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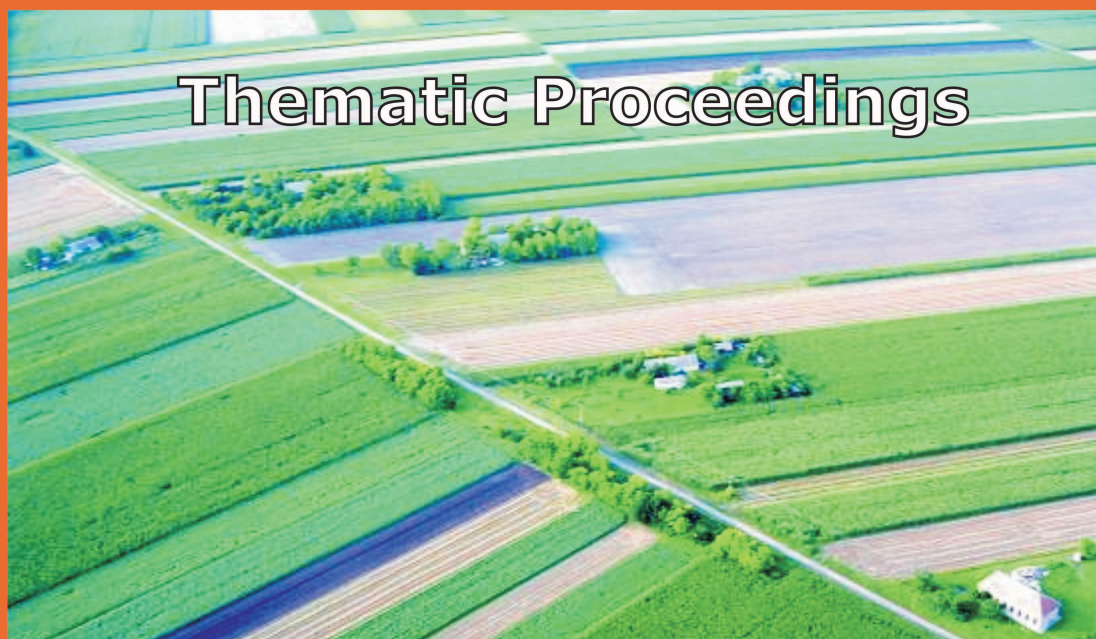
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# DEVELOPMENT OF AGRICULTURE AND RURAL AREAS IN CENTRAL AND EASTERN EUROPE



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## THE DEVELOPMENT OF CEEC AGRICULTURAL MARKETS AFTER EU ACCESSION

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### 1. INTRODUCTION

After a structural break that caused a decline in the agriculture sector of the Central and Eastern European Countries (CEEC), a recovery in the production of the crop sector has occurred and to a lesser extent in livestock production (OECD, 2002). Budgetary support mechanisms in the CEEC have changed through time. In particular, the before accession period of these countries to EU witnessed a switch from policies that were focused on input subsidies to policies that are comparable with CAP mechanisms. Prior to the CEEC' accession to the EU, CAP measures - such as area and headage payments, market support interventions and supply constraints - were introduced. However, the degree of their application differs across these countries.

Accession of CEEC to the EU has changed economic environment for agriculture significantly (Münch, 2000; Banse, 2000; European Commission, 2002b). Introduction of price support mechanisms followed by the introduction of Single Area Payments (SAPS) - except in Slovenia and Malta, where AGENDA 2000 standard scheme was applied – triggered agricultural commodities' price convergence towards EU15 price levels. Although these payments are decoupled, they could still induce production to some degree. Further steps towards integration of these countries into the CAP will be the introduction of CAP reform (for majority of CEEC probably after 2011) and increase in direct payments as agreed in Accession Negotiation Agreement (European Commission, 2003 and 2005).

This paper sets out the projections of agricultural sectors in countries of Central and Eastern Europe achieved from AGMEMOD country models. AGMEMOD Partnership consists of national agricultural experts from all EU27 member states

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in order to develop a model for forecasting economic trends on agricultural markets at the EU level as well as at member states' level. The aim of the Partnership is to project and run policy simulations in each country's agricultural sector and at the aggregate EU27 level. Behavioural equations reflect supply and demand side. Another appealing feature of these models is their feasibility to build in exogenous variables such as technological change, population growth, income and consumer preferences. Models provide production, domestic use, and trade and stock levels projections in crop sector, livestock and for dairy products until 2015.

AGMEMOD CEEC models account for more than three quarters of agricultural output of countries that accessed to the EU in 2004 and 2007. The focus of the paper is to analyse the production level of agricultural commodities and the trade potential of the CEEC under the accession conditions. As a baseline measure of this accession impact analysis pre-accession production and trade levels of CEEC will be considered.

