value, Coke Industry achieved 2.83 KM, and "Poliochem" Tuzla 1.75 KM.

Furthermore, the achieved net export per 1 KM asset value amounted to 11.94 KM at "Sisecam" Soda Lukavac, Coke Industry 0.22 KM and 0.118 KM at "Bosnalijek" Sarajevo.

Profit per each 1 KM asset value amounted to 0.33 KM at "Sisecam" Soda Lukavac, 0.169 KM Coke Industry Lukavac and 0.07 KM at the company "Bosnalijek" Sarajevo.

9.3 Possibility of Revitalizing and Modernizing Technologies

Chemical Industry

As in the period from 1995 to 2003 no significant progress in changing the ownership structure took place and almost no privatization of any company from this business activity was carried out by foreign investors, a common approach to another concept was undertaken for the revitalization and start up of selected companies that use local resources and raw materials, which form a wider business system.

The concept of reviving and revitalizing the commencement of production by its own, very modest financial potential in order to attract the interest of one of the potential investors due to the created precondition that it was just a written off equipment and that one should no longer count on those companies. The public created the opinion that they were "depreciated" companies.

The truth is that initially, such a wrong attitude was created and spread by some individuals of the international community, which created a big dilemma and delays in adoption of more concrete decisions by those in charge.

The introduction of strategic partners with significant investments in reconstruction, revitalization and modernization, these companies grew in profitable economic entities, which provide continuous supply of consumers with their products, according to defined standards of quality and the lowest necessary cost. The majority owners especially prioritized the increase of the degree of automation and increase of energy efficiency while increasing the reliability of the overall system. It should be noted that the special impact was achieved by the fact that strategic investors introduced their experiences and modernization through imported equipment by the highest technical and technological standards in these technologies. Therefore, it is certainly expected that the overtaken companies will in the future operate in accordance with the standards of environmental protection and provide overall support to the economic development of BiH.

In order to achieve this it was necessary to implement the following activities:

- selection of strategic partners who will assume obligations to:
- physical reconstruction and modernization of plant facilities,
- financial strengthening of the company,
- orientation towards market business operations,
- corporate orientation and transformation into decentralized group that will be a regionally positioned company.

Today it can be said that most of the stated objectives in this sector are realized due to:

Introduction of strategic partners in stated owned companies:

- Coke chemical combine Lukavac,
- Cement factory Lukavac,
- Soda factory Lukavac,
- Detergent industry DITA Tuzla,
- Chlorealkale complex Tuzla – POLIHEM,
- Part of the metal industry.

New established companies:

- „Global Ispat“ Coke industry Lukavac,
- Cement factory „Alas international“ Lukavac,
- „Sisecam“ soda Lukavac,
- „Dita“ Tuzla,
- „Poliolchem“ Tuzla.

Introduction of strategic partners improved all performances in business:

After many years with negative financial result in 2007, cumulatively speaking, chemical and pharmaceutical industry achieved profits in the business.

- Realization of the goals reflected in the market valuation of stock whose value increases every month, reliable system operation, operational readiness of reconstructed units increased and a steady growth in production and sales was achieved.
- Companies continuously raise the quality of products and services, and after a new three-year investment cycle most of the problems related to repayment of debts would be eliminated, and the quality of delivery would be closer to the EU standards.
- Plans were prepared for major investment projects to expand production and new production capacities.

- Companies provide a direct stimulus through their business activities to economic development of BiH, by allowing supply of chemical products of local buyers at affordable prices.
- Companies already operate in a free market in the region.

Market access is increasingly present in both the sales process and procurement.

9.3.1 Overview of the Most Important Investments in Companies from the Sector of Chemical and Pharmaceutical Industry

Chemical industry

„Global Ispat“ Coke Industry Lukavac

The treaty on establishing the joint venture with the majority owner “Global Infrastructure LTD”, with 51% starting capital, assumed the obligation of a new investment 15,000,000 KM for the completion and launch of unfinished V-Coke battery and 50,000,000 KM in working capital for procurement of raw materials and intermediate goods. A complete replacement of technology factories for production of anhydride maleic acid with benzene in n-butane on a solid layer of catalyst, with a total investment of over 8,000,000 KM. It is the most modern production process in the world today. The introduction of raw material n-butane, modernization and automating of the factory reduced pollution of the environment for more than 50%. The company introduced the most modern system of packaging and shipping of all products, which required a modern system of transport and exports. Computer-control system was quickly introduced in all facilities. Additional investments in start-up of IV Coke battery and revitalization of the accompanying equipment was estimated at around 50,000,000 KM.

Currently the company makes preparations for receiving the appropriate ISO certification and obtaining CE sign for its products.

„Sisecam“ Soda Factory Lukavac

By forming a joint venture with Turkish company "Soda Sanay AS", the investor has taken a commitment of complete revitalization and modernization of the plant, for which reconstruction the investment of 44.500.000 KM was planned. The previous investments amounted to approximately 30.000.000 KM. These investments enabled the production increase from 300 to 600 t/day of current production and now speedy operation was directed towards achieving the projected capacity of 800 t/day. Increased overall efficiency of the process was achieved and the required quality of final products. A plant facility of heavy soda was built, which required an investment of 12.000.000 KM in the equipment. Automation of power plant facilities was carried out, which increased the use of boilers and thus reduced emissions. Project documentation is currently drafted for the reduction of all flows and the possibility of recirculation for the management of the environment system.

The construction of a new system of packing and shipping was carried out with new automatic machines for packaging, palletizing and binding. Resumed organizational structure and implemented system of project management. An information system and software process control was introduced.

The ultimate goal of the strategic partner was to achieve the capacity of 500,000 t/year and an additional investment of 131,000,000 KM.

„Solana“ Tuzla

Given the ownership structure of capital in this company, which also has an enormous need for reconstruction and modernization of its technical-technological system, and the situation of the former incurred liabilities, the company has two choices:

- ensuring the necessary resources to affordable credit arrangements and long-term repayment period, for the necessary revitalizing and increasing of overall efficiency of the plant as a whole,
- ceding the majority of shares to the prospective buyer that would offer full reconstruction and modernization of this factory as the factories in other EU countries.

