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FOREIGN INVESTMENT PROMOTION AGENCY

# **Bosnia and Herzegovina Agriculture and Food Processing Industry**

BOSNIA AND HERZEGOVINA INVESTMENT OPPORTUNITIES



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FOREIGN INVESTMENT PROMOTION AGENCY



BOSNIA AND HERZEGOVINA

# GREAT POTENTIAL FOR HEALTHY FOOD



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## Agriculture and food processing industry

### 1 INTRODUCTION

Bosnia and Herzegovina (B&H) is situated on the Balkan Peninsula, between 42° 26' and 45° 15' N and 15° 45' and 19° 41' E, bordered by Croatia (932 km) to the north, west and south, Serbia (302 km) to the east and Montenegro (225 km) to the south (Figure 1). Bosnia and Herzegovina is almost landlocked, except for 26 kilometres of Adriatic coastline centred on the town of Neum. Bosnia occupies the northern areas which form roughly four fifths of the country, while Herzegovina occupies one fifth in the south.



Figure 1. Map of Bosnia and Herzegovina

Bosnia and Herzegovina is richly endowed with natural resources and conditions which create a superb environment for agricultural production, including availability of labor, land, and other natural resources, as well as a suitable climate.

The enormous agricultural potentials are only partly realized, in spite of huge human and natural resources. Strong development and permanent production growth, which characterized B & H agricultural sector, is considerably below its real potentials and expected performances. Almost all food products are imported, and especially all wheat, meat products, milk products and fruit juices. However, the trade deficit in agricultural and food production has grown.

One of the core limitations for faster development of this sector is the lack of financial resources, which are desperately required for overall modernization of all segments of agricultural production, replacement of both outdated technologies and equipment; upgrading of the existing structure of agriculture sector, etc.

The lower agricultural tariffs than all neighbouring countries re-emphasize the need of B&H to increase the competitiveness of country's agriculture.

Before mentioned limitation for faster development of B & H agricultural sector could be a great opportunity for potential investors which could activate and benefit these huge frozen potentials, with reasonable investments, based on the following main advantages:





- Agriculture is defined as strategic destination of Bosnia and Herzegovina
- Abundance of agricultural arable land the 50 % of which is uncultivated
- Unutilized natural grasslands
- Favorable climat conditions for majority of agricultural products
- Good availability of skilled low cost labor
- Developed education system, R & D institutions, agronomical and veterinarian support
- B & H is a considerable net importer of agricultural and food product
- Privatization of state owned companies
- Possibility of ecological production in most agricultural products
- Competitive price of fruit and vegetables
- Development of traditional products and productions (autochthonous products)
- Diversification of cultures (especially in Herzegovina Region with Mediterranean cultures)
- Existence of natural conditions for implementing integrated projects (agriculture-tourism)
- Existence of natural conditions for raising additional income (self-grown forest herbage, medicinal herbs).

## 2 NATURAL CONDITIONS & PRODUCTION FACTORS

All natural conditions & production factors, except capital, are very suitable for sustainable development of agriculture and food processing industry in B & H.

### 2.1. Land resources

The total area of B&H is 51 000 km<sup>2</sup>, of which 50.3% is agricultural land (25 720 km<sup>2</sup>) and 48.3% under forest. Total arable land amounts to 15 850 km<sup>2</sup> or 62%; in the Federation 7 650 km<sup>2</sup> and in the Republika of Srpska 8 200 km<sup>2</sup>. Plough-land amounts to 10 180 km<sup>2</sup> or 19.9% of the total land. There are about 0.59 hectares of agricultural land per capita, of which 0.36 hectares are fields and gardens. Land quality classes are given in Table 1. The best quality land (classes I to III ) covers 14.0%, class IV land covers 17.9%, class V 16.7%, class VI 31.83% and classes VII and VIII 19.4% (data according to a classification made by the Institute of Agropedology Sarajevo see Ž'Dugoročni Program Razvoja, 1986-2000").

Forty-five percent of agricultural land is hilly (300 -700 m), of medium quality and well suited to semi-intensive livestock production. Mountain areas (> 700 m) account for a further 35 % of agricultural land but high altitude, steep slopes and lower soil fertility limit the use of this land to grazing in spring and summer.

Less than 20 percent of agricultural land (half of all arable) is suitable for intensive agriculture, mostly in lowland river valleys. The land base for agriculture is thus very limited in both quantity and quality. Natural water resources are more abundant, with many unpolluted rivers and readily accessible groundwater. Despite the abundance of water only about 10 000 ha (0.1 percent of arable land) was irrigated before the war, an area which could be increased significantly.

LAND CLASS	Hectares	%
I - III	717,600	14.04
IV	917,500	17.94
V	856,000	16.74
VI	1,627,400	31.83
VII - VIII	994,400	19.45
Total	5,112,900	100.00

Table 1. Land quality classes in Bosnia and Herzegovina

Although the territory is mainly mountainous, little has been done to improve water and soil conditions in upland areas. Excessive deforestation, inappropriate conversion of grassland to arable and uncontrolled cultivation of sloping terrain are degrading the land even in the valleys and lowland regions. The large sums invested in the protection of flat areas (river course direction, embankments, outfall drains, pumping stations) remain ineffective if soil and water conservation measures, both of an agricultural engineering and technical nature, are not undertaken in the hilly-mountainous uplands. Such measures would contribute to revitalising the mountainous area and would provide better protection for the lowlands.

## 2.2. Land use

There was a large land use change during the war years 1992-1995 which is primarily reflected in the area of abandoned land and deforestation. Although before the war there was unused agricultural land because of migration of people from rural areas to towns and abroad, its amount greatly increased during the war. Significant deforestation occurred mainly during and after the war. Large areas of forest were cut and wood used as firewood as well as a source of funding for the war.

At present, it is estimated that 3 000 hectares of agricultural land are permanently lost to other land uses annually; often the most fertile and accessible cropland, but there is no reliable record of these land use changes although the reliable and timely information on land cover and land use change is essential for sustainable land management. Given the limited availability of agricultural land, its effective is essential for sector development. Agricultural production decreased enormously during the war. A large proportion of the means of production were destroyed, and more than 237 000 hectares were mined. Now the greater part of the agricultural land (Figure 2) is under meadow and pasture (56%), then comes ploughed fields (40%) and orchard and vineyards (4%).

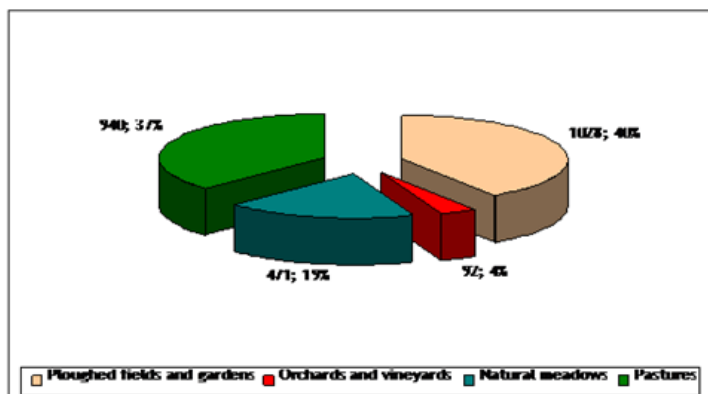


Figure 2. The Structure of Agricultural Land in Bosnia and Herzegovina (in 000 ha, 2005)





However, agriculture is still one of the most important economic sectors in Bosnia and Herzegovina, providing food security for a significant part of the rural population. According to the Central Bank of B&H, agriculture accounted for 10.1% of GDP in 2007. But most farms are small scale family subsistence units delivering any surpluses to neighbors or local markets as shown by the data in Table 2. More than 66% of farms have less than three hectares. The average size of a household farm is about 3.0 hectares divided into 8 to 10 plots. Moreover, for better understanding of the land relationships, it is useful to have an insight into the ratio of different categories of land use per inhabitant in relation to altitude in the layout of the landscape of Bosnia and Herzegovina (Table 3).

Farm size in ha	Number of farms	Percentage of total area
Up to 1	180,673	33.93
1 - 3	178,138	33.45
3 - 5	86,272	16.20
5 - 8	56,115	10.54
8 -10	16,661	3.13
More than 10	14,669	2.75
Total	532,528	100.00

Source: Statistics Bulletin (1983)

Table 2. Indicators of land access and fragmentation

Ratio of land use		Height above sea level	
Category	ha/capita*	Metres	Percentage
Ploughed fields and gardens	0.23	0 -200	14.2
Total arable	0.36	200 - 500	29.0
Total agricultural land	0.59	500 - 1,000	32.1
		1,000 - 1,500	20.8
		1,500 - 2,000	3.8
		Over 2,000	0.1

\*Precise population data are still lacking. Current estimates of total population range from 3.6 million (World Bank)

Table 3. Different categories of land use per inhabitant

The largest part of the arable land is under cereals (Table 4); maize is most important. Forage production (although there are no data in Table 4) is in second and vegetables in third place. Roughly, forage is produced on 30 % of arable area (clovers, alfalfa, grass-legume mixtures and maize for silage) and on 1 400 000 ha of permanent grasslands which are mostly in hilly and mountainous areas ŠFAOSTAT estimate for the area of permanent meadows and pastures is approximately 1 030 000 to 1 057 000 ha. in the period 2000 to 2007.