The paper is structured into four sections. Following this introduction Section 2 is devoted to the methodological approach applied. It also provides information on data acquisition and policy assumptions of these outlook results. Main results obtained are presented in Section 3. Finally, the conclusions that are drawn from the research are presented in Section 4.

## **2. METHODOLOGY**

AGMEMOD Partnership has developed a model for forecasting economic trends on agricultural markets at the EU level. The objective is to build and validate econometric model of EU agriculture sector for projection and policy simulations. AGMEMOD EU model is build from blocks of national models implying that these projections and policy simulations are also possible at Member States' (MS) level. AGMEMOD models are econometric, dynamic, multi-commodity partial equilibrium models (Hanrahan, 2001). In general, AGMEMOD models consist of sub-models for grains (soft wheat, durum wheat, barley, maize, rye, and oats), oilseeds (rapeseed, sunflower, and soya), livestock (cattle, pigs, poultry, sheep & goats) along with its products and dairy products (milk, cheese, butter, skimmed milk powder, whole milk powder).

Country models and their commodity sub-models are built on a common format in order to link up with other partners' models and such provide integrated model for the EU as a whole. On the other side, each national model has to reflect specific problems and characteristics typical for agricultural sectors in that country. National model joints sub-models of individual commodities that are linked together through cross-price effects in supply and demand equations and price transmission equations which link domestic prices with international prices.

Commodity sub-models describe acreage, animal stocks, yield levels, production, commodity stocks, food and feed demand, imports and exports. Individual crop sector models are linked through the allocation of land, while crop and livestock sectors are linked through the use of feeds. Sub-models consist of numerous components which reflect various aspects of demand, supply and price determination and such represent particular commodity market structure in the form of linear equations. Each commodity market is in equilibrium when sum of production, beginning stocks and imports equals to sum of domestic use, ending stocks and exports. To achieve this identity a common rule was applied for all countries' sub-models: the closing variable is greater one of imports or exports. Hence, the closing variable is determined through a supply and demand identity, while the latter is determined by equation of various factors.

Country models present open economies that are influenced by markets of other Member States and the rest of the world. To capture these impacts, models use price transmissions to reflect the influence of EU and world market prices on their country prices. For each commodity, the market of a chosen Member State is seen as a key market and its respective price is considered as an EU key price that influences other Member States' national price of a given commodity. The Member State, which is considered as the key market has its price (key price) linked to the world price and EU intervention price. EU net export supply and EU net import supply determine equilibrium key price for each year. National prices other than key price are therefore derived via price equation linkage equations. Since none of CEEC is regarded as a key market for any of the modelled agricultural commodities, all their commodity prices are modelled using EU prices (key prices).

Besides key prices two additional types of exogenous variables enter AGMEMOD country models. Firstly, macro-economic variables like population, real GDP, GDP deflator and exchange rate between national currency and EURO. And secondly, agricultural policy variables, that are direct payments only. In Baseline version of the AGMEMOD models new Member States SAPS payments and the nationally financed complementary direct (coupled and decoupled) payments (CNDP) are assumed to have some supply inducing impact on agricultural production after Accession. The supply inducing impact of different types of payments is captured by deriving synthetic direct payments; these are added to the producer incentive prices (in euro per 100Kg) in the country models. Therefore, different multipliers are used to capture the possibly different supply inducing impact of the SAPS and CNDP payments.

The annual data was obtained from national statistics and academic databases in addition to New-Cronos and OECD databases as well as FAPRI forecasts. Equations in CEEC national models are estimated using annual data mostly from

1990 until beginning of 2000, which is considered quite a short period when estimating econometrically validated values of sub-models' regression coefficients. The estimation of the model parameters follows the general rules provided for in the AGMEMOD modelling approach (Hanrahan, 2001). However, due to data inconsistency and structural breaks in policy, calibration techniques were used. The econometric approach is generally used to give the initial values for the regression coefficients used in the models.

Policy assumptions for the new Member States (NMS) that joined the EU in 2004 underlie projections presented in this paper follow the Accession Agreement negotiated at the Copenhagen EU Summit in 2002. New Member State other than Slovenia have simulated the impacts of the accession on their domestic agricultural markets on the basis of the adoption of the SAPS (in 2004-2008 period) and the regional version - uniform payments per hectare - of the SFP scheme (from 2009). For Slovenia standard EU15 direct payment scheme and from 2007 onwards the introduction of static hybrid direct payments scheme based on regional flat area payments is simulated. Bulgaria and Romania applied the same policy assumptions as described for NMS other than Slovenia only that accession effects are implemented 3 years later since they joined EU in 2007.