Assessment of the necessary investment in new technologies amounts to 30.000.000 KM, while the investment for environmental protection amount to 20.000.000 KM.

The company has managed to obtain ISO certification, but its products have CE mark.

„Dita“ Tuzla

Commercial company was privatized by the majority owner of the domestic company "Lora" 2006. Until now significant investments were made to introduce additional automation in manufacturing facilities, procurement of new machines in the system of packing powder and liquid detergent, the preparation of PET packaging, and technological preparation of demineralized water. However, for a new range of products, compact detergents, there is a lack of adequate equipment. Previous investments in modernization amounted over 2,000,000 KM, while investment in environmental protection amounted to about 200,000 KM. Necessary funds for further upgrading of technical-technological system is estimated at around 4,000,000 KM.

The company has ISO certification, while the same products have secured the CE sign for its products.

Pharmaceutical industry

Out of the above companies in the field of pharmaceutical industry the data on financial investments were provided only by "Bosnalijek" Sarajevo.

„Bosnalijek“ Pharmaceutical and Chemical Industry d.d.

Bosnalijek uses the experience of the leading international companies and prestigious institutes for the management of its business policy in order to gain a basic support of Bosnalijek's long-term development strategy, which will ensure the competitiveness of

companies in the global pharmaceutical market. A production-distribution center was built according to the avant-garde technological concept of production and distribution of drugs, as it is implemented only in the leading pharmaceutical companies worldwide. Its construction and equipping cost around 40,000,000 KM.

In the following development plans "Bosnalijek" intends to invest in new technologies in the amount of 120,000,000 KM, while investments for environmental protection is estimated at 20,000,000 KM.

Overview of the necessary funds for the reconstruction and modernization of industrial capacity in the sector of chemical and pharmaceutical industries is shown in Table 9.7:

Table 9.7 Necessary investment for industrial capacities

Company	Amount in KM
"GLOBAL ISPAT" Coke industry Lukavac	50,000,000
"SISECAM" Soda Lukavac	130,000,000
"SOLANA" Tuzla	50,000,000
"DITA" Tuzla	5,000,000
"BOSNALIJEK" Sarajevo	140,000,000
"POLIOLCHEM" Tuzla	100,000,000
Total amount of investments in the sector	475,000,000

9.4. Internal and External Constraints (SWOT Analysis)

A study of the current position of representative companies engaged in chemical and pharmaceutical industry of the FBiH was carried out by direct visits to factories, inspection and review of their development programs and the existence of their objectives and policies for development and employment. A cross-section of the state of production programs, technologies and technological systems was presented, as well as possible activities related to the revitalization and modernization of technology and technological processes.

In order to define the set goal in a quality way, Development of Industrial Policy of the FBiH, a joint questionnaire is designed for this sector, covering inter alia the following issues:

- data on financial indicators for 2006, 2007, and the plan for 2008,
- data on staff,
- production program,
- state of technology,
- state of production,

- development,
- measures of economic policy,
- foreign investments and system of development incentives.

By analyzing the position of the chemical and pharmaceutical industry in the FBiH in the system of the same activity of the former Yugoslavia, and its share in European and world relations, one noted the changes in the chemical and pharmaceutical industry under the influence of technical and technological progress in the world of globalization, and their reflections on the development of this branch in the FBiH. Furthermore, an analysis was presented of the political, security, environmental and economic framework for the development and incentive of this activity as well as the limiting factors for the smooth operation and development.

The main goal of direct access and rating given by the management and experts in this sector was used to identify internal and external constraints for this activity. An assessment of general social and economic condition in the industrial and economic development, and the state of the overall environment to prosperity of this industry was presented. Based on the SWOT analysis a review of the influence of internal and external economic framework was made. Moreover, reasons that may constitute obstacles to the successful incentive to mass production and proposal of activities for their elimination will also be presented.

Evaluating strengths and weaknesses of the internal environment, and threats and opportunities that come from a particular environment of a certain business entity or the sector as a whole, is generally known as a SWOT analysis. Using the SWOT analysis that is based on principles which start from the fact that efforts to formulate development policies must aim to establish a harmonious relationship between the internal capabilities of the company, and sector, on the one hand, and the external environment of the company and sector, on the other hand.

Established review of resource strengths and weaknesses, and of opportunities and threats in the environment is essential in the process of formulating the policy of the sector development of the chemical and pharmaceutical industry. According to the conducted surveys, assessment of opportunities and threats in the external environment of chemical and pharmaceutical industry in the FBiH is based on a medium term period, and assessment of strengths and weaknesses related to the situation found. Thus, at this stage of the Project a gap was identified between the expected opportunities and threats until 2015 and the existing strengths and weaknesses, of the sector of chemical and pharmaceutical industry, which needs to be addressed by relevant strategies listed in the project.

Based on a designed questionnaire with all the advantages and limitations for the SWOT analysis carried out in workshops from this business sector, ratings for individual factors were presented, on the basis of which positioning of the sector of chemical and pharmaceutical industry in the FBiH was carried out.

9.4.1 SWOT Analysis of the Chemical Industry Sector

Table 9.8 Factors of external environment and their assessment for the period until 2015 (chemical industry sector in the FBiH)

External environment factors Opportunities: from 7 to 10 Threats: from 1 to 3 Neutral influence: from 4 to 6			
No.	Description of factors	Number of replies	Rating - Average
1.	Access to financial resources	35	1.5
2.	Market liberalization	34	7.6
3.	Development of infrastructure	32	5.4
4.	Political climate in BiH	34	2.0
5.	Degree of market globalization	30	3.0
6.	Increase of products' demand from the chemical and pharmaceutical sector	30	7.1
7.	Adequacy of educational system to the needs of this sector	32	2.9
8.	Prices of raw materials and energy	33	2.1
9.	Measures of economic policy	34	2.1
10.	Foreign investments and system of development incentives	32	4.1
	Average values		3.41

Table 9.7 Factors of internal environment and their assessment of the situation found (chemical industry sector in FBiH)