	2000	2001	2002	2003	2004	2005	2006	2007
Crop area (000 ha)								
Cereals	365	365	342	315	324	317	312	310
Oilseeds	5	4	4	5	4	6	8	7
Pulses	14	15	14	14	14	14	14	14
Roots and tubers	44	45	43	43	43	41	41	41
Vegetables	125	126	127	138	139	139	139	136
Production(000 t)								
Cereals	930	1,138	1,307	793	1,439	1,350	1,341	1,000
Oilseeds	1	2	2	1	2	3	3	3
Pulses	12	18	22	18	25	25	27	21
Roots and tubers	286	397	404	302	447	458	410	387
Vegetables	673	730	734	715	783	765	803	759

Source: FAOSTAT 2009

Table 4. Area, production and yield trends in crop production B&amp;H (2000-2007)

### 3 TOPOGRAPHY AND SOILS

#### 3.1. Topography

The country is largely made up of mountainous highlands in the south and the west, hilly lands in the centre and the north, and flat to undulating plains in the northeast, where most of the fertile agricultural lands are situated. Physiographically B&H can be divided as follows:

- Plains or lowland areas (up to 300 m ), 11.3%;
- Hilly area (300-500 m ), and Hilly-Mountainous area (500-700 m ), 26.3%;
- Mountainous area (above 700 m ), Mediterranean-Mountainous area (700-500 m above sea level), 57.2%;
- Mediterranean area (below 500 m above sea level), 5.2%.



Figure 4. Main Zones of Bosnia and Herzegovina



### 3.2. Soils

There were two periods in development of the soil map, which differ from each other in inventory criteria, classification and methods. In the first period from 1963 to 1973, the national classification was based on genetic principles. In the second period 1973 to 1985, a new classification was adopted, which was influenced by international classifications, and this is readily apparent on soil maps made after 1973. In the second stage of mapping, application of modern methods were used such as telemetric research using aerial photography at various scales. At first, black and white photography was used, following by color photography.

A very important task for soil scientists is to adapt the national classification to the FAO one, and to carry out adjustments to the database of the BSM of B&H. Bosnia and Herzegovina is very rich in soil types (see Figure 5) whose characteristics derive from its range of geology, morphology, climate conditions and other factors.

The lowland zone, in the northern part of B&H, is the most valuable land. There, the degree of development of primary food production is much higher than in the hilly-mountainous areas. The most common soils are: Stagnic Podzoluvisols, Fluvisols, Umbric Gleysols and Eutric Gleysols.

The hilly zone is more heterogeneous than the lowland zone in terms of soil. A considerable part has slopes above 13% and the processes of erosion are very marked and are exacerbated by inappropriate ways of farming, lack of water and soil conservation measures and preference for row-crops (maize and potato) on such terrains. The commonest soil types are: Chromic Luvisols, Eutric Cambisols, Leptosols x Rendzic Leptosols and Vertisols. In the mountain zone erosion processes are also present, although these lands are mostly covered by forests and grasslands. Among sown crops, rye, barley, oats and potato dominate. The commonest soil types are: Dystric Cambisols and Dystric Regosols, followed by Leptosols - Rendzic Leptosols and Regosols.

The Mediterranean zone, with its warmer climatic conditions, can grow a wide variety of crops and support intensive farming, so that as well as traditional arable crops, early vegetables are grown for local markets. Fruit-growing and vine-growing are also developed here. The commonest soil types are: Lithic Leptosols, Regosols, Leptosols - Rendzic Leptosols, Chromic Cambisols, Fluvisols in the river valleys, Umbric and Eutric Gleysols in the karst fields. In swamps, Histosols are often present which are important environmentally.

In summary the main characteristics of soils in Bosnia and Herzegovina are:

- Acid soils occupy more than 1/3 of the land;
- Humus content is low;
- Content of the most important fertilizer nutrients is low;
- Soils are generally shallow;
- Excess water on about 14% of the territory;
- Inadequate concern for improvement of fertility;
- Individual land holdings are small and fragmented;
- Erosion is a problem particularly on sloping land.

## 4 CLIMATES

Bosnia and Herzegovina is equidistant from the Equator and the Pole, thus the climate is not dominated by a single type of weather. There are neither dry seasons nor harsh and long winters. It can be divided into three climatic regions with more or less sharp boundaries or moderate transition zones:

- Northern region
- Hilly mountain region
- Southern region

The climate is predominantly moderate continental, particularly characteristic for Central Bosnia and Herzegovina, while northern part of the country has predominantly continental climate.

South of the country has Sub-Mediterranean climate, characterized by long, summers and short, mild winters, with more than 200 sunny days and 1400 l/m<sup>2</sup> of precipitation per year.

### 4.1. Temperature

Northern region, has a temperate continental climate and average temperature in January from -0.2oC to 2.0oC, in July 20oC to 22oC. Hilly-mountains region, with variations of continental, high-mountainous and alpine climate, average temperatures in January from -0.3oC to -7.4 oC, in July 10.2 oC to 21.2 oC. Southern region, with characteristics of Mediterranean climate, average temperatures in January being 2.3oC, in July 22.5oC to 25.7 oC, and precipitation of about 2 000 mm. The varying climatic conditions offer wide possibilities for agricultural production, both in terms of crop choice and cultivation of land farming, fruit-growing, vine-growing, vegetable growing and forage crops and in terms of livestock production.

### 4.2. Hydrological cycle

Natural water resources are abundant and ground water is accessible in many places. About 38 719 km<sup>2</sup> (75.7%) of the B&H territory drain via the Sava River to the Black Sea, and 12 410, (24.3%) drain via the River Neretva to the Adriatic Sea. The boundary between these catchments is obscured at the local level, especially in the south west, where rivers flow through karst areas. The spatial variation of the hydrological cycle (Figure 6.) is very characteristic for B&H. For instance, the mean annual precipitation in the southern region is 2.5 times larger than in northern region, and twice that in the central region. In the south, the mostly Mediterranean type precipitation is between 1 500 and 2 000 mm of rain, potential evapo-transpiration 900 mm, actual evapo-transpiration 600 mm, potential water deficit or irrigation requirement 300 mm and potential outflow or surplus from 900 to 1 400 mm. It is interesting that the southern region has the most abundant precipitation, but also the highest water deficit, and highest water surplus in the absolute and relative sense. The mean annual precipitation in central region of B&H is about 1,000 mm, potential evapo-transpiration 650 mm, actual evapo-transpiration 600 mm, potential water deficit or irrigation water requirement 50 mm and potential outflow or surplus 400 mm. This region has a much better water-balance than the southern region. In the northern region of B&H mean annual precipitation is about 800 mm, potential evapo-transpiration 700 mm, actual evapo-transpiration 600 mm, potential water deficit or irrigation water requirement is 100 mm and potential outflow or surplus 200 mm. This region, with its continental climate characteristics, is more similar to the central than to the southern region regarding the soil water cycle.



Figure 6. Scheme of spatial distribution of average annual precipitation (O), potential evapotranspiration (PET), surplus (V) and soil water deficits (M). Agro-ecological zones (also see section 2, above)

The flat or lowlands zone is found in the northern part of B&H and represents the most valuable land resource. The degree of development of primary food production is much higher than in the hilly-mountainous areas and the most common soil types are: Stagnic Podzoluvisols, Fluvisols, Umbric Gleysols and Eutric Gleysols.

The hilly zone is more heterogeneous than the lowland zone in terms of soil. A considerable part of this zone has slopes above 13% and the processes of erosion are very marked and are exacerbated by inappropriate ways of farming, lack of water and soil conservation measures and preference being given to row crops (corn and potato) on such terrains. The most common types of soil are: Chromic Luvisols, Eutric Cambisols, Leptosols - Rendzic Leptosols and Vertisols.

In the mountain zone the erosion processes are present also, although these lands are mostly covered by forests and grasslands. The main sown crops are rye, barley, oats and potato and the most common types of soil are: Dystric Cambisols and Dystric Regosols, followed by Leptosols - Rendzic Leptosols and Regosols.

The Mediterranean zone, with its warmer climatic conditions, can grow a wide variety of crops and supports intensive farming, so that as well as traditional arable crops, early vegetables are also being cultivated for local markets. Fruit-growing and vine-growing are also developed here, so that this region is also called the region of southern crops. The most common types of soil are: Lithic Leptosols, Regosols, Leptosols - Rendzic Leptosols, Chromic Cambisols, Fluvisols in the river valleys, Umbric and Eutric Gleysols in the karst fields. In swamps Histosols are often present and these are environmentally important.

