

Bosnia and Herzegovina case study

State of land issues in Bosnia and Herzegovina

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Background

Bosnia and Herzegovina (BIH) is geographically situated in southeast Europe, in the Balkan Peninsula, between 42° 26' and 45° 15' of northern latitude and 15° 45' and 19° 41' of eastern longitude. It covers about 51,000 km². The country is largely made up of mountainous highlands in the South and the West, hilly lands in the middle and the North, and flat to undulating plains in the Northeast. Consequently, most of the continuous tracts of fertile agricultural lands are situated in this north-eastern part. The agricultural activities in the other parts of the country are mainly limited to relative narrow alluvial valleys and on undulating to rolling hills. From a morphological point of view, physiographical BIH can be divided as follows:

- Flatland or lowland area (up to 300 meters above sea level) - 13,3%
- Hilly area (300-500 meters above sea level), and Hilly-Mountainous area (500-700 meters above sea level) - 26,3%
- Mountainous area (above 700 meters above sea level), Mediterranean-Mountainous area (700-500 meters above sea level) - 57,2%
- Mediterranean area (below 500 meters above sea level) - 5,2%.

Land resources

The total area of BIH is 5.11 million ha, of which 50.3% is agricultural land (2,572,000.00 ha) and 48.3% forest land. Total arable land in Bosnia and Herzegovina amounts to 1,585,000 ha or 62% from total agricultural land: in the Federation 765,000 ha and in the RS 820,000 ha. The plough-land area amounts to 1,018,000 ha or 19.9% of the total land. There are about 0.59 hectares of agricultural land per capita, of which 0.36 ha are fields and gardens.

To get the situation related to land classified, it is necessary to point out land quality classes in Bosnia and Herzegovina (Table 1). The best quality land (from I to III class) covers 14.0%, of the territory of Bosnia and Herzegovina, IV class land covers 17.9%, V class 16.7%, VI class 31.75% and VII and VIII class 19.4% (data according to SZS).

Bosnia and Herzegovina covers an area of highland-mountainous regions with slope land (terrain gradient), slopes over 13% cover more than 80% of the all territory. This is the factor restricting the use of machinery in current agricultural production.

Table 1.

SOIL CLASS	ha	%
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

Soils

The Project of the Basic Soil Map (BSM) was started in 1964 at the scale of 1:50,000 and implemented by Agropedology Institute from Sarajevo. For this purpose the first Manual for field soil investigation has been published. Working out of the BSM was funded on pedogenetic principles and took very long – 23 years, from 1966 to 1986. It is considered largest pedological project in Bosnia and Herzegovina. Classification of soil is the genetic-evolutionary base, where the type of soil was the basic unit of classification system. Mapping went to the level of distinguishing map units including type, subtype, variety and even form. Morphological and litological characteristics were considered mainly. With this sort of mapping, the work was done quite detailed. Considering that the scale of map 1:50,000 belongs to the category of large proportion, 1.176 different mapping units have been identified on the soil map of BIH. The total number of printed leaves is 116.

One of the very important tasks at the present time and in the future as well of the soil scientist will be activities on adaptation of national to the FAO classification, calculation and adjustment of data base from the BSM of BIH. Bosnia and Herzegovina is very rich in different type of soil. The general spatial distributions different type of soils in BIH is presented in the map and its characteristics very much depending from geology, morphology, climate condition and other factors and processes at the ground.