Factors of internal environment Strengths: from 7 to 10 Weaknesses: from 1 to 3 Neutral influence: from 4 to 6			
No	Description of factors	Number of replies	Rating – Average
1.	Production program	35	7,9
2.	Data on staff	35	4,0
3.	State of technology	34	3,5
4.	Development	35	2,2
5.	Availability of sources of energy and raw materials	31	9,5
6.	Quality of human resources management	34	3,6
7.	Financial resources	35	2,3
8.	Training and experience in production	33	6,5
9.	Possibility to create strategic partnership	17	5,1
10.	Possibility of diversification	10	3,6
11.	Nature of competition	18	2,3
12.	Degree and quality of privatization	15	2,0
	Average value		4,37

Based on the evaluation of the mutual influence of strengths, weaknesses, opportunities, and threats, the SWOT matrix was presented with four possible strategies as the final interpretation of the results achieved, tables 9.8 and 9.9.

The choice of an appropriate strategy is the final step of this analysis. The total value of strengths and weaknesses, on one side, and the opportunities and threats, on the other side, were compared and differences were calculated: strengths (S) - Weaknesses (W): $17.4 - 8.8 = 8.6$, opportunities (O) - threats (T): $14.7 - 13.6 = 1.1$. These results show that the chemical sector in the FBiH has a certain amount of strengths and opportunities, which includes the so-called WT Strategy (liberation strategy, weaknesses - threats).

In the most general case, this strategy involves reducing internal weaknesses and avoiding threats from the environment. It means using the strengths (force) of this sector in the FBiH in order to avoid or reduce the impact of threats from the environment that is expected in the future, with greater intensity and a significant influence on global economic trends.

The expected increase in demand for products of the base and processing sector of the chemical industry, especially the broad line of products based on salt production of coke and coke gas products, liberalization of markets, the situation with the highest ratings of the participating companies. Moreover, the resources on which the largest part of this sector is based, provide a reasonable basis to the future development of the processing sector to resist the threats that are expected over the next five years through the category of connected concentric diversification.

This implies the introduction of new technologies and technical solutions to existing industry, with special emphasis on environmental protection, increase of energy efficiency and rational use of resources. Competitiveness in the BiH and regional markets, the development of companies must be based on human resources and knowledge. Based on the situation analysis, it can be concluded that natural resources are used in a fairly extensive manner that adds significantly to production costs and environmental burden to the environment. This is particularly important to emphasize regarding the need for technical and technological efficiency due to the use of nonrenewable resources, and their limitation is a very important factor which should be taken into account very much.

Therefore, the strategy of diversification implies penetration into new industrial branches of the processing sector and the gradual abandonment of the inherited base sector in the future.

9.4.2 SWOT Analysis of the Pharmaceutical Industry Sector

High unemployment rates in FBiH refer to planning of development which will be based on work intensive sectors, to which the pharmaceutical sector also belongs. Lack of resources in this regard would be compensated through the extensive use of labor, which would, on the other hand, have positive effects on the reduction of unemployment. Here

one should pay attention to development based on human resources, which are in the category of experts and staff with university education, with technologies that require such skills.

Important considerations of this sector show that the international trend in the pharmaceutical industry is nowadays moving towards research and development of drugs, medical products and homeopathic means for modern diseases, cardiovascular diseases and diseases of the immune system.

Number of private companies in the pharmaceutical market is growing. Their concept of strict market-economic orientation already shows the first successful results. Although relatively small in numbers, all companies in the area make profit. These are firms with less capacity and fewer employees. They have more flexible production programs and can easily adapt to market conditions. The trend in the area of services indicates an increase in the number of private pharmacies and wholesale of drugs.

One should also have in mind that the economic agents, or members of sectoral groups established in the SWOT analysis as the main constraints and threats, mark the difficult position of social and health sector and participation of users in health services, difficult access to affordable (incentive) sources of finance, economic policy measures, political climate, and inadequate education system in BiH. This should be borne in mind in defining the key factors for the development of pharmaceutical industry in the FBiH, in order to focus on reducing the negative impact of these factors.

Analysis of the strengths shows that the most important strengths are installed capacities, satisfactory range of products and existence of energy and primary infrastructure.

Table 9.8 Factors of external environment and their estimates for the period until 2015 (sector of the pharmaceutical industry in FBiH)

Factors of external environment Opportunities: from 7 to 10 Threats: from 1 to 3 Neutral influence: from 4 to 6			
No	Description of factors	No of replies	Rating – Average
1.	Access to financial sources	5	3.0
2.	Liberalization of market	3	2.8
3.	Infrastructure development	1	8.1
4.	Political climate in BiH	7	2.3
5.	Degree of globalization of markets	10	3.0
6.	Increase in demand for the products of pharmaceutical industry	13	9
7.	Adequacy of educational system to the needs of this sector	12	4.2
8.	Prices of raw materials and energy	9	7.0
9.	Measures of economic policy	11	3.7
10.	Foreign investments and system of development incentive	8	6.3
11.	Social and health protection	7	2.8
12.	Installed capacity	7	8.0
	Average value		6.61

The biggest threats are the strong competition of foreign markets, and expensive, and huge financial resources for modernization and future development. The main strength is functioning of drug market in all circumstances, regardless of possible reductions caused by economic circumstances.

The analysis shows that the sector of the pharmaceutical industry has more opportunities and strengths next to possible threats and weaknesses.

Table 9.7 Factors of internal environment and their assessment of the situation found (sector of pharmaceutical industry in FBiH)

Strengths: from 7 to 10 Weaknesses: from 1 to 3 Neutral influence: from 4 to 6			
No	Description of factors	Number of replies	Rating – Average
1.	Production program	5	7,9
2.	Data on staff	3	5,6
3.	State of technology	1	4,5
4.	Development	7	4,0
5.	Availability of energy resources and raw materials	10	9,5
6.	Quality of human resources management	13	7,8
7.	Financial resources	12	2,3
8.	Training and experiences in production	9	6,5
9.	Possibility of creating strategic partnership	11	7,6
10.	Possibility of diversification	10	7,0
11.	Nature of competition	8	4,2
12.	Degree and quality of privatization	10	4,7
	Average value		7,26

The final step of this analysis is the selection of appropriate strategies. The total value of strengths and weaknesses, on one side, and the opportunities and threats, on the other side, were compared and the differences were calculated: strengths (S) - Weaknesses (W): $39.8 - 2.3 = 37.5$ (1), opportunities (O) - threats (T): 19.3 to $21.4 = 2.1$ (2). The results show that the sector of pharmaceutical industry in the FBiH has more strengths and opportunities, which implies a promising future of this business activity.