## 5 DEVELOPMENT AND INVESTMENT POTENTIAL IN SUB SECTORS

The soil quality and varying climatic conditions, accompanied with availability of the water, in Bosnia and Herzegovina offer wide potentials for agricultural production, both in terms of crop choice and cultivation systems, including:

### 5.1. Field crops

Northern parts of the country and river valleys are particularly suitable for field crops production, including cereals, industrial crops, vegetables, feed crops etc. as well as for Intensive commercial cattle rising for fattening meat production as well as dairy production.

### 5.2. Medicinal and Aromatic Plants, Honey, Mushrooms and Wild Forest Products

Bosnia and Herzegovina has long tradition in collecting medicinal and aromatic herbs. The biodiversity of medicinal and aromatic plants and mushrooms in the area of Bosnia and Herzegovina is very rich, thanks to the favourable geographic position, climate and varying geological and pedological conditions, interminable surfaces of pastures, medical flora and different kind of forest, lakes and rivers. In Bosnia and Herzegovina medicinal and aromatic plants have the potential to contribute substantially to the national and local economy.

It is believed that Bosnia and Herzegovina has over 700 species of medicinal and aromatic plants of which around 200 are exploited.

The annual harvesting in B&H varies from 1.500 to 9.000 tons (depending on demand and climatic conditions), mostly dried plants packed and sold in 25 kg sacks as raw material.

Diversity of climate and vegetation, clean environment and tradition in beekeeping are good preconditions for the production of high quality honey in B&H. The main beekeeping products are honey, beeswax, royal jelly, pollen, and bee venom.

There are several varieties of honey produced in BiH, depending on the geographic region.

Sage, Heather, Jerusalem Thorn, Dalmatian Laburnum and Tangerine honey are produced by the beekeepers from the southern part of BiH, and Chestnut Sunflower Alfa-alfa and Acacia honey are produced in the northern part of BiH.

Beekeeping accounts for 1% of the total agricultural production in B&H. Total honey production in B&H cannot cover the needs of the local market.

#### 5.2.1. The companies significant producers & potential strategic partners

ŽABC Mahić, Bosanska Krupa - [www.abc-mahic.ba](http://www.abc-mahic.ba); ŽHerceg med, Trebinje - [www.herzegmed.ba](http://www.herzegmed.ba); "Biljana", Maoča - [www.biljana.com.ba](http://www.biljana.com.ba); "Čeliković, Bihać - [www.celikovic.com](http://www.celikovic.com), ŽFaveda, Sarajevo - [www.faveda.ba](http://www.faveda.ba); ŽFrutti Funghi, Visoko - [www.frutti-funghi.com](http://www.frutti-funghi.com); ŽHalilović, Sarajevo - [www.bio-halilovic.com](http://www.bio-halilovic.com), ŽLjeko bilje, Trebinje - [www.rico.co.yu](http://www.rico.co.yu), ŽPlantago Laktaši - [www.plantagocajevi.com](http://www.plantagocajevi.com); ŽRoing Ljubuški - [www.roing.net](http://www.roing.net); ŽSmrčak, Zvornik - [www.smrcak.co.nr](http://www.smrcak.co.nr); ŽBelladonna, Laktaši - [www.belladonna.ba](http://www.belladonna.ba); ŽKap po kap, Laktaši - [www.kappokap.com](http://www.kappokap.com), ŽPharmamed, Travnik - [www.pharmamed.ba](http://www.pharmamed.ba)





### 5.3. Fruit & vine-growing

The most convenient fruit-growing regions are the hilly and hilly-mountainous regions and along the rivers (Sava, Bosna, Drina, Una, Neretva, etc.), which are abundant in sunny sites with the right type of well drained soil, as well as Mediterranean region (Southern Bosnia and Herzegovina). Currently, there are an estimated 14 million trees producing plums, pears, apples and other fruits, for export and fruit-juice production.

In addition, both the climatic and the economical conditions are very well suited for berry production in many parts of Bosnia and Herzegovina.

### 5.4. Vegetable-growing

Applying watering and correct crop choice, soil and climate conditions are suitable for all types of vegetable production in all regions of Bosnia and Herzegovina, along the rivers, in flat, hilly and hilly-mountainous regions, even in mountain grasslands, where could be produced a high quality potatoes and cabbage, as well as rye, barley, oat, etc.

### 5.5. Livestock production systems

A large part of the agricultural land in B & H is suitable for livestock, milk, dairy and meats production, with lots of grassland, and climatic conditions, which are favourable for cattle, sheep and goat intensive and extensive raising, as well as for cultivation of silage etc.

B & H is richly endowed with pastures and grazing land, particularly in the Central part of B & H with great mountain grasslands that are full of water. Exploitation rate of these potentials is extremely low, what could be turned to competitiveness in products that make considerable use of this resource.

Furthermore, B & H could be expected to have comparative advantage in products that make considerable use of grazing land, such as extensively raised veal and beef as well meat and dairy products from sheep and goats.

In addition, intensive commercial cattle raise for meat production as well as dairy production can be developed in both flat and hilly regions where there are enough ploughed fields for fodder.

The share of livestock in total agricultural production is estimated at 50% which is much lower than it was and could be, considering natural preconditions for livestock production and the level of animal production before the war.

There were 970.142 cattle in Bosnia and Herzegovina before the war; they were owned by the state in numerous state concerns and state farms. The breeding system, production and sale was established and organized by the state. After the war the number of cows was 218.406, and number in milk production 161.452.

After the first five years of the post-war livestock fund reconstruction during which the number of livestock was increasing very fast, 2001 and 2002 were characterized with a decrease in cattle numbers and modest increases of sheep, pig and chickens, and since 2003, all livestock categories are increasing except goats (Table 5).

Livestock/product	Units	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cattle	000 head	462	440	410	440	453	460	515	468	460	458	462
Goats	000 head	98	101	86	81	72	73	76	70	70	71	63
Sheep/ewes	000 head	584	608	633	733	893	903	1004	1033	1031	1055	1047
Pigs	000 head	450	483	500	540	595	653	708	535	502	529	590
Poultry	000 head	9000	9700	10400	12000	8626	9540	12300	13800	14000	18 741	21 802
Cattle meat	000 tonnes	16	14	16	18	19	24	22	24	26	25	25.5
Milk	000 tonnes	544	525	518	537	601	649	683	747	737	759.2	720
Pig meat	000 tonnes	6	4	6	7	8	9	10	9	9	9.4	12.3
Poultry meat	000 tonnes	6	6	9	12	16	12	14	20	29	32	36
Sheep/goat meat	000 tonnes	1	1	1	2	2	2	2	2	2	1.9	2.5

Table 5. Livestock numbers and production (live weight) for period 2000-2010

### 5.5.1. Cattle

The predominant cattle breeds are Simmental, estimated as 80%, then Holstein- Friesian 10% and Brown Swiss 5%. Gatačko and Buša, as domestic breeds, are few and small in proportion to the total. Dairy farming is predominantly in lowland and hilly areas with soils and climate suitable for higher yields of roughage. Beef rearing is rare, almost unknown as a specific type of farming as it is connected to dairy farming using male calves/cull cattle for fattening. Cattle are predominantly housed for all or most of the year, or now and then out of doors during the growing season (May-October).

### 5.5.2. Dairy farming

The importance of the sector lies in several facts: more than 80% of the country is suited to livestock production; there is an abundance of underused natural grassland; there is a tradition of livestock farming and livestock production is the most common agricultural activity and employs the majority of the rural population. In addition, there are lots of processing plants operating at very low capacity, which guarantees a safe distribution outlet for milk. Before the war (1992-1995), total annual production of milk in Bosnia and Herzegovina was around 875,000 tonnes.

The main characteristic of the pre-war primary dairy sector were: a dominant share of small producers (up to three heads); very low yields (1 400 litres per cow p.a.); low milk collection rate (12-15%); poor herd breed composition and no selection activities in the private sector; private producers were not included in incentive and supportive measures of the government; state owned farms had higher yields but they only produced 30% of the milk, so the majority of milk producers were left to themselves. War damage almost destroyed the sector completely. In 1991, the number of cows in -Bosnia and Herzegovina was 623,000 and average annual yield of 1 410 litres per cow. During the war the number of cows fell by 60%, and milk production by even more as the average milk yield also fell. Many farmers became refugees or were displaced so the number of farmers decreased. An estimated 80% of farm infrastructure suffered war damage and access to agricultural land suitable for livestock production was restricted due to the numerous minefields. Channels for milk distribution were disrupted and the majority of institutions specialized in supporting the dairy sector ceased activities.

The dairy sector in Bosnia and Herzegovina has been the subject of many studies and development programmes and projects as a priority agricultural sector. The Government emphasizes that the agriculture and dairy sector, are strategic and, although the level of regulation in the dairy sector in Bosnia



and Herzegovina is far behind EU member states, it is still the most regulated agricultural sector in the country. Thus, in 2005, Republika Srpska (RS) allocated 26% (4.4 million) and Federation of Bosnia and Herzegovina (FB&H) allocated 43% (3.5 million) of their total budgets for subsidies for the dairy sector.