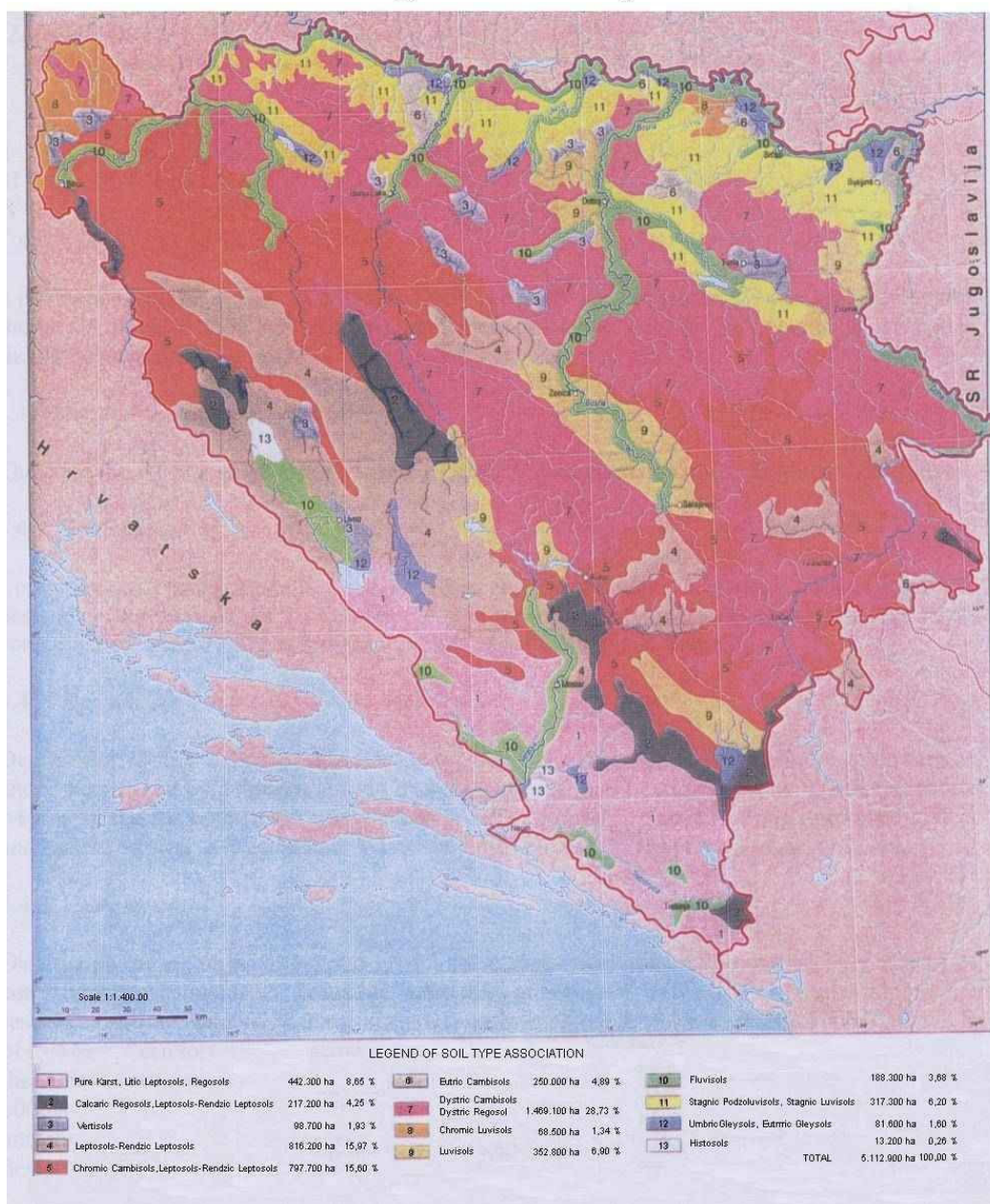
Flat or low-lands zone is found in the northern part of BIH and represents the most valuable land resource. There, the degree of development of primary and processing food production is much higher than in the hilly-mountainous areas. The most common types of soil are: Stagnic Podzoluvisols, Fluvisols, Umbric Gleysols and Eutric Gleysols.

The *hilly zone* is more heterogeneous in terms of soil. A considerable part of this zone has slopes above 13% and the processes of erosion are very marked. The erosion processes are further enhanced by excessive and inappropriate way of soil 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 too, although these lands are mostly covered by forests and grasslands. As for sowing crops, rye, barley, oats and potato dominate. The most common types of soil are: Dystric Cambisols and Dystric

Regosols are predominantly present then Leptosols – Rendzic Leptosols and Regosols.

Bosnia & Herzegovina - Soil map



The Mediterranean zone, in view of the warmer climatic conditions, has a possibility of growing a wide array of crops and of developing intensive farming, so that a part from land farming crops, the crops of early vegetables are also being cultivated for the market. 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: Litic Leptosols, Regosols, Leptosols – Rendzic Leptosols, Chromic Cambisols, Fluvisols in the river valleys, Umbric and Eutric Gleysols in the Karst fields. In the swamp of the

Karts field Histosols are also often presents, and it has very important environmental value.

Land use change

The recent war has had a major effect on land cover and land use changes in Bosnia and Herzegovina. The movement and displacement of people caused deep changes in the distribution pattern of the population on the ground.