The preliminary analysis shows that the best strategy for business activity of pharmaceutical industry is SO strategy (offensive or attacking strategy with positive data of presented strengths and opportunities).

9.5 Possible Strategic-Development Goals and Strategies

Chemical Industry

Objectives:

The development of the industrial sector of chemical industry in the Federation of Bosnia and Herzegovina should provide:

- The required quantities of these products for long-term and reliable supply of all users in BiH;
- Achieving export with the realization of economic profit because of the need to balance foreign trade, optimal use of domestic energy, mineral and natural resources, in order to achieve economic and social benefits acceptable for environment;
- Rationalization of consumption of mineral and natural resources, increase of technological efficiency in all segments of the system of production, transformation and use of energy resources and raw materials;
- Ensuring an adequate degree of independence on imported chemical and pharmaceutical products, as well as products of low tons chemistry, special materials, high performance materials and materials for special purposes, by the primary position of domestic energy sources and available resources and company skills;
- Achieving quality consumptions of normative materials and energy by world standards, conducting environmental policy, and development of the internal market;
- In the field of design and development of chemical industry and related activities, Bosnia and Herzegovina must recognize the European and even global trends in the field of offer and demand and continuous process of globalization, especially in this sector.

Until last year all companies engaged in chemical industry in the FBiH were operating with losses.

Today, these companies are reconstructed to a significant extent and modernized, and thus make profit and trigger new investments. Share prices of all companies are constantly increasing.

The process of restructuring should be continued and completed in the next few years.

This implies a complete privatization of the current joint company and transfer of responsibility to the majority owner.

Companies that develop their activities on non-renewable resources should be assigned the use of public property in the form of concessions in amounts

that will not jeopardize strategic interests, the future of industrial and economic development of BiH.

Expressed interest in granting concessions to search for oil and gas by foreign corporations, and if they should be found, it would considerably change the structure of current production in favor of petrochemical products and their derivatives.

Unlike other countries, Bosnia and Herzegovina could achieve significant opportunities to build new production and processing capacities, especially in the area of low-tons chemistry product, special chemicals and high performance materials.

This would open space for launching major investment, attracting foreign investors, increasing electricity production and intensification of trade in the region. This means the start of the economy, creation of new jobs, greater economic cooperation with neighboring countries in the region, and thereby preservation of peace and better social conditions. Therefore, there remains the question of dynamics of construction and of capacity that is built for export, in terms of preserving natural resources.

9.5.1 Terms and Possibilities of Medium and Long Term Development of Chemical and Pharmaceutical Industry of FBiH in Terms of Resources as Factors of Development

1. Raw material resources as a development factor of the chemical industry sector of FBiH

Successful development of each sector, and sectors of the chemical and pharmaceutical industries is determined by internal and external factors of development. Internal factors of development include the development and availability of raw energy, technological, technical, and financial and human resources.

External factors include the development of markets and economic system. Therein lies the importance of constant enlargement possibilities of all these resources, and in this sense, the establishment of appropriate development goals for each resource separately, in order to enable the realization of development objectives for chemical production in the long run.

Compared to the previous period, when the state was the only decision maker about the strategy of its own development, and of development of the chemical industry sector, under today's circumstances of implemented partial or full privatization processes, majority shareholders decide on the development of their own companies or joint ventures. The logic of development planning is the market evaluation and the amount of profit that can be secured, and the expansion of global markets to prevent the upcoming competition.

On the basis of perception, the chemical industry, which has a wide range of products, processes a relatively small number of basic raw materials. Thus, the chemical industry of the former Yugoslavia spent for over 90% only ten most important raw materials. These are mainly phosphates, pyrite, burning gases, salt, calcium chloride, lime, coal, hydrocarbons from oil and natural gas, refined coal, pulp and sulfur. With the expanding list of resources to the most common of some twenty most frequently used ones, then one can ensure the production of over 98% of chemical products. In order to realize this percentage is possible, when the following raw materials are added to the aforementioned group: molasses, titanium concentrate, technical fat, aluminum hydrate, bones, borates, quartz sand, barite and zinc.

This speaks about the fact that almost the entire chemical production is based on these twenty raw materials. Therefore, the need to make more detailed consideration of these raw materials and the possibilities of ensuring the smooth development of chemical industry, both for current and future development and prosperity of this indispensable sector.

As we can see, the global distribution of raw materials for chemical industry, can be divided into two main groups according to its origin:

- Minerals and
- Biological raw materials.

The first group of mineral raw materials is divided into:

- Carbon raw materials,
- Non-metallic raw materials,
- Metal raw materials.

The group of carbon raw materials include: salt, lime, calcium salt, sulfur, pyrite, phosphates, natural soda, (throne), quartz sand, borates, etc.

Metallic raw materials are aluminum and aluminum hydrate, zinc, titanium concentrate, chromic concentrate, lead, iron, copper, etc.

Biological raw materials include: cellulose, molasses, fat of vegetable and animal origin, bones, etc., animal waste, starch and sugar, herbal pitch, charcoal, and the like.

With the current increasing variety of waste disposal, one takes more and more into account the use of various industrial and agricultural wastewater materials, which, on one hand, increases raw material base of the chemical industry, and, on the other hand, diminishes and rehabilitates significant environmental problems and requirements.

Review of consumption of raw materials in chemical industry of BiH in the previous period until 1990 is given in Table 9.10.