Year	Number of cows (000)	Total milk production (mil. l)	Yield per cow p.a.
2000	297	529	1 781
2001	283	532	1 879
2002	244	535	2 192
2003	279	545	1 953
2004	291	583	1 999
2005	298	629	2 110
2006	313	662	2 118
2007	307	724	2 360

Source: Agency of Statistics of Bosnia and Herzegovina, Institute of Statistics of FB&H, Institute of Statistics of RS.

Table 6. Number of cows and milk production in Bosnia and Herzegovina 2000-2007

The trend in milk productions over the 2000-2007 in terms of cattle numbers, total milk production and yield per cow per annum is shown in Table 6 (where figures differ slightly from the FAO data in Table 5). The 2007 number of cows is only 53% of the pre war one. Milk production over 2000-2007 recorded constant growth and reached 724 million litres in 2007, which is 39% more than in 2000. It is encouraging that the increased milk production is the result of increased yield per cow which rose from 1 781 l in 2000 to 2 360 l in 2006, or 32%. Yield per cow in 2007 is 39% higher than pre period, thanks to improvement of the breed composition.

A farm register has not yet been set up in Bosnia and Herzegovina, so it is impossible to get reliable data on farm numbers and their structure. Average herd size was 2.32 head in 2007 (Table 7), which is far below for example Slovenia (6.6) and other EU countries. Small farms up to two head account for 48.5% of the total cow herd, and 95.5% of the herd is on farms up to 30 head. Even farms that are considered as medium or large for local conditions have few cows. Thus, average size of the farms that have 5-10 head is 6.72, for farms with 11-30 cows average is 16.64 head; 46.11 for those with 31-100 heads and 259 head for farms with more than 100 head. Only 3.1% of all cows are on farms with over 100 head. Such unfavourable structure with many very small farms has numerous consequences on performance at farm level. This structure also indicates low specialization in agricultural production as most dairy farms are not commercially specialised in milk production, but semi-subsistence farms in which milk is a source of certain and safe income. Milk yield per cow per year in B&H has been recording a constant but very modest increase in the last decade. Average yield of 2 360 l per cow in 2007 is 50% higher than in 1996. Yield per cow is somewhat higher in Republika Srpska than in the Federation of B&H, but, in general, is very low and far below the yields in EU countries. There are many reasons for such poor productivity; first is poor animal nutrition. Grazing is rare due to small farm plots. Hay, as a main component of the diet, is often of poor quality. In winter hay is often combined with maize silage. Part of the diet is concentrate or energy feeds like corn. During the growing season animals are fed on green forage of legumes or grass-legume mixtures (temporary grasslands). Besides, there are poor herd breed composition and the poor level of technical and technological knowl-

edge of the farmers. The number of market-oriented farmers who already achieve remarkable results is also increasing in Bosnia and Herzegovina, thanks, among others, to a number of development projects implemented by international organizations during the last decade.

Specification	No farms	% of total	Cum. %	Number	% of total	Cum. %	Average/farm
TOTAL	25,057	100.00		58,334	100.00		2,32
1-2 head	19,071	76.12	76.12	28,319	48.55	48.55	1.48
3-4 head	4,404	17.58	93.70	15,013	25.74	74.29	3.4
5-10 head	1,367	5.45	99.15	9,197	15.77	90.06	6.72
11-30 head	190	0.75	99.99	3,162	5.42	95.48	16.64
31-100 head	18	0.07	99.97	830	1.42	96.9	46.11
> 100 head	7	0.03	100.00	1,813	3.10	100.00	259

Source: Federal Ministry of Agriculture, Water Management and Forestry  
Table 7. Size structure of the livestock farms in the Federation of B&H in 2007

As far as delivery of milk to the dairies is concerned, significant progress has been recorded during 2000-2006. In 2000-2005, collection increased annually by 22%, and then slowed down in 2006, due to closing down of some dairies. In delivery of milk to the dairies FB&H contributed with 51%, RS with 47% and Brcko District with 2%. In 2006 180 million litres of milk were delivered to the dairies, which was 7% more than in the previous year and amounted to 27% of total milk production. Although this means that significant quantities of milk are still not sold to dairies but consumed or processed domestically or sold locally, milk collection is 71% higher in 2006 than pre-war. 31,414 farmers are included in milk collection and the average delivery per farmer in 2006 was 5,660 l (6,416 in FB&H and 5,020 in RS).

Consumption data are not recorded so it is difficult to provide data about dairy consumption, but taking into account production and import less export the consumption of all milk products is increasing gradually each year. In 2007 the consumption per capita of fluid milk was 43.5 kg, yoghurt 7.71 kg, cheese 3.14 kg, while butter consumption stagnated at 0.55 kg.; these levels are very low comparing to most EU countries.

Increase of production and consumption of milk and milk products follows the country's economic and social recovery. Milk production rose gradually on average at an annual rate around 6.5% during 2002-2007 but this is below the country's needs.

The official statistical office is still in the process of development so it is hard to obtain reliable data about sector economic performance. Total dairy industry sales and exports have been gradually increasing during 2004-2006. The increase rate of dairy sales was 34% in 2006 compared to 2004. The sector is not an important contributor to the GDP, but its contribution increased from 0.698% of GDP in 2004 to 0.777% in 2006. Sector output share in total industry output is changing slowly from 7.4% in 2004 to 7.9% in 2006. It means the sector is small but its performances are improving each year. More than 20% of dairy production is exported. The share of dairy products value in exports of agriculture and food products is gradually increasing over time and in 2007 it reached 23% of total agribusiness export.



### 5.5.3. Beef production

Beef production in Bosnia and Herzegovina is hardly organized as a specific type of farming, but there are a few fattening farms which buy young cattle from dairy farms. Animals are kept housed and fed green forage, hay or silage with addition of some grain or concentrate. Many small dairy farms keep male calves from 3 to 6 months and then sell them to slaughterhouses. According to data from the Chamber of Foreign Trade, the meat sector is among the least as regards foreign exchange. In 2000, total meat imports amounted to 89.9 million, while the value of exports was only 8.24 millions. In 2006, the situation was even worse at, 127.12 million and 8.33 million respectively. Even with the current low average meat consumption per capita, estimated at 34.8 kg, Bosnia and Herzegovina is self-sufficient only in sheep and goat meat. The percentage self sufficiency is, according to expert estimations, much lower than officially reported due to illegal imports. According to official data, self-sufficiency in beef was 70% in 2006, while in the Mid-term Strategy of the Agricultural Sector in the Federation of Bosnia Herzegovina (FBH), the experts estimated self-sufficiency it at only 27%. Self-sufficiency is lower in FBH than in Republika Srpska, but official data do not include trade in illegal imports on the black market so they give the false picture that self-sufficiency is higher than it really is. But, although much lower than in the past, beef is still the single most common meat consumed contributing 35.5% in 2000 and 32.88% in 2006. Records indicate a slow but constant increase in the share provided by sheep and goat meat, rising from 9.3% in 2000 to 12.63% in 2006. Opportunities for further sector development should be sought in very low self sufficiency. Gaining the trust of consumers in the quality of domestically produced meat should also be considered. Meat producers are not competitive on the market due to the lack of support, lack of efficient control of the border and the consequent large amounts of cheap black market meat, unstable and high prices of inputs, but also their weaknesses at farm level. These weaknesses are easily seen in poor production practices, low levels of technical knowledge, insufficient care of animal feeding and welfare and many other issues. These weaknesses result in low yields, high production costs, inefficiency and low competitiveness. Therefore, the main challenge will be to increase the efficiency of meat producers; underused capacity of many slaughterhouses and meat processing plants can accommodate all current and foreseen quantities of domestically produced meat.

### 5.5.4. Sheep and goats

Sheep rearing is a long term tradition in Bosnia and Herzegovina. There were round 2 000 000 sheep and 1 000 000 goats before the First World War; thereafter their number decreased especially during the recent war (1992-1995). Since 1996 sheep numbers are increasing but goats are in slow decline (Table 8). Sheep are widely distributed, being most evident in hill and especially mountain areas where they are often the only, or the main, farm enterprises.

Specification	1996	2000	2005	2006	2007	2008
Sheep (head)	46 3000	58 400	902 731	1 004 696	1 033 264	1 030 510
Slaughtered (head)	64 000	93 000	102 941	107 880	103 242	94 679
Sheep milk (t)	11 600	16 000	18 800	20 600	21 126	18 774
Goat (head)	136 800	97 700	73 474	76 489	70 255	70 392

Source FAOSTAT 2009

Table 8. Number of live and slaughtered sheep; sheep milk production and number of goats in recent years

Sheep farming is historically nomadic; it is still common practice that sheep are moved from mountain to hilly or plain areas for grazing in winter. Otherwise sheep are predominantly grazed out of doors. In future that nomadic system may be forbidden due to changes of arable land utilization, but also because of some sheep diseases. Sheep usually graze on low productive pastures getting also some salt. The number of sheep per flock varies from 50 to 200, rarely more.