There was a large increase in land cover and land use (LC/LU) changes during the war years 1992-1995. These changes have been primarily reflected in the area of abandoned land and deforestation. While even before the war there was unused agricultural land in BIH because of migration of people from rural areas to towns and abroad, its amount has been greatly increased during the war. Economic considerations are another factor contributing to the increase of abandoned land. State farms leave significant areas of land uncultivated because they cannot sell its produce profitably.

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. It is often the most fertile and accessible cropland but there is no reliable record of these land use changes. Yet, the reliable and timely information on land cover and land use changes would be essential for sustainable land management. Given the limited availability of agricultural land in BIH, effective use of this land is essential for sector development.

Land-related constraints to sustainable agriculture

The land question in BIH can be looked at in for main ways:

- Considerable uncertainty over land rights, with obvious implications for investment
- Fragmentation and small size of farm units (see table below)
- Poor or non-existent (some war-damaged) cadastral and legal registration systems
- Mined land is a great risk for people. De-mining of the thousands of minefields may require many years to complete.

Whatever approach is adopted will be difficult. There is no common legal regime at BIH level for regulating land ownership. Entity laws do exist and regulate legal titles and registration of ownership over real estate, including land. Again however there are in practice 3 versions of real estate and land transaction legislation, one for the RS, and one for each “Canton” within the Federation. Fortunately the main principles of all three are similar because the legislation rests heavily on ex-Yugoslav laws.

Any sense that this relative uniformity is an advantage must be illusory however, given that these roughly similar laws are probably being applied very differently and also manipulated in each Entity or Canton. Moreover, land information and survey records are archaic or were destroyed during the war.

The average size of a rural household farm in the BIH is about 3.0 hectares divided between 8 and 10 plots (table 2). For a better understanding of the land-related constraints to the land resources, it is useful to have the insight into the ratio of different categories of land use per inhabitant, and the percent of altitude in the layout of the landscape of Bosnia and Herzegovina (table 3).

Table 2: Pre-war (1991) Indicators of Land Access and Fragmentation

Farmer 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: Statistic Bulletin from 1991

Table 3

Ratio of land use		Height above sea level in BiH	
Category	ha/capita ¹	In m	In %
Plowed fields and gardens	0,23	0 - 200	14,2
Total plow able land	0,36	200 - 500	29,0
Total agricultural land	0,59	500 - 1000	32,1
		1000 - 1500	20,8
		1500 - 2000	3,8
		More than 2000	0,1
		TOTAL:	100,0

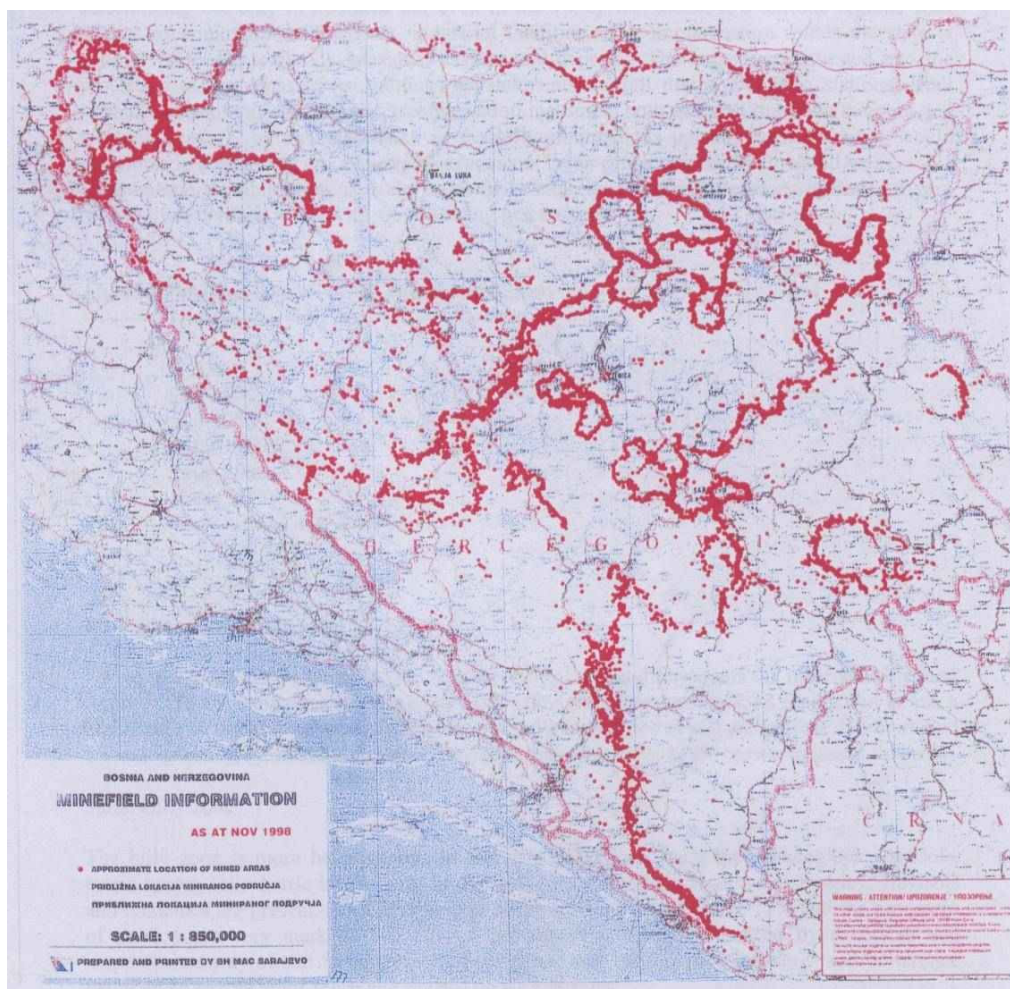
Land market activity has to be increased as a means to address the problem of small farm size and fragmentation. Leasing should be encouraged by developing legally recognised, standard lease contracts which protect both lessee and lessor. Institutional reforms include continued international community support for the process of updating and reconciling the land book and the land registry, and computerising land records; amendments to inheritance law to prevent further land fragmentation; and the establishment of Land Development Boards for land use projects that require cooperative action (drainage, irrigation and land consolidation programmes, and the management of communal grazing areas).

