1. Introduction

Bulgaria is located on the Balkan peninsula in the Black Sea. The surface of Bulgaria covers 111,000 km$^2$. In general, the natural conditions in Bulgaria are favourable for agriculture. Summers are pleasant, autumn is windless, sunny and colourful, and the winters cold. The average winter temperature is 1.6°C, summer average is 21°C, mean annual temperature is 10°C. The mean annual rainfall is 813.6 mm.

Sofia is located at 42.7° N and 23° E in the southern part of the Sofia Plain, at the foot of the Vitosha and Lyulin Mountains. The city covers 1,326 km$^2$. The average altitude of Sofia is 550 m above sea level. Major soil types of the Sofia Plain are maroon sandy soils, alluvial and illuvial sand and clay and black earth (humus).

Like in most Central and Eastern European countries, the total population in Bulgaria, presently 8,283,200 people, is declining. At the same time, the population in urban areas is increasing. Also the average age of the population in Bulgaria is increasing. About 15% of the country’s population, or 1,182,600 people, lives in Sofia, the largest city in Bulgaria, in about 480,580 dwellings. The population density of the city is 908 per km$^2$.

1.1 The urban structure of Sofia

The city of Sofia has a compact central part, the old historical town centre, in which 1,114,168 people live, but Sofia also includes three towns with in total 25,198 people, as well as 34 small villages, villa zones and a periurban zone which are home to 51,181 people (National Statistical Institute 1998). The town is divided into 24 districts, each with its own centre (and subcentres).

Sofia is still remarkably green, with parks, gardens and other public green areas. However, the natural vegetation is decreasing. The major city parks altogether cover an area of 2,700 ha. Most of the parks stretch from the central part of the city to the
periphery and thus connect green areas with the suburban and villa zones. There are regional parks in each of the residential zones, while the central city area has several historical gardens and memorials. (Sofia Municipality 1987).

2. Urban agriculture in Sofia

Urban agriculture has been an essential element of Bulgarian life for centuries. It is typical for all cities, including the capital. In all the villages of the Sofia municipality, in the city outskirts and in central parts of the city, private gardens and backyards produce food, which is often also processed at home. Unlike in, for example, the USSR, private ownership of small plots of land both in rural and urban areas was never abolished.

Officially, only 2% of the economically active population is engaged full-time in agriculture. However, approximately half of Sofia households are engaged in cultivating fruit, vegetables and spices, and more than 90% make preserves and pickles out of home-grown or purchased agricultural produce. The percentage of households in Sofia achieving self-sufficiency in different foods (either self-produced or processed by friends and relatives up country) is about 14% (UNDP 1998).

The transition period from a socialist to market-oriented economy has caused the collapse of the agricultural co-operatives and state farms. This process was followed by slow privatisation and lagging agricultural reform. This also affects the organisation and land use in urban agriculture.

2.1 Changes in land use

Land use is in a state of transition. The periurban villages to the south of Sofia (Dragalevtzi, Simeonovo and Pancharevo) are no longer areas of agricultural production, as they were strongly urbanised during the past ten years. In the compact city, agricultural land has been turned into housing complexes, e.g., the districts of Mladost and Darvenitza were constructed on fertile agricultural land.
In the periphery of Sofia many vegetables are grown and animals kept for self-supply (Picture Antoaneta Yoveva)

Garden produce is often sold directly on the street (Picture Antoaneta Yoveva)
In the southern areas of the capital (Malinova Dolina and Hladilnika), houses were also constructed. The urban sprawl competes directly with land available for agriculture.

Table 1:  **Land use in the municipality of Sofia**

<table>
<thead>
<tr>
<th>Total area in ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>54,738.4</td>
</tr>
<tr>
<td>Forestry</td>
<td>44,854.8</td>
</tr>
<tr>
<td>Housing etc.</td>
<td>24,494.7</td>
</tr>
<tr>
<td>Water</td>
<td>4,399.2</td>
</tr>
<tr>
<td>Roads, railways and transport</td>
<td>2,054.6</td>
</tr>
<tr>
<td>Mining</td>
<td>2,071.5</td>
</tr>
</tbody>
</table>

*Source: National Statistical Institute 1998*

Part of the loss of agricultural land can be attributed to the owners, who received their property back after the transition from a centrally-planned to a market-oriented economy. Most of them tried to realise a maximum profit from their land and requested changes in the land-use allocation from farmland towards residential zoning. Such a change in designation increases the potential economic value of the land but reduces the land availability in the city area.