Table 9.10 Consumption of raw materials in chemical industry of BiH in the period 1980-1990 (in kt/year)

Group of raw materials	1980	1981	1982	1983	1985	1990
Carbon raw materials	214	215	215	215	215	215
Non-metal raw materials	841	885	930	956	1000	1200
Metal raw materials	7	7	8	9	9	10
Biological raw materials	29	31	34	23	35	40
Total	1,091	1,138	1,187	1,203	1,259	1,465

The structure of consumption of raw materials in BiH as compared to the former Yugoslavia, and especially to the structure worldwide, lags far behind, whereby other countries have a much higher consumption of carbon materials, due to their development, and primarily the development of their petrochemical production. Bosnia and Herzegovina based its share of development in this area mainly on coal and its derivatives.

A disproportionate disorder of this structure of consumption was made in favor of chemical processing of metals and other materials. This discrepancy cannot be explained if the significant portion of imported oil was required to provide for the development of petrochemical industry, because the other producers have also developed, and also significantly improved petrochemical industry on imported oil. Thus, petroleum and petroleum products are refined in a considerably more processing stages, which were also highly evaluated, which provided a huge export and import substitution of organic chemical products.

Here follow the basic raw materials in chemical industry of BiH that were used in the previous period by individual groups as original raw materials:

- carbon raw materials: coke gas, coal for synthesis and coke,
- non-metallic raw materials: salt, sulfur, barite, pyrofilite,
- metal raw materials: aluminum hydrate, zinc,
- biological raw materials: chemical pulp, technical fat, colophony, etc.

When it comes to charcoal imported in the overall volume, designed for coking and coke production, only one part of it was used for the production of valuable by-products - coke gas, which was burned in the past and especially today. Raw material resources that are based on salt, limestone, cellulose and wood, were used for the production of cellulose-based paper and cell-fibers.

Apart from these, the real raw material base for development of chemical industry in future will be renewable raw materials of plant and animal origin, for obtaining biotechnology products. Truly, when considering this factor of development one certainly must bear in mind the widespread use of waste materials (liquid, gaseous and solid), which represent an economic loss and environmental problem and could be used on average 60% of available volume, which is cannot be ignored.

2. Human resources as a factor of development of chemical industry of FBiH

Staff resources are of particular importance for the development of chemical industry. They are certainly the most important factor of development. Great development of the economy and the chemical industry in Japan, Switzerland, Holland and other countries that do not have sufficient resources of raw materials and energy but do have capable and productive staff that solve and compensate for the lack of other resources through their engagement and skills.

Therefore, successful implementation of identified development goals, which is defined by long-term development strategy of the chemical and pharmaceutical industry of FBiH, will depend primarily on the availability and qualifications of personnel who will be involved in this industry.

The way of today's market trends and daily increase in energy prices, future work with more expensive and scarce raw materials, rigorous quality requirements, new and varied chemical products, installing of more complex processing equipment, along with growing fierce competition in the international market – all of which demand by far greater staff skills and abilities from those who engage in early stages of development of BiH and its chemical industry.

Table 9.11 shows structure of qualifications and number of employees of some companies in the sector of chemical industry of FBiH.

Table 9.11 Number and structure of qualifications of employees in companies

Company	Dr.	MA	University degree	Two year degree	Highly qualified	Secondary education	Qualified	Semi-qualified
Solana d.d. Tuzla	1	4	38	13	102	147	154	59
Poliolchem d.o.o Tuzla	-	-	11	6	10	33	24	1
Sisecam soda d.o.o.Lukavac	-	1	56	7	94	228	238	129
Dita d.d.Tuzla	-	-	27	11	29	69	68	62
Global Ispat KIL Lukavac	-	1	86	21	344	246	299	168

According to data from the previous table, the share of two year degree and university education in the total number of employees is 10.62%, which can be a good indicator, but these are older staff members with long production experience, but with the lack of knowledge of foreign languages and information technology.

Moreover, the number of semi-qualified workers, as well as very high number of unqualified workforce is a point of concern, which in the modern chemical industry cannot be tolerated.

The number and participation of staff with secondary school education is constantly growing, which is a good indicator of the trend of raising qualification levels at this level of education.

Surely, the percentage of highly qualified workers and technicians is of extreme importance for the transmission and production work in the chemical industry, and, therefore, it is very important that their participation is constantly increasing at the expense of reduction of the number of semi-qualified and unqualified workers.

The presented data, and the fact that highly educated personnel available does not work sufficiently on professional and creative tasks, and primarily on research and development tasks, are probably the right answer to the question: why is the sector of chemical industry of BiH marked with continuous lagging behind compared to its other comparative advantages.

Under the present circumstances, marked by disintegration of the state of BiH, but also with anticipated entry into the EU, the issue of overall efficiency becomes even more imperative and an unavoidable necessity. The modern chemical industry capacities, particularly in the sector of base chemicals and intermediates, will inevitably be included in the international division of labor, which is primarily required to achieve, as well as to possess the appropriate level of knowledge and competitiveness and efficiency, which is provided, for the most part, by hiring of competent professional staff. As noted above, the level of world production, and in the chemical process industry, can be achieved only if we have a world-level education at our universities.

The current restructuring of the ownership and management of largely black and non-ferrous metallurgy and of the base sector of chemical industry, imposes a completely new approach to designing development strategies, which must be in compliancy with the majority owners and their development visions.

Our involvement may be the imposition of development of chemical industry from the processing sector. Predictions of developmental trends in processing industry and chemical industry are becoming a real development opportunities based on existing manufacturing capacities and available raw material basis in BiH and FBiH.

This sector of the chemical industry does not require relatively high investments, and it provides a significant contribution to employment, which is why he should be given proper priority to development in the future. In order to achieve the appropriate projects, one needs to establish an appropriate system for interlinking of the owners of these companies, and give one's own ideas and possible solutions with the corresponding additional incentives that would be willing to provide the market, bring equipment and technology with all the solutions required by the instructions and directives of the European Union.

Thus, the main limiting factor for the development of this sector is the knowledge of our staff, because this kind of production requires great flexibility and adjustment to the needs of the market and its requirements, which are required except the chemical-technological and ongoing marketing research, while taking into account the trends of globalization and the demands of new production philosophy and knowledge society.