Minefields are still one of the main constraints to the development of the rural areas in BIH. Large tracts of strategically important agricultural land and forest areas remained mined after the war and therefore cannot be used. De-mining of the

¹ Precise population data is still lacking. Current estimates of total population range from 3.6 million (World Bank), to 3.7 million (Reconstruction and Return Task Force - RRTF). Before the war 4, 3 million of inhabitants was in BIH.

thousands of minefields may require many years to complete. Estimates do suggest that at current rates of de-mining, it might take several generations before rural areas are again safe.

The de-mining of agricultural land will be accelerated by establishing an administrative unit to: identify and prioritise land for de-mining, obtain requisite donor finance, and coordinate and monitor de-mining. Following the guidelines and programmes developed by the Reconstruction and Return Task Force (RRTF), the resettlement of rural land will be supported by ensuring that the returnees, re-locating families and residents in resettlement areas have full access to available credit and extension facilities.



A clear agricultural policy response to the tragic problem of land mines in rural areas has yet to be developed. It is estimated that there are 17,000 mine fields and some 750,000 land mines remaining in BiH. More than 250,000 ha of arable land are poisoned by mines. As urban areas and infrastructure have priority for current de-mining activities, only 330 ha of agricultural land had been de-mined by the end of 2001.²

² Current de-mining costs range from US\$2-7/m² depending on terrain, density of vegetation, residual metal content in the ground, and the number of land mines discovered.

Mined land is a great risk for people that walk on it for doing some agricultural work or felling of trees. Indirectly, minefields are the cause of fires, spreading of weeds, erosion processes and so on, which is directly connected with plant production. Demining is therefore critically important not just from the human rights perspective, but is also as pre-condition for long-term development and environmental action.

Other constraints to sustainable agriculture

Land and water conservation are the major environmental issues for land use policy. There is a strong awareness of this imperative in FBiH as around 538,500 ha (20 percent) of agricultural land has suffered some environmental damage. Of this area around 90,000 ha is agricultural land taken out of production before the war for mining, roads, human settlement, industry etc. War damage (trenches, fortifications etc.) accounts for a further 10,000 ha and 180,000 ha has been polluted by the impact of roads and power stations.

The cost of recovering these areas is probably prohibitive. Much more can be done to restore the remaining 258,500 ha which has suffered a combination of erosion and fertility loss as a result of poor management. Guidance on management techniques such as deep ploughing, green manuring, liming and crop rotations would assist this restoration.