### 2.2 Types of urban agriculture

For Sofia municipality, two basic types of urban agriculture can be distinguished: namely, private farms and urban household agriculture.

#### 2.2.i Private farms

Small private farms on the borders of the city and in the neighbouring villages produce meat, fruit and vegetables. Some of these farms are combined with micro-enterprises for processing agricultural production. These private farms are usually located on private restituted land or, since December 1990, in privatised former “state farms”. In the 1970s, it was realised that the demand for agricultural produce could not be met. State-owned land was issued for agricultural use to private farmers on a temporary basis. The areas for these farms ranged from 0.1 to 1.0 ha. On these farms, mainly vegetables, fruit and animals for home consumption are produced. Most of the animals are kept in the private yards of farmers or in adapted old buildings. A private farmer usually owns 1-3 cows, 1-5 goats and a few other small animals – sheep, pigs, etc.
2.2.ii Urban household agriculture

Urban household agriculture assumes at least three different forms:

- *farming in backyards and private gardens* adjacent to family houses - this is typical both for the villages surrounding Sofia and the city itself and, in the case of the villages, is usually combined with poultry raising and the keeping of other small livestock;

- *farming and livestock keeping in gardens of second homes or summerhouses* located in designated recreational zones, owned by Sofia families. The houses are located within 100 km from the urban centre in the periurban areas. These so-called “villa zones” were developed in the socialist era to compensate for the life in prefabricated complexes in the urban environment. People from the city needed recreational areas and a green environment. In this way, the migrants could maintain their habits and desire to have individual homes with yards. However, in the 1980s and 1990s, fuelled by an increased standard of living, the construction of villas went out of control. In the 1980s, one third of the population of Sofia received plots for recreation (as planned, see Table 2). This area was considered to be reserved for future residential zones; and

- *farmland provided under State Decrees* for self-supply of vegetables for families in the villages around Sofia. From 1970 to 1985, State-owned farmland was issued to people under different State Decrees for temporary use. This land was for recreation and for self-supply of fruits and vegetables. Zones for self-supply were formed; their location, in many cases, was next to designated villa zones. On some plots, the construction of buildings of limited size (max. 35 m²) for seasonal use was allowed. However, illegal construction and violations of building rules often took place. Worse was that attractive areas bordering existing villages or villa zones were illegally seized, fenced and turned into recreation plots. Such areas are typical for the regions around the villages

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Table 2: Areas for urban agriculture and recreation in ha

<table>
<thead>
<tr>
<th>Agricultural land (in ha)</th>
<th>Recreational land (in ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villa zones</td>
<td>2,233</td>
</tr>
<tr>
<td>Farmland with (max. 35 m²) and without permission for construction</td>
<td>610</td>
</tr>
<tr>
<td>Total for the capital periphery</td>
<td>2,463</td>
</tr>
</tbody>
</table>

*Source: Programme for protection and reproduction of the natural environment in Sofia by the year 2000. 1987*
German, Lozen and Pancharevo, at the foot of the Balkan and Vitosha Mountains.

One can also observe a trend to grow food around the housing compounds along the riverbanks and in other vacant spaces where the public green is not maintained or in places entirely neglected by the municipalities.

2.3 Urban agricultural production

The most commonly grown vegetables around Sofia are cabbage, potatoes, onions and beetroot. The larger private farms around Sofia produce grains, vegetables, fruit and animals on a large scale. Most of the agricultural production comes from Kniazhevo, Vladaya, Bojournishte, Kostinbrod, Voluyak, New Iskar, Benkovski and Svetovrachane.

In Sofia, only information on the marketed produce is available. Since a large part of the production is for subsistence and thus not marketed, this information can provide only a limited insight into the importance of urban agricultural production.