Photo 1. Grazing Dubska pramenka on Vlastic mountain

The dominant sheep breed is Pramenka, a primitive breed adapted to harsh environments and feeding. Body weight of ewes is 25-55 and rams 35-80 kg, with meat ratio after slaughtering 40-50%. This breed is triple-purpose: meat, milk and wool. Depending on where they are developed they are known as follows: Dubska, Privorska, Kupreška, Stolačka and Podveleška. The most important and widespread is the Dubska breed, well known also Vlašička, in central Bosnia on the Vlašić mountain (Photo 1).



Dubska Pramenka type



Kupreška Pramenka type



Privorska Pramenka type



Stolačka Pramenka type

Photo 2. Pramenka sheep types





In the 1990s there were programs of improving the Pramenka (see Photo 2) breed by crossing with Wurttemberg, but this lapsed during the war. Pramenka produce 70 to 100 litres of milk and 1.5 to 2 kg wool. Milk is used in the family or for making cheese. Famous cheeses include Vlastic cheese, Livno cheese (Photo 3), cheese from sack a fermented cheese (see Photo 3) made in a sheep skin or sack from sheep milk or mixed sheep and cow milk in Herzegovina, and special sheep cheeses. Nowadays efforts are being made to have these cheeses connected to their geographical origin for sale on the European market.

#### 5.5.5. The pasture resource

Livestock production is emphasised in all strategies, both in Republic Srpska and Federation of Bosnia and Herzegovina and forage production is given high importance. But just as the livestock sector has numerous difficulties so does forage production. The main characteristic of pre-war ruminant production was a dominant share of small producers, up to three head; very low milk yields (1 400 litre per cow p.a.), poor breed composition and they were not included in the supportive measures of the government. They did not pay much attention to forage production and quality. State owned farms had better breeds and higher yields, but represented only 30% of milk production; they had better organized forage production, with higher yields of forage, usually of better quality.

	1988	2006	2007	2008
Forage crops	184	142	142	144
Meadows <sup>1</sup>	-	452	494	501
Pastures <sup>2</sup>	-	777	786	606

Table 9. Forage crops, meadows and pastures (000 ha) in Bosnia and Herzegovina

1. Meadows occupy more productive areas of natural grassland and they are usually mown for hay.
2. Pastures are less productive grassland, used as pastureland.

Data about forage crops on arable (Table 9) land indicate that, thirteen years later, there is less sown forage than before the war. However, it seems that forage yield per hectare is increasing. Perennial forage crops occupy the majority of arable land under this type of production. In recent years more attention is given to maize for silage, especially in lowland. Among perennials, by area clovers are more important than alfalfa although the latter is more productive. Soils in Bosnia and Herzegovina are more suitable for red clover or other perennial legumes. In the statistics for B&H clovers include bird's foot trefoil and sainfoin.

		Clover		Alfalfa		Grass-legume mixtures	
Year	Total	ha	yield/ha	ha	yield/ha	ha	yield/ha
1988	164.68	82.70	2.8	43.73	3.4	38.25	2.6
2005	113.95	51.19	4.4	36.72	5.1	26.04	3.5
2006	118.92	51.75	4.3	38.14	4.7	29.04	3.5

Table 10. Perennial forage production



Photo 4. Grass-Legume mixtures



Photo 5. Grazing dairy cows on temporary grassland (grass-legume mixture)

#### 5.5.6. Grassland

Natural and semi-natural grasslands occupy more than half the agricultural land in Bosnia and Herzegovina. Statistics distinguish between meadows and pastures. Meadows are more productive and usually used for hay production; they are included in the cultivable area and comprise one third of all grassland (Table 9). Most meadows are in the lowland, lower hilly area, but can be found also on flat areas in mountains regions. Average yields range from 1.2 to 1.6 t ha<sup>-1</sup>. Such low yield indicates poor management, especially poor fertilization. Fertilized meadows can give up to 11 t ha<sup>-1</sup> dry matter if mown at flowering, or up to 6 t ha<sup>-1</sup> dry matter and 950 kg protein if mown earlier.

Pastures are low productive areas situated on shallow or rocky soils and if used, they are permanent grazed. Estimated yields ranged from 0.5 to 0.7 t ha<sup>-1</sup> hay.

Bosnia and Herzegovina is characterized by very different soil and climate conditions and that is why there are many different types of grassland (Photo 6). Usually they are rich in species but botanical composition varies from acid to calcareous, from wet to dry soils, deep to shallow. There has been much research on grassland associations and their botanical composition, especially after the Second World War, but the inventory is not yet complete.



Mown meadow (Kupres)



Brometum, late mown



Grazed meadow (Glamoc)



Dry pasture (Sujica)

Photo 6. Various pasture types in Bosnia and Herzegovina

#### 5.5.7. Opportunities for improvement of pasture resources

Livestock production is stressed in all national strategies, with forage production of high importance in developing the sector; opportunities for improvement of pasture resources are considerable.

True meadows are still managed to produce hay which is cut in late June to July, sometimes later when plants are in the flowering stage or often at seed set. Pastures are used for continuous sheep grazing.

In recent years farms are improving, milk and meat production are rising and the number of market oriented farmers is increasing. There is reason to improve forage production and quality, both on arable land and grasslands.

Improvement of forage production on arable land may include:

- Introducing suitable cultivars of forage legumes (alfalfa, red clover, bird's foot trefoil), and paying more attention to farming technology in order to produce more forage per unit area.
- For better temporary grasslands, better choice of grass and legume species to suit soil conditions, persistence and maturity.
- Improving forage quality, using the crops in bud stage or early flowering.
- Stimulate seed production, because the local seeds guarantee safer production than imported seed of unsure origin.
- More attention has to be paid to grazing, which is cheaper and healthier for animals.
- Improving forage conservation, making more silage of better quality.
- If needed there is more than enough arable land which could be used for forage production.
- Education of farmers concerning forage management in order to get high yields of good forage quality, but also about animal needs.

Improvement of forage production on grasslands should include:

- Bosnian grassland soils are poor and fertilization is needed as a first measure for improving forage yields per unit area.
- Utilization of grasslands by permanent grazing or late mowing has to be changed. Introduction of rotational grazing and mowing in earlier stage of growth will lead to better botanical composition, better forage quality and better yields too.
- Forage from grassland, if conserved, is poor quality hay; this is often left outside. That has to change also by making silage.

The big problem is lack of a joint state-level ministry of agriculture. Then there is an open market which makes domestic production uncompetitive. Insufficient budget for support measures is one of the traits for further development of the ruminant sector.

## 5.6.Fish farming

Abundance of the clear, unpolluted rivers and streams that cross the country presents huge potential for both family owned and industrial size fish farming production. Fish farming is already developed, especially trout and carp rising.

### 5.6.1.History and general overview

Bosnia and Herzegovina has more than a century-long tradition of aquaculture of salmonid and cyprinid species. The current situation with respect to aquaculture production has been significantly influenced by the previous war, when a large number of fish farms were destroyed or badly damaged. Thanks to the efforts of the producers and the government, there have been significant improvements in the aquaculture production sector, specifically in relation to the number of food fish species in production, technology, management and marketing.

The introduction of modern fish culture in Bosnia and Herzegovina is associated with the establishment of the fish farm 'Žvrello Bosne' near Ilidza in 1894. In 1898 a new, large hatchery was built. With a capacity of 600 000 pieces of fry, it was the largest and the most modern hatchery in the region. It played a major role in the development of salmonid fish culture and stocking.

The development of cyprinid fish culture in Bosnia and Herzegovina began in 1902 when a Polish citizen, Viktor Burda, purchased barren land near Prijedor and Bosanska Gradiska from the Government and constructed a fish farm.

In the period 1946-1982, a novel, more intensive model of culture of fish and other aquatic organisms developed rapidly under the international name of aquaculture. A system of floating cages in lakes and reservoirs with dense populations and significantly higher production was developed. Fish was fed on highly nutritious pellets. In the same period herbivorous fish species (grass carp, silver carp and bighead carp) were introduced and produced. At the same time, the production of salmonid species achieved full expansion. In 1964, Bosnia and Herzegovina had 13 salmonid fish farms with a total surface area of 38 000m<sup>2</sup>.

The Institute for Fishery was established in 1952. It subsequently merged with the Sarajevo University Institute of Biology which has developed extensive scientific activities and is responsible for the development of ichthyology and fishery, in particular salmonid and cyprinid fish production in Bosnia and Herzegovina.



In 1959 the Center for Fishery was established under the umbrella of the School for Scientific and Technological Cooperation of the Veterinary Medicine Institute. It played a major role in the field of diagnostics, prevention and management of parasites and infectious diseases in controlled salmonid and cyprinid culture.

