

## Research Findings

### The Role of Extension in Bulgaria in Increasing Agricultural Productivity - Experience over the last 20 Years

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Agriculture and forestry are important sectors in the Bulgarian economy making a significant contribution to the country's GDP, exports and employment. The total land area of Bulgaria is 111,000 km<sup>2</sup>, of which 50.9 percent (5.7 million ha) is devoted to agriculture. In 2009 the utilized agricultural area (UAA) was 5.3 million ha covering 45.3 percent of the country's landmass, the arable area making up 3.12 million ha. Permanent grasslands, meadows and orchards account for 34.2 percent of the UAA and permanent crops, 3.3 percent. Most of the agricultural land area is used for cereal production (over 50 percent of the arable land), and the cultivation of sunflower, oilseed rape, potatoes, vegetables (tomatoes, cucumbers, peppers, cabbages), vineyards, orchards (apples, plums, peaches, cherries, apricots) accounts for the rest.

In the days of socialist control, the big collective farms had sufficient agricultural specialists – agronomists, livestock breeders, economists and engineers. Some elements of advisory services were developed but they were not systematic. The most effective service was organized for fertilizer recommendations. At that time, the state subsidized the monitoring of soil nutrient status, and fertilizer recommendations were based on the

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In this document the terms "extension" and "advisory" are used as synonyms.



Farmers' meeting with extension officers, Troyan, Bulgaria. 2009. In recent years these types of meetings are regularly conducted throughout the country. Photo by M. Nikolova.

soil analytical data. However, because of the absence of both private land ownership and a market economy, fertilizer recommendations were not well implemented.

During the transition to a market economy the collective farms were disbanded and the land restituted - a development which created significant fragmentation in land ownership. The average size of agricultural plots is now 0.62 ha and the number of registered farmers in Bulgaria is over 91,000. Approximately 97 percent of the total number of farms are small, between 0 and 4 economic units (*Note: A European economic unit (EEU) is a measurement of the difference between gross agricultural product and the cost of production; 1 EEU = 1,200 Euro*), but they cultivate only 18.2 percent of the agricultural area. At the same time, 0.4 percent of the total number of farms are large-scale (over 40 economic units), and they cultivate 67.8 percent of the total agricultural area.

The new farmers emerging after disbandment of the collective farmers lacked knowledge and experience in farming. This disadvantage, together

with the accompanying economic constraints affecting all the agricultural practices, depressed production. For example, fertilizer usage dropped significantly. Compared to the years before the reforms, fertilizer usage was lower by about five times for nitrogen, 10 times for phosphorus and up to 50 times for potassium. These lower rates of fertilizer consumption were reflected in yield decreases in all the main crops. There was thus a clear need for developing a system for an agricultural advisory service for the new agricultural producers.

In the late 90s in Bulgaria, the development of a system for agricultural advisory services was started under the EU PHARE projects (The PHARE program is one of the three pre-accession instruments financed by the European Union to assist the applicant countries of Central and Eastern Europe in their preparations for joining the European Union) and in 2000, a National Agricultural Advisory Service (NAAS) was established under the Ministry of Agriculture. NAAS activities began in 2001 which marked the beginning of a professional

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extension service in Bulgaria. NAAS has a central department in Sofia with 27 area offices, one in every regional centre of the country in which agronomists, livestock breeders and economists are employed. A well equipped analytical laboratory for soil, plant, forage and water analyses was also set up.

NAAS's mission statement is to support state policy implementation in the agricultural sector as well as the achievement of the Ministry of Agriculture and Food priorities and goals for carrying out effective and competitive agriculture in Bulgaria by providing qualitative up-to-date and useful information and technical assistance to the farmers. The national advisory services aims to benefit the customer (the farmer) and create value on the farm.

The versatile activities of NAAS focus on various topics depending on priorities. Before EU accession, the main areas of interest were directed to the preparation of Bulgarian agriculture to EU standards:

- Common agricultural policy explication
- Grain production development
- Restoring and establishing of fruit orchards
- Balanced fertilization and soil fertility
- Quality live-stock production
- Organic farming
- Assistance to producers groups foundation
- Assistance to agricultural accounting.

In its work, NAAS applies most advisory methods and tools including specialised technical advice, knowledge and information dissemination, field trials, demonstrations, seminars, development of projects, education, training and courses. NAAS also provides the link between research and practical farming and participates in international projects involving

**Fertilizer use in Bulgaria, 1990-2009.**

Year	N fertilizers		P fertilizers		K fertilizers	
	<i>kg ha<sup>-1</sup> N</i>	<i>mt</i>	<i>kg ha<sup>-1</sup> P<sub>2</sub>O<sub>5</sub></i>	<i>mt</i>	<i>kg ha<sup>-1</sup> K<sub>2</sub>O</i>	<i>mt</i>
1990	85.1	395,900	14.5	67,700	2.3	108,400
2000	30.9	155,400	3.4	21,400	0.5	1,100
2009	35.3	177,600	6.1	30,700	2.4	11,800

knowledge transfer.