<table>
<thead>
<tr>
<th>Vegetables</th>
<th>Surface area (in ha)</th>
<th>Production (in tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomatoes</td>
<td>387</td>
<td>4,100</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>133</td>
<td>1,400</td>
</tr>
<tr>
<td>Green pepper</td>
<td>197</td>
<td>1,900</td>
</tr>
<tr>
<td>Cabbage</td>
<td>444</td>
<td>7,300</td>
</tr>
<tr>
<td>Strawberries</td>
<td>317</td>
<td>700</td>
</tr>
</tbody>
</table>

*Source: National Statistical Institute 1997*

In the growing season, direct sales by urban farmers at the largest auction in the residential complex Drouzhba amounts to 380 tons per day. This production comes from both the northern and eastern areas of Sofia. For all the open markets in Sofia, the production is estimated at about 1,000 tons per day.

The private small farms in Sofia keep 92% of the cattle, 98% of the goats, 100% of the sheep, 93% of the poultry and 92% of the pigs in the city (National Statistical Institute 1997).
Table 4: Animal production in Sofia (1997)

<table>
<thead>
<tr>
<th>Animals</th>
<th>Number</th>
<th>Production in tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>7609</td>
<td>16337 (milk)</td>
</tr>
<tr>
<td>Goats</td>
<td>9268</td>
<td>185 (milk)</td>
</tr>
<tr>
<td>Sheep</td>
<td>24640</td>
<td>1633 (milk) 84 (wool)</td>
</tr>
<tr>
<td>Pigs</td>
<td>21133</td>
<td>2110 (meat)</td>
</tr>
<tr>
<td>Chickens</td>
<td>219122</td>
<td></td>
</tr>
<tr>
<td>Beef, chicken and mouton meat</td>
<td></td>
<td>3810 meat</td>
</tr>
<tr>
<td>Chicken eggs</td>
<td>2381200</td>
<td></td>
</tr>
</tbody>
</table>

Source: National Statistical Institute 1998

2.4 Marketing and processing of urban agricultural production

Agricultural production which is not directly consumed is either processed or marketed through various channels:
- the auction (in the case of non-perishables);
- the open markets (in the case of the more attractive goods);
- direct sales by the producers; and
- middlemen who buy vegetable and animal products for processing.

The markets are located in the densely-populated urban quarters. Each of the central communities has at least one open market. The markets are managed by specialised municipal enterprises and strictly controlled by the respective sanitary authorities. The markets in the southern city districts are supplied from the countryside. In this area, residential complexes were recently constructed. The local people, who used to produce their own food, have now become consumers who buy their food in the markets. The northern districts of Sofia are supplied by producers from the neighbouring villages, where agricultural production has increased in recent years.

However, most households process almost all their crop and animal production at home, to prepare food supplies for the winter. Part of the agricultural production is canned or pickled. The fruit is processed into stewed fruit or jams. Fruit and grapes are also used to make home-made brandy. Some of the processed production is also sold.

The animal products are processed in private dairies and in meat-processing plants for sausage production. Private entrepreneurs operating as middlemen supply leather to leather plants.
3. **Urban agriculture in a country in transition**

Sofia has some specific issues, emerging from the transition from a socialist to a capitalist system, which has had an impact on urban agriculture and its role in the city.

3.1 **Urban agriculture and the household economy**

Since the early 1990s, profound changes have taken place in the society and economy in Sofia. Prices increased while wages remained the same, and many people lost their jobs. Economic insecurity increased and so did the informal sector. As a result of this political transition, two severe humanitarian and food crises occurred: the first from late 1990 to early 1991 (winter); and the second from late 1996 to early 1997 (winter). During these crises, urban agriculture remained the most important way to overcome food shortages and was a strong stabilising factor for the food security of the population of Sofia. As is typical for low-income urban families, home-based production played a role in increasing food security (UNDP 1998). By engaging in household agriculture and domestic processing, families also avoided the serious seasonal fluctuations in the market prices of fruit and vegetables, and the relatively high prices of preserves and canned foods.

Urban farmers live in the periurban areas or in the villages around Sofia. Most are retired or have a job and do backyard farming in their free time. The primary aim of production is to contribute to subsistence needs; only excess production is marketed. In 1997, roughly 28% of the households in Sofia acquired some income from private farm production. Urban agriculture is a steady and quite high source of in-kind household income, while cash income from urban farming is often irregular (Bulgarian Early Warning Report 1998). In the period 1992-95, the products of urban agriculture officially represented only 1% - 2.6% of the total income of individuals and households in Sofia (National Statistical Institute 1997; 1998). However, as a rule, most agricultural activities are not registered and people do not declare the income from sales of agricultural products.