In 1990, Bosnia and Herzegovina produced approximately 3 000 tonnes of fish for consumption. During the war, most of the production capacity was devastated and a number of workers and experts abandoned aquaculture. After the war, in 1996, aquaculture started with a major deficit. A great deal of hard work and dedication by the producers as well as the re-establishment of communications resulted in the 'normalization' of aquaculture production. The privatization process also exerted a major influence and in the majority of cases turned out to be rather successful.

In the period 1999-2003 the overall conditions for production and processing of fish were improved. These included the availability of high quality feed, new technology, expansion of capacity and the establishment of producers' associations. Good communication among fish producers in Bosnia and Herzegovina was established and several business arrangements were set up with foreign investors.

In 2004, 6 344 tonnes of food fish were produced in Bosnia and Herzegovina. This comprised 3 430 tonnes of salmonids, 2 807 tonnes of cyprinids, 92 tonnes of marine fish and 15 tonnes of molluscs.

#### 5.6.2. Fish species

The most important fish species in the aquaculture sector in Bosnia and Herzegovina are:

- Salmonid species: rainbow trout , brown trout , and brook trout
- Cyprinid species: common carp , grass carp , silver carp and wels catfish
- Marine species: European seabass gilthead seabream and common dentex
- Molluscs: Mediterranean mussel and European flat oyster

One of the main problems in the aquatic environment and aquaculture are alien species intentionally and/or unintentionally introduced in the waters of Bosnia and Herzegovina, since they are strong competitors with native species. There are currently 11 introduced species, as follows: *Oncorhynchus mykiss*, *Salvelinus fontinalis*, *Salvelinus alpinus*, *Carassius gibelio*, *Pseudorasbora parva*, *Ctenopharyngodon idellus*, *Hypophthalmichthys molitrix*, *Hypophthalmichthys nobilis*, *Gambusia affinis*, *Lepomis gibbosus* and *Ameiurus nebulosus*.

Endemic species are today endangered due to the lack of legislative measures and funds for their protection. The most endangered species are: *Salmo obtusirostris* and *Salmo marmoratus*. There is very little information on the current level of threat for the following species: *Aulopyge huegeli*, *Chondrostoma phoxinus*, *Chondrostoma kneri*, *Phoxinellus adspersus*, *Phoxinellus alepidotus*, *Phoxinellus pstrossii*, *Phoxinellus metohiensis*, *Phoxinellus ghetaldii*, *Leuciscus turskyi* and *Leuciscus vvalize*.

Significant attention is currently being paid to *Salmo obtusirostris*, *Salmo marmoratus* and *Salmo trutta fario* from the river Neretva (particularly involving DNA analysis and the construction of a hatchery for more detailed research at Boracko lake in Herzegovina), as well as to *Hucho hucho*, *Thymallus thymallus*, and *Salmo trutta fario* from the river Una (involving DNA analysis and the construction of a hatchery on the river Krusnica in western Bosnia, through an FAO project).



### 5.6.3. Farming systems distribution and characteristics

In Bosnia and Herzegovina, fish farms are generally distributed in three main regions. In northern Bosnia, in the Republic of Srpska, there are 5 cyprinid fish farms with a total area of 3 276 ha. In the river Neretva and the river Vrbas basins (mainly in the Federation of BiH) there are about 40 concrete salmonid fish farms of 8.5 ha and 14 salmonid cage fish farms of 8.1 ha. Marine aquaculture in 2 cage farms, with a total area of 3.6 ha, is located in Neum.

Overview the some of the breeders of fish for consumption

No	Name of the Company fish producer	Contact person	Tel/Fax	Species
1.	NORDFISH BLAGAJ	Sanel Šarić	036/572487	Salmonid
2.	TROPIK RIBARSTVO, RIBNIK	Mirko Risović	050-431-024	Salmonid
3	TROPIK RIBARSTVO, Krupa na Vrbasu	Mirko Risović	051/417-050 051/ 417-092	Salmonid
4.	"RIZ KRAJINA" Ribogojilište, Martin Brod	Rifat Tahirić	037/331-401 061/ 149-766	Salmonid
5.	"RIZ KRAJINA" Ribogojilište, Zdena	Rifat Tahirić	061/149-776 037/-331-401	Salmonid
6	HE «Bočac», Ribogojilište «JEZERO»	Ilija Dakić	050/211-660 050/291-130	Salmonid
7.	«Krupić» Rama-Prozor	Mile Marić	036/770-750 036/770-117 063/ 352-901	Salmonid
8.	«Okašnica-OVAKO» Bugojno, Vrpeć –Bugojno	Kemal Dafić	030/ 251-459	Salmonid
9.	«Salmon» LJUBUŠKI, Grabovo vrelo-LJUBUŠKI	Veselko Vištica	039/841-107 039/841-589	Salmonid
10.	«RIBA NERETVA» KONJIC	Faruk Hadžimešić	036/726-756 061/ 133-400	Salmonid





## 7. AGRICULTURAL FACULTIES AND INSTITUTES

### 8. INSTITUTIONAL FRAMEWORK

Organization	Contacts	Contact person
Agricultural Institute Banjaluka Knjaza Miloša 17. 78000 Banjaluka	Tel: +387 51 303 112 +387 51 313 287 Fax: +387 51 312 792 Email: polj.institut.bl@blic.net Web: www.poljinstbl.com	Dr.Svetko Vojin Email:vojinn@blic.net ZeljkoLakić Email:zeljko_lakic@inecco.net
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## 8. INSTITUTIONAL FRAMEWORK

Policies related to foreign trade, external relations and general veterinary matters are implemented at the state level by the Ministry of Foreign Trade and Economic Relations (MoFTER) and by the State Veterinary Office.

MoFTER is responsible for the coordination and harmonization of policies and plans defined at the Entity as well as at the international level. In particular MoFTER policy is defined within several state level laws: on veterinary services, on plant protection, on supervision of quality of food products, on competition, on consumer protection, on cooperatives, on food safety.

Ministry of Agriculture, Forestry and Water Management of RS (MoAFWM) and Ministry of Agriculture, Water Management and Forestry of FBiH (MoAWMF) have authority on agriculture, veterinary, forestry and hunting as well as water management. Apart from MoAFWM RS and MoAWMF FBiH, there are other institutional bodies that support the Ministries in policy implementation: extension and selection service agencies, research institutes, inspection bodies and municipality bodies.

### STATE LEVEL:

Ministry of Foreign Trade & Economic Relations – MoFTER Sector for Agriculture, Food, Forestry and Rural Development

### ENTITY LEVEL:

Ministry of Agriculture, Water Management & Forestry of the FB&H  
Ministry of Agriculture, Forestry & Water Management of the RS  
Department of Agriculture, Forestry & Water Management of District Brcko

### CANTON LEVEL:

6 Ministries of Agriculture, Forestry & Water Management; 4 Agriculture Departments within Ministries of Economy

### MUNICIPALITY LEVEL:

Departments of Economy in 63 RS Municipalities  
Departments of Economy in 80 FB&H Municipalities

Figure 1 key administration bodies involved in the agricultural administration of B&H.

## 9. LEGAL FRAMEWORK

The most of agriculture legislation including all legislation affecting animal and plant health as well as food safety, but also harmonisation with EU agricultural legislation and EU standards for the agricultural sector, is transferred to B&H state level.

State and Entities have to introduce an obligatory reporting system on envisaged legislation in order to better coordinate drafting procedures of new legislation. B&H already has established services of veterinarian control, plant-sanitary control and food control and a significant share of the work on the adoption of the EU standards may be built on the existing basis.



### 9.1. Laws at State level

Law on Agriculture, Food and Rural Development, ("Official Gazette of BiH", No. 50/08)  
 Law on Veterinary medicine, ("Official Gazette of BiH", No. 34/02)  
 Law on protection Plant Health ("Official Gazette of BiH", No. 23/03)  
 Law on Food (Official Gazette of BiH no. 50/04).  
 Law on Protection new plant varieties of BiH, ("Official Gazette of BiH", No 46/04)  
 Law on Seeds and Seedlings of Agricultural Plants BiH, ("Official Gazette of BiH", No 03/05)  
 Law on Mineral Fertilizers ("Official Gazette of BiH", No. 46/04)  
 General law on cooperatives, ("Official Gazette of BiH", No. 57/03.)  
 Law on Phyto-pharmaceutical Products (Official Gazette of BiH no. 49/04)  
 Law on wine, brandy and other products of grapes and wine (Official Gazette BiH no. 25/08)

### 9.2. Federation of B&H Laws

Law on Agriculture (Official Gazette FBiH no. 88/07, 4/10, 27/12, 7/13)  
  