3. Technological resources as a factor in the development of BiH and FBiH

The concept of technological resources includes the necessary knowledge and skills for research, development, design, construction and exploitation of plants and processes for the production of chemical products. Having one's own technology, or active participation in their completion and transfer, provides a competitive and dynamic development in the chemical industry.

We can recall that in the chemical industry in Bosnia and Herzegovina several plants were built in the previous period, such as DITA, HAK-1 and HAK-2, maleic anhydride and ophthalmic acids, production of technical gases, then the new plant chlorinated solvents, polyester plant fibers, paints and varnishes, plastics processing, etc. Truly, most of the built capacities of the base chemical industry were realized on the basis of foreign technology and knowledge. The technological solutions are often purchased from Western industrial countries: Italy, Germany, Japan, Canada and others. It must be acknowledged that the greatest number of purchased technology and selected goods were chosen by qualified partners for cooperation, the level of technology purchased generally corresponds with modern advances in certain manufacturing areas. Unfortunately, there are cases where it is not so, as was the choice of equipment and technology solutions for the plant for electrolysis and cuprites in the HAK-1, Tuzla.

Since recently one could observe in the processing sector of the chemical industry the tendency of development of its own technological solutions, such as in plastics processing, production of detergents and cosmetics, etc.; in this sector prevails the development based on import of technology solutions and equipment, although this production sector of the chemical industry can be developed with much less investment risk than is the case with the base sector.

4. Financial resources as a factor in the development of chemical industry of the FBiH

To determine the reproductive capacity of the chemical industry as a factor in the development of this sector is of crucial importance to the newly assigned value and the social product of this industry. The previous Table 9.5 shows this information for the last three years.

The mentioned review of the various appropriations for taxes and contributions, and not listed utility and water supply costs, gives enough information about the lack of incentives for this sector that, under these conditions, should provide the necessary reproductive capacity and modernization.

5. Organization of chemical industry of FBiH as a factor of development

Pursuant to the Law on Enterprises of FBiH, the companies engaged in chemical and pharmaceutical industry based on capital ownership are transferred under the supervision and control of the cantonal governments.

This leaves the companies isolated from one another and each canton is left to itself to search and find potential investors for their start-ups and revival of businesses, as the Law on Budget of the Cantons and the Federation of BiH does not stipulate available funds for this purpose.

Most of the companies are simply left to themselves, their debts and liabilities accumulate, in which case employers are obliged to sell them for next to nothing, often for other purposes or to go into complete liquidation.

9.5.2 External Factors of Development

Economic system as a factor in the development of chemical industry in FBiH

Market prices are one of the important factors of the position of economic entities. In the studies that were previously carried out, it was stated that the chemical industry infrastructure sectors of the economy whose base sector, with about 85% of total production, and processing about 50%, supply the reproductive consumption, and forwards for further processing. Among the most significant consumers of products of chemical industry appears to be the chemical industry itself, agriculture, textiles, metalwork, basic metal industry, food processing and pulp and paper industry.

This situation is similar in developed countries in Europe, where the base of the chemical industry sector places its production in the reproductive spending over 90%. Considering these findings, then the placement of products of chemical industry (and manufacturing base), with three quarters of total production is related to other industries and, ultimately, they share the same fate of the position in the market.

A bit larger part of chemical products from the processing sector is related to the broad and general consumption.

Among these products, an important place belongs to the individual products that are holding regular consumption of products such as maintaining the purity of space and personal hygiene, human and animal health, so that ultimately it is not a question of placements.

Chemical industry stays in relative relation to other sectors leading the growth rates, and there is no record of special crisis placements. Chemical industry, as a branch, is very intense in introducing new products to substitute any existing products derived from chemical and other industries were by winning completely new products both in the production and consumption.

Possible problems could occur in the placement of petroleum products, as fuel, due to the very high prices, on the one hand, and the decline in real purchasing power of the population. However, the better side of this problem when it comes to the chemical industry, appears in the change of products for energy, and greater quantities for processing are being ordered for the chemical industry.

Changes in any case must be conducted in a manner that meets the requirements of EU directives, which should enable the creation of competition in the sector, the functioning of open markets and choice for customers.

9.5.3 Objectives and Concept of Long-Term Development of Chemical Industry of FBiH

The long-term development goals of the chemical industry of BiH and FBiH should define:

1. Forecast of development trends of the chemical industry of FBiH
 - Forecast of development trends in the base sector,
 - Forecast of development trends in the manufacturing sector, and
2. Strategy for implementation of development directions and goals.

9.5.4 Projection and Forecast of the Development of Existing and New Major Products and Technologies of the Chemical Industry of FBiH

Forecast of development trends in the base sector:

The projection of long-term development of individual production areas:

1. Carbon and chemical products and artificial fertilizers,
2. Inorganic salts and sulfuric acid,
3. Production of chlorine and alkali,
4. Petrochemical products,
5. Chemical fibers, films and artificial materials based on cellulose,
6. Chemical products based on silicon,
7. Technical gases,
8. Production and processing of plastics and polyurethane,
9. Pharmaceutical raw materials and products,
10. Washing and cleaning materials,
11. Cosmetics, soaps and essential oils,
12. Coating materials and resins,

- 13. Commercial explosives,
- 14. Other chemical products.

Forecast of development trends in the manufacturing sector:

In the chemical manufacturing industry in the Federation of BiH there are also real development opportunities, based on some existing manufacturing production capacities and the available raw material basis. The characteristic of this sector of the chemical industry is that it requires relatively large investments, but provides a significant contribution to the employment of the population, which is why he should be given proper priority in the development and future medium term.

However, one must have in mind that this type of production requires a great deal of flexibility and adaptation to market needs, which is why they are necessary in addition to chemical-technological and constant marketing research. Thus, the main limiting factor for the development of this sector is knowledge and skills of our staff.