Although the service sector and manufacturing industry in Sofia are the greatest employers, the agricultural “black” and “grey” labour market is significant in size. Officially, 13,400 people are employed in agriculture. Total employment numbers are much higher than the official statistics, because of informal employment and
The typical characteristics of actors on the (informal) urban agricultural labour market are:

- family members and self-employed without strict registration requirements and tax obligations;
- unskilled workers, unemployed for a long period, who are hired occasionally or for seasonal jobs; retired people, students and even children are also employed in urban agriculture; and
- people developing small businesses, and people employed in state enterprises and government agencies often working seasonally or in their free time (UNDP 1998).

### 3.2 Environmental pollution and urban agriculture

The traditional focus on heavy industry in socialist Bulgaria had a severe impact on soil, air and water pollution in Sofia. According to a 1989 survey, about 78% of the agricultural land in Sofia is polluted (Spassov et al. 1994); 37% of the farmland is classified as degraded, meaning that land in these areas has lost its agricultural and environmental functions.

The metallurgical plant Kremikovtzi alone pollutes an area of 3,374 ha and contaminates about 200 ha of agricultural land with heavy metals. In the Kremikovtzi village area, 87.3% of the 5,790 ha is polluted above the permissible concentration levels. Another example is Novi Iskar, where a 1996 survey found that, in 18 out of 34 soil samples from farmland and backyards, the lead concentration exceeded norms by 1.5 to 14 times; 4 samples contained zinc up to 4 times the highest permissible concentration (HPC), and in one test copper levels were three times the limits of permissible concentration (LPC) (State Gazette 43, 1997).

The impact of this pollution on crops became clear from a survey in the Kremikovtzi area (see Table 5): 86% of the samples were medium-polluted arable soil, 8.9% heavily polluted and 1.8% extremely heavily polluted.
The main sources of air pollution in Sofia are the metallurgy and energy plants. These industries lack advanced pollution controls and purification technologies, and use low-quality raw materials. The concentration of contaminants in the atmosphere in Sofia exceeds the sanitary standards. The average atmospheric pollution is 5.8 HPC. The calm weather during most of the year causes retention of the emissions and contamination of industrial zones, the surrounding villages and the eastern residential areas (National Centre for Sustainable Development 1997).

The water of the Iskar-Lesnovska, Kakach and Blato Rivers is not suitable for any agricultural use according to findings of a 1997 study, and is qualified as highly polluted. The inspection of Kakach River, in which industrial and household wastewater is released, reports the highest degree of water pollution, including severe contamination with oil products (National Centre for Sustainable Development 1997, Pelovski 1998). However, all of these rivers are being used as a watering source for domestic animals. Two tests of local drinking water sources show concentrations of ammonia, nitrites, nitrates, lead, iron and zinc to be above acceptable limits, and also the presence of phosphates. With these levels of pollution, the two sources are suitable neither for domestic use nor for irrigation of leafy vegetables and fruit (Spassov et al. 1994, JICA).

### 3.3 Institutional mechanisms

Because of reduced budgets and a policy to reduce the role of the government, as a reaction to the strong State in the socialist era, enforcement of existing regulations has become more difficult. On the other hand, most regulations do exist and government institutions still have highly-qualified staff and regulatory frameworks inherited form the socialist era (e.g. for land-use planning, construction and...
environmental protection). In the 1980s, new legal statutes were introduced to allocate appropriate land use. Special measures were taken to preserve the areas for self-supply, as their importance was well recognised, and to reduce and regulate the construction of second homes. However, on account of the political transition, the implementation and enforcement of such measures has become problematic. A clear example is the law for protection of farmland, which was to inhibit construction on agricultural land (State Gazette 35, 1996). Now, with the land returned to the private owners, the land-use allocation has been easily changed, resulting in house construction on farmland.

Bulgaria has a strict system of sanitary-hygienic standards. This permits the monitoring of serious controls and the imposition of restrictive land-use regimes, if necessary. These standards are currently also imposed to bring the Bulgarian standards in line with EU regulations (State Gazette 39, 1984; Tenev 1995), and a host of organisations is involved in monitoring and enforcing environmental regulations.