 Law on Financial Support to the Primary Agriculture Production ("Official Gazette of FBiH", No. 28/04)  
 Law on Forestry ("Official Gazette of FBiH", Gazette of FBiH", No. 20/02, No. 20/03)  
 Law on Veterinary ("Official Gazette of FBiH", No. 46/00)  
 Law on Waters ("Official Gazette of FBiH", No. 18/98)  
 Law on Tobacco ("Official Gazette of FBiH" No. 45/02)  
 Law on Measures for Improvement of Cattle Breeding ("Official Gazette FBiH", No. 23/98)  
 Law on Medicaments Used in Veterinary ("Official Gazette of FBiH", No. 15/98)  
 Law on Seeds and Seedlings of Agricultural Plants ("Official Gazette of FBiH", No. 55/01)  
 Law on recognition and protection of agricultural and forest plant species, (Official Gazette FBiH no 31/00)  
 Law on cooperatives FBiH ("Official Gazette of FBiH", No. 29/97)  
 Law on Agricultural Land ("Official Gazette FBiH", No. 52/09)  
 Law on wine (Official Gazette FBiH no. 55/12,)  
 Law on financial aid to agriculture and rural development (Official Gazette of FBiH br. 42/10)

### 9.3. Republic of Srpska Laws

Law on Forestry ("Official Gazette of RS", No. 66/03)  
 Law on Hunting ("Official Gazette of RS", No. 4/02)  
 Law on Water ("Official Gazette of RS", No. 10/98, 51/01)  
 Law on Health Protection of Animals and Veterinary Activities ("Official Gazette of RS", No. 11/95, 10/97, 52/01)  
 Law on Agriculture Inspection ("Official Gazette of RS", No. 10/97)  
 Law on Fishery ("Official Gazette of RS", No. 4/02)  
 Law on organic agriculture ("Official Gazette of RS", No. 75/04)  
 Law on Plant Protection ("Official Gazette of RS" 13/97, 52/09)  
 Law on Seed and Planting Material ("Official Gazette of RS" 13/97, 37/09)  
 Law on Measures for Improvement of Livestock Breeding ("Official Gazette of RS" 10/98)  
 Law on Medicines used in Veterinary and Veterinary-Medicine Products ("Official Gazette of RS" 37/02)  
 Law on Fertilizers ("Official Gazette of RS" 35/04)

Law on Provision and Allocation of the Funds for Stimulating Agriculture and Rural Development ("Official Gazette of RS" 43/02, 44/02, 106/09,)

Law on farming cooperatives RS ("Official Gazette of RS" 18/99)

Law on Agriculture Land ("Official Gazette of RS", No. 14/04)

Law on Organic Production (Official Gazette RS 12/13)

Law on brandy and wine (Official Gazette RS 71/09)

Law on food (Official Gazette RS 49/09)

Law on Tobacco (Official Gazette RS 72/12)

Law on Agricultural (Official Gazette RS 70/06, 20/07, 86/07, 71/09 )

Law on Agricultural Land (Official Gazette RS 93/06, 86/07, 14/10)

Law on Measures for improving the livestock production

Law on Agricultural Cooperatives (Official Gazette RS 73/08; 78/11, 106/09)

#### 9.4. B&H Law on Agriculture, Food and Rural Development

Law on Agriculture, Food and Rural Development determines the competencies at all levels within the agriculture, food and rural development sector and main responsibilities of the new state-level Ministry of Agriculture and Rural Development and its relationship with other institutions within the sector.

The law also outlines the initial legal and institutional framework required to gradually prepare the sector for EU integration. The law provides for the establishment of a wide range of new institutional structures and mechanisms which can ensure effective co-ordination and communication between all stakeholders. Many of them are essential foundations to attract future EU pre-accession and structural funds, and include:

- B&H Agriculture Market Information Service
- B&H Administration for Harmonisation of Payment Systems
- B&H Farm Registry and Land Parcel Identification System
- B&H Agricultural Report
- A range of mechanisms co-ordinated by the new State Ministry of Agriculture and Rural Development.

#### 10. RURAL DEVELOPMENTS IN BOSNIA AND HERZEGOVINA

Rural development is being in focus of all governmental institutions in Bosnia and Herzegovina, which intend to enable faster and more effective sector integration into EU institutions, as well as to facilitate access to the funds along accession process.

The increasing importance of rural development and the role of agriculture in rural development find its root to the first rural development policies defined by EU in the Agenda 2000, but also to the acknowledgement that rural areas, especially in the Western countries, face the same challenges and that citizens voice more and more demands such as areas of recreation for tourism, protection of the environment, quality of food.

Rural development becomes essential to increase the volume of agricultural production, employment opportunities, income and living standards of rural population, to improve environmental protection and, consequently, to stop the depopulation and de-agrarisation of rural and mountainous areas.



According to B&H Agriculture Report 2007, (made by MoFTER), 81 % of the total land area and 61 % of the population can be classified as rural in B&H. In the same time the 114 out of 143 municipalities are classified as rural and have a population of 2,372,162 persons.

In strategic plans of many cantons and municipalities, both in Federation BiH and Republic Srpska, rural development is considered as one of the main development goal including a rural tourism.

### 10.1. Opportunities for development rural tourism

Rural visitors in Bosnia and Herzegovina can be attracted by typical landscapes, which are defined also by the agriculture resources. Among the other the agro-tourism sector includes:

- Farm-oriented retail opportunities;
  - Farm-based accommodations, meals, activities;
  - Agricultural events, where tourists interact directly with the farm family and their employees.
- Farms that sell products directly to visitors can help attract large numbers of visitors to a community. These visitors may also buy meals, lodging and other items from businesses that serve tourists. Eating and drinking establishments that serve tourists are in an excellent position to help promote local agricultural products through what they serve and the information they provide on their menus. In addition, to gain from direct sales to visitors, many indirect benefits are attained from tourism.

## 11. LABOR

Taking in consideration the presence of the rural unemployment, and the fact that agriculture employs about 15 % of the labor force, agricultural labor is abundant and cheap particularly when compared to the EU. In addition, all categories of the experienced workforce (engineers, technicians, skilled workers) required in food processing industry are available under competitive prices.

## 12. FOOD PROCESSING INDUSTRY

The food industry is an important sector in the economy of B&H, both for assuring food security for the country as well as for preventing a further increase in the negative trade balance of the country (trade balance for food products is in deficit).

The war-related damages in the agricultural sector amounted to approximately 4 billion  $\square$ . In some areas, 70% of the business infrastructure and 60% of the livestock were lost. More than 237,000 ha were mined when the war ended.

Since then the food processing industry has worked only at approximately 10% of its capacity. Currently B & H food processing industry encompasses the companies engaged in manufacturing or processing of foods and beverages for human consumption, including meat, milk, fruit, vegetable, sugar, oil and tobacco, as well as prepared feeds for animals and fowls.

All before mentioned production capacities are still limited and insufficient to satisfy even local consumption requirements, making food processing sub-sector prospective for further development and enlargement, following augmenting and development in primary production.

### 12.1. Meat production and processing

Due to the high share of grasslands in total agricultural land, livestock production is important for BiH. Halved during the war, livestock have been gradually renewing. The years 2000-2011 are characterized by constant increases in production of almost all livestock products (milk production +37%, meat production +16.3%). However, BiH is still a net importer of meat.

BiH has tradition in lamb meat and baby beef production as well as in processing of meat (in particular dried and smoked meat). There are more than 30 meat processing companies in BiH, but most are small-scale. The annual production capacity of the 11 largest companies is approximately 60,000 MT, but only around 50-55% is utilized.

Market leaders are "AKOVA IMPEX" d.o.o., Sarajevo (50 million € turnover), "LIJANOVICI" d.o.o., Široki Brijeg, and "MENPROM", Tuzla. All three companies have HACCP and ISO certificates, and AKOVA GROUP also has a HALAL certificate. Other companies are smaller (e.g. "BRAJLOVIĆ", "BROJLER", "LA VITA", "BROVIS", etc.). Market leader in egg production is "POSAVINA KOKA" from Orašje.

### 12.2. Milk production and processing

There are about 100 dairies in BiH, with a total capacity of 2 million liters/day. Only about one third of that capacity is used. Approximately 45 dairies exceed capacity of 1,000 liters/day and 10 exceed capacity of 100,000 liters/day. The dairies produce mainly high-volume, fast-turnover, low margin products like fluid milk and only a few dairies produce value-added products like aged cheese. As a result, most value-added milk products are imported from neighboring countries or the EU.

Market leaders are "MLIJEKOPRODUKT" from Kozarska Dubica (31 million € turnover), "MEGGLE" Eastern Europe GmbH, from Bihać (20 million € turnover), "MILKOS" Sarajevo (9 million € turnover), Banja Luka Dairy and Tuzla Dairy. The companies have HACCP and ISO, and some also HALAL certificates. The dairies Banja Luka, "EASTMILK" and "MLIJEKOPRODUKT" are integrated with "IMLEK GROUP" (the majority owner of which is DFG, Salford Capital).

#### 12.2.1. Indigenous products - HQ B&H brands

##### Cheese

Bosnia and Herzegovina has great potentials in gastronomic offer where the famous specialties are made from the cattle fed in healthy pastures environment.