Overview: society's response to ameliorate the situation

Ongoing efforts to make inventories and assess the land resource base in BIH are beyond any doubt enlarging the knowledge base that will serve as a foundation for decision making on future land use.

Entity level decision-makers have a clear conviction now that land resources management is to be considered as a priority for the development of the rural world. The genuine interest that is yielded at the local level, mainly through some punctual exposure, indicates that further efforts will meet strong endorsement.

Bosnia and Herzegovina presents a diversified resource base offering opportunities for both quantitative and qualitative improvement of the agricultural production.

Recent legislation and policy intentions reflect a real concern to preserve the land resources base. Recommendations to train municipal authorities in the application of "ISO 14000 - Environmental Management Systems for Municipalities" are underlining the genuineness of these pre-occupations. Actual discussions within local governments on priorities to de-mine agricultural land, and on the identification of "virgin" land, i.e. not polluted, for promoting biologic agriculture are other indicators of support to preservation planning.

International support

The FAO "Agricultural Sector Strategy Project" (TCP/BIH/7821) was finalised in 1999 with the publication of a comprehensive medium-term strategy paper for the

agricultural sector in BIH. The global objective of the strategy recognises the importance of optimising land use and preserving the natural resources base.

The FAO Land Resources Inventory Project (GCP/BIH/002/ITA) has been carried out from 2000 to 2004. The activities covered the entire territory of BIH. The development of a land use management model based on the Agro-Ecological Zoning (AEZ) methodology is a major achievement. The project is still active on lower levels with a main task to establish sustainable land use methodology in three municipalities of BIH.

GTZ (German Cooperation) is presently involved in some pilot cadastral projects, addressing among other things the issue of land registration procedures. The major aim here is to build a modern cadastre that responds to the present needs of the country. In some pilot areas new procedures to deal with the privatization of state enterprises, including the land resources are being tested. After the pilot project furnishing phase project is stopped.

The United Nations Development Programme (UNDP) implements the Local Action Programme in the Brčko District (BLAP), hence gaining important experience in area-based development. With the technical assistance of FAO, this programme has also supported the Department of Agriculture and Forestry with the preparation of a plan for the future use of the “PD Posavina” state farm base on the optimal land use.

Through its Agricultural Strategy and Programming Unit (ASPU), the European Union supports policy and legislation development for a number of land-related issues. It is instrumental in the revision of the legislation on land restitution. Furthermore, many national and international NGOs are working in BIH in the sectors of agriculture and sustainable use of land resources.

Conclusions

The main characteristics of soil in Bosnia and Herzegovina are:

- Acid reaction of soil on over than 1/3 of the land;
- Low portion of humus;
- Low content of the most important fertilizers;
- Low physiological depth of soil;
- Excess water on about 14% of the territory;
- Inadequate care for improvement of fertility;
- Small size of individual land property and high level of property's fragmentation;
- Sloping land and erosion problems.

The basic *goals* for the short term are:

- Institutional strengthening in the domain of management, protection and use of land resources;
- Reduction of soil degradation.

Measures necessary for achieving the goals above are:

- Preparation of a unique strategy (policy) for the protection of soil on the level of Bosnia and Herzegovina;
- Preparation of a unique Law on Soil (protection, use and management), based on the unique policy;
- Inventory of the current balance of soil in Bosnia and Herzegovina for the needs of strategic planning;
- Determination of the contamination degree in order to provide conditions for organic food production (institutional building of soil contamination monitoring instruments);
- Increase of fertility of intensively used soil with a soil fertility monitoring system;
- Establishment of a state or entity level agency or institute that would be in charge of the implementation of soil management and protection policy;
- Determination of the current and potential erosion of soil in Bosnia and Herzegovina and protection measures (preparation of erosion and landslide maps);
- Classification of soil for sustainable management and use in agriculture and forestry;
- Determination of the quality of soil in order to outline defining priorities;
- Establishment of a systematic monitoring of soil, first within the Aple-Adria association, and then further on within the European integration processes;
- Preparation of other soil (pedologic) maps in order to provide for better space management and reaching higher food and raw-material production level;
- Establishment of a unique land information system (ZIS);
- Revitalization of “techno gene deserts” of mines and thermal power plants;
- Raising population education level on the importance of soil for sustainable development and future generations benefit,
- Preparation of programs for activation of unused lands and turning limited areas on inclined terrains into orchards and forests in order to prevent erosion;
- Reform of the land registry and cadastral books.