The “Regulation for qualification and marketing of fresh fruits and vegetables” is meant to guarantee control over all movements of goods and products from the yard to the market. The Law for Trade will establish strict regulations on traders in the future. Proper documentation of quality will be required for each product offered on the market (Panayotova 1998, Hadgievea 1997). The auctions and open markets are supervised by the State Veterinary Sanitary Control and the Hygiene and Epidemiology Inspectorate. There are mobile laboratories on the spot, for example, checking the nitrate concentration (State Gazette 46, 1994; 89, 1996). The process is transparent and everyone can check the quality of the products.

4. Prospects and constraints for urban agriculture in Sofia

In Sofia, there exists a good knowledge infrastructure as well as sufficient qualified staff to integrate urban agriculture into town planning in order to minimise health risks associated with urban agriculture and to provide support to its development.

The continuing urban sprawl facilitated by less strict control of regulations extends into the periurban zones, where traditionally much urban farming was done. These zones are becoming densely-populated residential areas; this reduces the availability
of farmland. At the same time, the newly rich no longer produce food themselves but seek clean food products from the farmers in the neighbourhood.

After 10 November 1990, a process was started, to return agricultural land to its former (pre-socialist era) owners. This is a slow process, because many disputes and difficulties have arisen. An especially large number of problems arose concerning the land close to large cities. Often this land in villa zones was issued under the State Decrees for self-supply, with permission to construct buildings up to 35 m² big. The former owner then received a plot with a building on it which belonged to the new owner. Consequently, either the new owner has to buy the land back, or the previous owner must buy the building from the new owner. In Sofia, 42.4% of the land has not yet been returned to the former owners. Farming is done with temporary land-use rights which inhibits long-term investment in improving the land.

The unclear land-tenure situation and slow adoption of the laws have resulted in a non-existent market for agricultural land. It is difficult to obtain credit for agriculture as land is not accepted as collateral. The few possibilities that do exist to obtain loans have requirements which are difficult to be met by farmers in the informal sector. However, the process of restitution of land has sped up over the last two years and should be finalised in the second half of 1999. Secure land status can give new opportunities to enhance private farming initiatives, self-employment and self-supply with agricultural products (Doichinova 1996).

A prime factor encouraging farming around Sofia is the proximity of markets for the agricultural produce. The central markets are one to one and a half hours away from the outermost parts of Sofia is 1-1.5 hours, which ensures minimal transport time and expenses. The urban and periurban farmers can offer their products directly at the markets, without middlemen. They can also open their own retail stores to sell their products directly. Another advantage of the short distances is that it is easy to sell perishables. People from the high-density areas are even prepared to travel to the peripheral areas of Sofia, where they can buy fresh milk and other milk products directly from the farmers.

There is a trend to reduce the use of chemical fertilisers on account of their high price, while the use of natural fertilisers increases. Urban farming is thus increasingly less likely to contribute to pollution and, at the same time, it creates
opportunities for waste recycling by composting. There remains, however, the danger of contaminated crops, which is currently difficult to control since such a large part of the production is not marketed but rather consumed at home. On the other hand, environmental awareness and concerns over industrial pollution are increasing. Institutional control should improve, as well as the provision of information on contamination and health risks in the moderately and highly polluted lands.

Vacant plots in residential areas can be turned into community gardens. The inhabitants from the neighbourhood could acquire plots in these gardens to grow vegetables or flowers. Community gardening is an opportunity to increase social exchange, to improve the environment, to raise the value of property and to increase the safety of neighbourhoods.

The growing of vegetables on rooftops, in schoolyards, balconies and on idle lands is also possible and would be beneficial for Sofia. Land-use planning can enhance the use of neglected areas for urban farming. Mini-farming and school gardening can provide on-the-job training for young people and the permanently unemployed. Among other positive social effects of gardening is that it could be used as a therapy and improved self-support for mentally and physically disabled people, drug addicts, etc.

Municipal strategies are needed to further promote private initiative in urban farming. Measures such as extension of cheap credits for agriculture, creation of a municipal agricultural investment fund, promotion of foreign investment in the processing of local agricultural production and reduction of the production risks can support the process of stabilising private urban farming. Strong linkages still exist between urban families and the rural areas, along with a tradition of agricultural production on a limited scale. This is an enormous asset in further developing urban agriculture in Sofia.
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CITY CASE STUDY SOFIA


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