Developmental trends in the manufacturing sector should include:

- plastic materials and processing of polyurethane,
- detergents and cosmetics,
- production of medicines and pharmaceutical raw materials,
- development of the production of coating materials and adhesives,
- development of production of industrial explosives,
- additives for fuels and lubricants,
- catalysts,
- special chemicals for the production of fibers,
- special adhesives and putties,
- special polymeric materials,
- aid chemicals for the production of elastics,
- special chemicals to produce pulp and paper,
- chemicals for crop protection and agriculture,
- aids for the production of leather and rubber,
- products for finishing works in construction,
- products for reduction of flammability-retardants,
- additives for plastics.

Strategy for implementation of development directions and goals

This strategy should be particularly done in detail in order to define the methods and procedures, as well as necessary development factors and resources that would be necessary to provide for the successful implementation of pre-defined development objectives and orientations. The same strategy should analyze the factors inside and outside the fields of chemical industry, which will have a decisive influence on its development in future. Here you can immediately indicate the measures that need to

emerge so that each of the developmental factors could provide an optimal contribution to the overall development of chemical industry in the Federation of BiH.

Internal factors of development in the manufacturing sector are mainly:

- raw material,
- energy,
- technical,
- technological.
- personnel,
- financial,
- organizational etc.

External factors refer to:

- market, and
- economic system.

The state of the economic system as the environment and external factors of development, the chemical industry, as an extensive branch of the economy and a catalyst to develop other sectors of economic activity, must obtain the support and opportunity for accelerated pace of development, primarily with the following measures:

- improving the conditions for economy of the chemical industry by reducing taxes on income and contributions from income, reduction or exemption of customs duties and customs duties on importation of necessary equipment,
- targeting foreign loans or credits,
- targeting foreign investments in the production sector,
- securing favorable conditions of production of domestic lending of equipment for development of chemical industry.

As the chemical industry is very infrastructure-oriented branch, the system of economic policy measures can influence the development of the industrial sector and of the economy as a whole.

9.5.5 Concept of Long-Term Development of Pharmaceutical Industry

The concept of industrial production in the field of pharmaceutical products will be based on the development of new pharmaceutical products, and improvement of existing formulations, which are based on medium-term strategic plan for introducing new products to manufacturing companies. The current rate of development of new products (three-year period) ranges from 11-15 per year, and that level of annual launch is intended to continue in the next five years. Currently, the company “Bosnalijek” Sarajevo works on developing of an entirely new application of eye drops, whose launch is expected in the second half of 2009. Export plans of Bosnalijek are very ambitious, although the company is already present in 20 countries worldwide. We are working on registering its products abroad, and towards the goal that the revenue from foreign markets over the next five years is higher than the one for BiH markets.

The surveyed companies in the field of manufacture of medicines and pharmaceutical raw materials in FBiH predict further development of new products in the area of drug formulation (processing) and production of pharmaceutical raw materials as follows:

- Formulation (preparation) of finished drugs will provide the new forms as pelega, paranteral solutions, soft gelatin capsule, a composition based on herbs, veterinary medicines;
- In the production of pharmaceutical raw materials, based on organic chemical synthesis to develop a large number of chemical intermediates, or as a medicinal substance in the composition of certain types of medications, such as:

Vitamin B₁,
Thiazole,
Brome diethyl carbonate,
Avacan substance, etc.
Cytostatics,
Local anesthetics,
Cardiovascular medicine,
Psycho pharmaceuticals.

As for the production of pharmaceutical intermediates and raw materials based on inorganic materials following products will be developed:

- paranteral solutions, pharmaceuticals and p.a. sodium chloride,
- amalgams for dentistry,
- plaster for dentistry,
- barisulfat for X-ray,
- silver salt,
- development of biotechnological processes to ensure the production of a part non-penicillin antibiotics.

Such a development program in the field of pharmaceuticals is based primarily on the fact that the current production of finished drugs is taking place with considerable difficulties, because it must be supplied from imports, the main pharmaceutical raw materials and active components, with great dependence on foreign licensing.

Therefore, the recommendation is directed towards construction of an appropriate flexible experimental pilot plant for the development of biotechnology and basic organic synthesis of medicines, with a maximum concentration of personnel and funds for research and development work and implementation of relevant development cooperation with the chemical industry and agriculture, and other manufacturers of medicines in the EU countries.

Specific opportunities lie in winning production of essential oils of plant origin necessary for the domestic production of fragrances and cosmetics, with significant export opportunities and employment of labor, with relatively modest investments.

Companies and competitiveness

At the pharmaceutical market of Bosnia and Herzegovina there is a naturally strong competition. In addition to domestic producers of medicines, all major world companies are represented. So far there are registered over 32 representation offices of pharmaceutical companies with over 500 approved products. In Republika Srpska the number of pharmaceutical representations is over 60 - with more than 1,000 approved products. Only "Bosnalijek" has 92 approved products on the market.

Market assessment

Currently there is no accurate data on the size of the total pharmaceutical market in Bosnia and Herzegovina. A rough estimate based on the industry from 1997 included in total official drug market (including the private market) medical aids (including humanitarian organizations and the black market) and reached 147 million U.S. \$. Pharmaceutical costs had a share of 60%. In the Federation of Bosnia and Herzegovina in 1998 costs per capita amounted to U.S. \$ 35, while comparable data is not available in Republika Srpska.

As a comparison, the data of the two neighboring countries: Croatia 80-85 U.S. \$ (World Bank Estimates, 1998), Romania 18 U.S. \$ (Australian Health Insurance Commission, 1998). Current Pharmaceutical costs are for certain (excluding humanitarian aid) significantly smaller. Market volume of drugs that are in free circulation and for which there is no obligation prescription - despite the great importance - are not documented.

Quality assurance of pharmaceutical products

The concept of quality assurance includes safety, efficacy and good quality of medicine. Medications in the Federation of Bosnia and Herzegovina were involved in the overall control system, from the starting substance, to the control of the manufacturing process and finally to the supervision of the final product.

Quality assurance system includes verification of standards for approval of medication, the work of the national laboratory for quality control, allocation of licenses for manufacturers, wholesalers and pharmacies, pharmaceutical inspection and withdrawal of defective drugs. All activities are based on internationally accepted standards.