For example, the "Balanced fertilization program" was developed using the advisory methods and tools mentioned. An important precondition for its success was the training of all NAAS agronomists in plant nutrition, soil testing, and fertilizer recommendations. Later the NAAS experts organized and provided training to local agricultural producers. The Central NAAS department also published several brochures devoted to balanced fertilization and best fertilization practices, as well as specificity of N fertilization etc. Local experts regularly prepare information bulletins, calendars etc., focused on present day problems. The experts also assist farmers in taking soil samples and in providing fertilizer recommendations. Demonstrating the advantages of site specific fertilization based on soil analyses has been particularly effective especially as the samples are analyzed free-of-charge at the NAAS laboratory.

A very impressive means of implementing good fertilization practices has been achieved by carrying out demonstration trials with different fertilizers and crops. Such trials have been conducted mostly in collaboration with IPI on various crops including wheat, barley, sunflower, oilseed rape, potatoes, cherries, peaches, and grapes. Events with farmer groups have been held to present and discuss the results of these field experiments. Annually 10-15 seminars devoted to balanced fertilization have taken place. Some of these meetings with farmers were organized under the IPI umbrella whereby a number of very attractive and effective seminars were held. On these

occasions, Dr. Thomas Popp, IPI Coordinator for Central and Eastern Europe, presented IPI activities in general as well as the work of IPI in Bulgaria. He also gave lectures devoted to balanced fertilization and the effect of potassium in different trials carried out across the country. IPI has also published several brochures in Bulgarian about the effect of potassium fertilization on different crops including cereals, sunflower, potatoes, tobacco, vegetables, fruit crops, and vineyards. These brochures have been disseminated free-of-charge. In particular, the IPI Research Topic No 18 "Potassium – nutrient for yield and quality" has proved to be very popular among farmers, agronomists and students. A second revised edition was published in 2010 (see on [IPI website](#)).

Special attention has also been paid to fertilization research in Bulgaria. From evidence of an inadequate amount of research on the effect of potassium on vine and fruit crops a special seminar "Balanced fertilization of fruit plants and vine" held in Plovdiv, 2003 was organized by IPI and NAAS with Bulgarian and invited scientists from Hungary and Germany working on fertilization issues. During the seminar, the research achievements in balanced fertilization for these crops were presented and discussed and the needs for future investigations were outlined.

Thanks to the NAAS extended balanced fertilization program supported by IPI, farmers have gradually been convinced of the benefits of site specific fertilization so that the demand for soil testing increased 6.5 fold during 2001-2007. After a prolonged period of low application, a tendency for significant



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increase in phosphorus and potassium application was registered. In 2009, the use in phosphate fertilizers was 3.6 times and in potash fertilizers 5.1 times greater than in 2001.

Fertilization has been optimized for the main crops, with P and K rates per unit area for wheat and maize being doubled and those for sunflower increased four-to-five times. It is known that fertilization is not the only factor affecting the yields but it is a powerful factor and a clear tendency for increasing or stabilizing yields in main crops has been observed. For the same period (2001-2007) the average yield increase for wheat was 20 percent, maize 10 percent and sunflower 29 percent.

After EU accession, NAAS priorities have been aligned to the implementation of EU Common Agricultural Policy and the Rural Development Program (RDP) for 2007-2013 in Bulgaria - the main program document relating to utilization of EU funds. According to the Bulgarian RDP, NAAS is the single beneficiary under measure 143 "Provision of farm advisory and extension services in Bulgaria and Romania". NAAS orientated its responsibilities primarily to business plans and application form preparation for new measures including the following themes: Support for young farmers, Supporting Semi-Subsistence Farms Undergoing Restructuring, Setting up Producer Groups, Agri-environmental Payments, Modernization of Agricultural Holdings, Diversification with Non-agricultural Activities; Improving the Economic Value of the Forests; and Adding Value to Agricultural and Forestry Products. NAAS experts also provide farmers with advice, information and consultations as to how to achieve the objectives of the business plans. Unfortunately in 2007 the NAAS laboratory was closed because of political reasons and no longer offers free soil analyses and recommendation



*Experimental plot by the Extension Service, Bulgaria. Photo by M. Nikolova.*

services to the farmers. Some other university and institute labs carry out soil analyses but are limited in number and do not provide a systematic approach.

Recently the new NAAS administration has realized that there is still a need to increase producers' knowledge concerning fertilization practices in the country. The farmers still prefer to use nitrogen whereas phosphorus and especially potassium application is low. Over the last two years the unfavorable N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O ratio of 100:17:8 has been reported. Moreover, nutrient balances are negative – the national deficiency in 2009 is about 90,000 mt for nitrogen, 105,000 mt for phosphorus and 244,000 mt for potassium. NAAS and the other consultants (universities, institutes, and private sector) therefore need to put more effort into improving fertilization practices. A valued contribution in this respect is the International Plant Nutrition Institute (IPNI) project for Bulgaria titled "Best management practices for sustainable crop nutrition in Bulgaria" of which the main project goals are:

- to develop a nutrient management software with the objective of advising

farmers;

- to train and teach farmers and students good fertilization practices;
- to contribute to improving fertilization practice in the country.

An important development for the successful implementation of the project is the new change in policy in guidance from the Ministry of Agriculture in providing practical support for farmers. The NAAS analytical laboratory is also in the process of being re-established. NAAS, in cooperation with national universities and institutes, will once again be able to provide a program devoted to balanced fertilization. ■

**The paper "The Role of Extension in Bulgaria in Increasing Agricultural Productivity - Experience over the last 20 Years" appears also at:**

[Regional Activities/Central Europe](#)