Now day consumers are aware of the importance of nutrition and its impact on human health and quality of life where a cheese plays an important role because of the high calcium content. Thus, cheese today represents an important food in the nutrition of the people, but it is also gaining importance through mirroring a cultural and traditional image of a country. All cheeses native to an area represents a treasure for the country of their origin, highlighting its tradition and cultural heritage. Production of indigenous dairy products in Bosnia and Herzegovina has been preserved for centuries, in spite of numerous wars, displacement and frequent migration of population to the cities. These products are characterized by great diversity.





In BH today, a range of authentic cheeses is being produced, such as: Livno cheese, Vlašić cheese, Mješina cheese, Masni cheese, Vareni cheese, Kalenderovački cheese, Posni cheese or Torotan, Fresh pickled cheese, Dried pickled cheese, Hard goat cheese in oil, White goat cheese, Urda or Hurda , etc.

The Cheese from Travnik and cheese from Livno, as well as the Cheese and Cream from bellows (iz mijeha) are representing some of the most featured products and recognizable HQ B&H brands.



#### Travnički Cheese (from Vlašić Mountain)

Travnički cheese, after which Vlašić Mountain is widely known, is one of the best among white cheeses in souse / whey. It is assumed that the technique of making cheese in souse was introduced in this country by nomadic herders from the East who called themselves Vlachs, and hence, the name of Vlašić Mt. This tradition was later adopted by farmers from the surrounding mountains, so Vlašić cheese is nowadays produced

throughout the country and the wider region. This cheese is originally produced from unpasteurized, fresh sheep milk immediately after milking. It is produced on the mountain in cheese huts (katuns) and is usually kept for 2 to 3 months on the mountain in order to mature. Vlašić cheese belongs to a group of white soft cheeses ripened in souse. Indigenously, it is made from sheep milk. Slices of cheese need to be shapely, with a well-preserved surface, and no traces of rinsing, or cutting, weighing 0.5 to 0.75 kilograms. The color of the cheese is white, characteristic of the cheese from sheep milk. Consistency must be firm but not too hard. At the section, the cheese paste is packed, with a small number of irregularly shaped cavities. The flavor is lactic-acidic, typical of cheese from sheep milk. The fragrance is also typical for products made from sheep milk. Vlašić cheese is produced in the households as well as in the industry.



#### Livanski Cheese (from municipality Livno area)

The production of Livno cheese started in the 19th century around Livno, modeled after the French Gruyere cheese production technology on family farms. Ripening takes on average of 60 to 65 days in controlled conditions. The smell of cheese is a distinct and typical for kras cheeses. The taste is full and pleasing, and somewhat spicy in older cheeses. Place of origin of Livno cheese is an area of southwestern Bosnia and Herze-

govina, that is, the wider area of Livno Polje, from where its production spread to areas of Glamoč and Tomislavgrad. Originally, Livno cheese was produced from sheep milk per recipe of Swiss Gruyere cheese, but in smaller rings. Due to increasing market demand for this cheese, it gradually began to be produced from cow milk as well. Livno cheese belongs to the group of hard cheeses. It is traditionally produced from a mixture of sheep and cow milk in different proportions, but the best recommended ratio of sheep and cow milk is 80:20. Livno cheese belongs to the group of hard cheeses. It is cylindrical in shape, weighing from 2 to 2.5 kilograms. The crust should not have traces of cloth, it must be flat, wellgroomed and straw color. At the section, the cheese must have a small number of round, evenly arranged medium-sized holes. Cheese paste is yellowish. Consistency must be firm but not too hard. The flavor is moderately salty and spicy, typical for all cheeses made from sheep milk.

Cheese from bellows



The manufacture of cheese from bellows is characteristic for the entire region of Herzegovina. The similar technology is used to produce cheese from cow, sheep and goat milk, or their mixtures. Full-fat and skim milk are also used. Cheese maturation process takes place in the sheep or goat bellows. Cheese from bellows belongs to a group of semi-hard and hard cheeses. It is preserved in bellows. Cheese paste is white to yellowish color. Consistency must be firm but not too hard. When removed from the

bellows, the cheese is dry and in clumps. The flavor is moderately salty and spicy, typical for cheeses from sheep, cow or goat milk. The fragrance is also typical, depending on the type of milk that the cheese produced from. In addition, during ripening in the bellows, the cheese receives a distinctive taste and odor that are very much appreciated by some consumers. No industrial processing of cheese from bellows exists. It is produced in households.

### 12.3. Edible oil production

BIMAL Ltd. Brčko is the sole edible oil producer in Bosnia and Herzegovina and is one of the most advanced oil factories in the region of South East Europe. BIMAL's product range includes high-quality sunflower oil, rapeseed oil, soy oil and protein meal, which is used in livestock food production.

STUDEN & CO Holding, Vienna and Vereinigte Fettwareninidustrie privatized BIMAL in 2002. The value of direct investment in development of its business operations has by now exceeded 30 million €. BIMAL employs over 200 workers. The annual capacity of oilseed processing is 120.000 tons.

Favorable location of BIMAL Company at the three-point border of Bosnia-Herzegovina, Croatia and Serbia, as well as its direct links to highway, railroads and international port on the Sava River, have endowed us with excellent opportunities in terms of logistic support. BIMAL has set up and documented its quality system in adherence with the ISO 9001:2008 and HACCP standard series. A number of awards from international food industry fairs attest to BIMAL's capacity to develop high-quality products. BIMAL's long-term strategy is to become recognized as a leading edible oil producer in the regional market both in the realm of budget-friendly and in the realm of exclusive products

### 12.4. Sugar production

The sugar beet production has been restarted around Bijeljina and the sugar plant "Fabrika šećera" in Bijeljina started operating again on November 4, 2010 after 18 years of standstill. The plant has a daily processing capacity of 4,000 tons of sugar beet and production of 500 tons of sugar.

STUDEN in cooperation with AGRANA, Austria built a sugar refinery in Brcko called "STUDEN-AGRANA"-Rafinerija Secera. BiH still has some unused customs-free quota for sugar export to EU.



### 13. INVESTMENT OPPORTUNITIES

The existing structure of agriculture in B & H, characterized by small sized farms, and undeveloped (broken down) former co-operative system provides huge chances to large integrator companies in each sub sector, to integrate existing primary producers, and processors, and to start their operations, as well as develop new branded products for local and particularly export markets. This is an opportunity for medium and large food producers, processors and wholesalers to establish new modern system and infrastructure for production, collection, processing and marketing, on their own.

Privatization of big state owned companies is an opportunity too.

Taking in consideration, that B & H is endowed with abundant, uncultivated and unpolluted land and water recourses, free from chemical fertilization and pesticides, as well as with extraordinary pristine nature (mountains, rivers, lakes, seaside, etc.), the recourses which are only symbolically used by now, the organic food production of (crops and animal), particularly combined with tourism activities is a huge opportunity for investment with high-income potentials.

All before mentioned offers an array of opportunities for potential investors, which are supposed to provide apart of investment capital, the knowledge, new technologies and ideas in organic food production and managing, to introduce the new varieties suitable for organic production, as well as to open new export markets, etc.

### 14. B&H COMPANIES WITH FOREIGN OWNERSHIP

No	B&H Company	Subsector	Foreign Company
1.	COCA COLA HBC-BH, Hadžići	Beverages	CC Beverages, Nederland
2.	PERUTNINA PTUJ, Breza	Chicken Meal processing	Perutnina Ptuj, Slovenia
3.	VITAMINKA, Banja Luka	Vegetable processing	Kreisen Ind. Switzerland
4.	RAFINERIJA ŠEĆERA, Brčko	Sugar production	Studen-Agrana, Austria
5.	LEDO, Čitluk	Ice cream production	Ledo, Croatia

Source: Ministry of Foreign Trade and Economic relations of B&H  
Top 5 Foreign Direct Investment in B&H Agriculture & Food Processing sector

### 15. B&H AGRICULTURAL FAIRS

Ekobis -Bihać  
Gradačac Plum Fair  
Sarajevo Beekeeping Festival  
Banjaluka Fair  
Interagro Bijeljina  
Zeps Zenica  
International Festival of Tea and Medicinal Herbs  
Mostar Economy Fair

## 16. USEFUL CONTACTS

### Ministries

Federal Ministry of Agriculture, Water Management and Forestry

[www.fmpvs.gov.ba](http://www.fmpvs.gov.ba)

Ministry of Agriculture, Forestry and Water Management of Republika Srpska

[www.vladars.net](http://www.vladars.net)

Veterinary Office of Bosnia and Herzegovina

[www.vet.gov.ba](http://www.vet.gov.ba)

Ministry of Foreign Affairs of B&H

[www.mfa.ba](http://www.mfa.ba)

### Chambers

Foreign Trade Chamber of B&H

[www.komorabih.com](http://www.komorabih.com)

Chamber of Economy of Federation of B&H

[www.kfbih.com](http://www.kfbih.com)

Chamber of Economy of Republika Srpska

[www.komorars.ba](http://www.komorars.ba)

### Associations

Association "Organic Control"

[www.organskakontrola.ba/](http://www.organskakontrola.ba/)

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