Approval process

Currently there are two different approval processes in Bosnia and Herzegovina. For the Federation of Bosnia and Herzegovina in implementing the process of approval by the

Institute for Quality Control of Drugs. Capacity of the Institute is not used fully. In Republika Srpska there is no such institute. Only a "shortened procedure" is used which requires a minimum of documents for approval of medication in Republika Srpska. One new initiative is the establishment and equipping of laboratories for analysis of immune-biological drugs in Banja Luka. One such laboratory exists in Sarajevo. This Institute would be able to give consent to medication for the entire Bosnia and Herzegovina under the supervision of the Agency for Drugs of Bosnia and Herzegovina. This would be desirable given the better distribution of work load of the Institute for Quality Control of the Federation of Bosnia and Herzegovina and it would also be technically feasible.

Parallel to the legal market there is a black market in both entities. Part of the drugs came from Yugoslavia to Republika Srpska. This unregulated market across the border avoids the control of the market and has huge implications for the pharmaceutical sector in both entities. Due to the high demand a part of drugs is introduced through wholesale, which exacerbates the situation.

Drug Laws in both entities are mainly in compliance with the EU-PHARE program and is adapted to the EU guidelines. The application of these laws in the pharmaceutical sector is expected to better the situation.

Homeopathic substances and herbal preparations

Homeopathy in Bosnia and Herzegovina is little known and, according to the existing laws, it is not recognized as a method of treatment. The new Law on Drugs better regulates the area of the use of homeopathic and herbal preparations. Specific conditions of production as well as conditions of registration are regulated by the Ministry of Health.

The biggest problems that companies face are of administrative nature, particularly in domain of the registration in the Federation of BiH. On the basis of adverse legal regulation it is better to import than to produce independently. This is regrettable because most of the raw materials for production can be found on the local market with good quality. There is also enough educated staff with relevant knowledge and technological investments are relatively small. Employment possibilities for local population arise from domestic production. There are also realistic chances for the placement of homeopathic products in the domestic market for these products and for export. Appropriate use of natural resources for production of medical and homeopathic preparations is not possible without better cooperation with the government and the Ministry of Health. This refers to the area of registration of products and opening of new pharmacies, which will sell homeopathic and herbal medicines.

One of the unused potentials of Bosnia and Herzegovina is also the collection of wild medicinal plants, which is not sufficiently organized. In Bosnia and Herzegovina there are exceptional conditions for the plantation of medicinal herbs, with market and export

opportunities in BiH. The following herbs can be planted: *Salvia officinalis*, *Menta piperita*, *Juniperus communis*, *Inula helenium*, *Taraxacum officinalis*, *Melissa officinalis*, *Capsela bursa pastoris*, *Achillea millefolium*, *Hypericum perforatum*. To fulfill export ambitions and to take over the local market it is inevitably important to be aware of the quality, not only by the plating process, but also during processing of medicinal plants.

There is enough qualified staff for the entire production process, it only needs good organization and legal framework conditions for improving production and exports.

State measures and responsibilities

Pharmaceutical Industry in Bosnia and Herzegovina is under the responsibility of the Ministry of Energy, Mining and Industry of the Federation of Bosnia and Herzegovina, and under the responsibility of the Ministry of Industry and Technology of Republika Srpska. Pharmaceutical industry is closely linked with the health system, and the competent departments for drug policy, production, import, export, wholesale and sale were added to the Ministry of Health of the Federation of BiH and of Republika Srpska.

The Committee for Medicinal Products was founded end of 1996 as the supervisory authority of the Ministry of Health to define and monitor the implementation of drug policy reform and the pharmaceutical sector.

Strategic plan for reform of the pharmaceutical sector is determined by this Committee and approved by the Ministry of Health and the Ministry for Social Policy. One year later a draft plan for implementation was completed in cooperation with WHO within the framework of the EU-Phare program.

The main points of this plan for the implementation of the development of the pharmaceutical sector are as follows:

1. Law and regulation,
2. Quality assurance,
3. Supply and distribution of drugs,
4. Price of medicine, financing and compensation,
5. Rational use of medicine,
6. Education and training.

With the new organizational structure of the Ministry of Health a department of pharmacy was established in early 2000. The Deputy Minister is also the head of this new department. The responsibilities of the departments presents the general policy of drugs, medication regulation, approval, licensing, and quality assurance.

Development perspective

The State of Bosnia and Herzegovina with 3.6 million inhabitants is a market with insufficient potential for a dominant number of national producers and traders. There are providers that have a market opportunity, but the growth potential is limited. All economic activity should be considered in terms of internationalization:

Producers

- Local producers such as firms Bosnalijek, Saniteks and others need international markets for their products

Traders

- State and private pharmacies can survive on local and regional market only if they accept the additional products in the assortment.
- Sole production of drugs is controlled by the extent of growth of the major international producers.
 - For plant products as well as e.g. local herbs for tea, grease, etc., there are great opportunities for micro and small enterprises in local and regional markets, as bidders with international cooperation partners in the international market.

All local / regional producers in the pharmaceutical industry need foreign support in the form of foreign investment funds, shares, or Joint-Ventures. This particularly applies to the transfer of pharmaceutical-technical and commercial know-how.

9.5.6 Necessary Documents for the Modern Development of the Sector of Chemical and Pharmaceutical Industry in FBiH

In order to lay the foundation for the development of modern industrial production in this sector, taking into account existing resources, the trends of globalization and the demands of new production philosophy and the knowledge society, we suggest the creation and adoption of the following documents:

1. The consumption of chemical and pharmaceutical products in FBiH and the state of foreign trade in this sector.
2. The drafting and adoption of long-term strategy for development sectors of the chemical and pharmaceutical industry in FBiH.
3. Functional organization and connectivity of chemical and pharmaceutical industry in FBiH.

4. Economic policy and its impact on the development of the sector of chemical and pharmaceutical industry in FBiH.
5. Place and role of educational systems, scientific and research work and experts in current and future development of the sector of chemical and pharmaceutical industry in FBiH

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