### 3. RESULTS AND DISCUSSION

#### *Crop production*

The projected production and the net trade of grains and oilseeds in the CEEC are presented in Table 1. According to these modelling results, CEEC would greatly increase the production and net exports of **grains**, with Hungary, Romania and Poland producing more than 70 percent of total CEEC grains' production. In aggregate, CEEC production of **soft wheat** increases by about 19 percent with Poland in particular providing a significant increase in its production of soft wheat. The increase in **maize** production is more substantial at over 35 percent, which is largely driven by significant raise in production in Hungary and Romania. Returns of maize are relatively higher than returns of other grains due to higher yield increases. Demand from the EU15 for livestock feed should also be a factor. Technological transfer tends to be stronger in the case of maize than in the case of wheat and barley. Quality issues may remain a factor also in the case of the other grains, especially soft wheat, and this again may make maize production more attractive. In aggregate CEEC grains production is up over 20 percent on the 2001 level by 2015.

Due to increase in production, over the observed period, the CEEC achieve a sizable positive balance on net exports of grains. Already high self sufficiency levels in maize in Hungary continue to grow significantly as do wheat self

sufficiency levels in Bulgaria as well as in Romania, Poland and Czech Republic. Hungary, Romania and Bulgaria are by far the main contributors to the CEEC positive net trade balance for grains. This CEEC' positive grains sector outlook is due their relatively competitive grain sector and modernization of farms, which are now able to efficiently exploit their large scale production possibilities. The increase in net exports of grains is also a result of favourable conditions after accession such as increased feed demand from EU15, higher price levels, etc.

Table 1 Results for selected crop products in CEEC

	Total grain (000 t)		Soft wheat (000 t)		Maize (000 t)		Oilseeds (000 t)		Rapeseed (000 t)	
	2001	2015	2001	2015	2001	2015	2001	2015	2001	2015
	<b>Production</b>									
<b>Bulgaria</b>	5881	8499	4077	4858	873	2370	405	958	0	0
<b>Czech Republic</b>	6850	7690	4476	4669	409	482	1030	931	973	842
<b>Estonia</b>	446	465	133	183	0	0	41	179	41	179
<b>Hungary</b>	14524	19726	5197	6094	7858	12511	879	1134	205	247
<b>Latvia</b>	837	993	423	559	0	0	35	307	35	307
<b>Lithuania</b>	2084	3184	1076	1826	0	0	65	372	65	372
<b>Poland</b>	18866	19973	9518	11849	1362	1177	994	1222	994	1222
<b>Romania</b>	19703	22892	6314	7558	10803	12369	1291	2143	0	0
<b>Slovakia</b>	2995	3508	1766	1727	616	840	370	571	241	311
<b>Slovenia</b>	573	776	167	226	365	498	0	0	0	0
<b>CEE Countries</b>	72759	87706	33147	39549	22286	30247	5110	7817	2554	3480
	<b>Net trade</b>									
<b>Bulgaria</b>	653	3747	512	2447	-20	609	20	264	0	0
<b>Czech Republic</b>	790	1988	665	1261	34	33	424	142	386	102
<b>Estonia</b>	-216	-73	-127	-21	0	0	-18	22	-18	22
<b>Hungary</b>	6034	7133	2812	2473	2758	5201	196	278	72	34
<b>Latvia</b>	-51	20	14	111	0	0	14	94	14	94
<b>Lithuania</b>	83	784	207	716	0	0	48	332	48	332
<b>Poland</b>	-223	-238	-276	1634	154	-64	158	260	158	260
<b>Romania</b>	2579	3495	632	1386	687	710	154	268	0	0
<b>Slovakia</b>	351	481	180	155	-3	95	153	380	75	183
<b>Slovenia</b>	-446	-235	-116	-47	-245	-89	0	0	0	0
<b>CEE Countries</b>	9554	17102	4503	10115	3365	6495	1149	2040	735	1027

For **oilseeds** there are significant positive production trends in all countries, except in Czech Republic where these trends are negative. Nevertheless, Czech Republic, Poland, Hungary and Romania in particular are still main contributors to CEEC' oilseeds production. Moreover, it is projected that in 2015 Bulgaria will contribute more to CEEC overall oilseeds production than Czech Republic. These CEEC' notable oilseeds production growth is also a result of a good existing facilities for industrial scale production. Great **rapeseed** production growth is projected for the Baltic States. The increase in Latvia is over 700 percent, with increases in Lithuania and Estonia of more than 300 percent. Although their production volume is still much lower than in Poland and Czech Republic, the main CEEC' rapeseed producers, in 2015 the Baltic States will contribute 20 percent more to CEEC' rapeseed production than they did in 2001.

Rapeseed production growth in Poland and Czech Republic is projected to be 23 percent and -13 percent respectively and thus overall rapeseed production growth for the CEEC is close to 36 percent. Foreign investments helped to establish a good industrial chain for rapeseed production. In addition, technological production systems are facilitated by large scale farming in this sector. In contrast, Romania's and Bulgaria's notable contribution to CEEC' oilseed production accounts for **sunflower** production, which will raise by 67 percent and 136 percent, respectively. In general, crop producers will gain due to the relative increase in prices and direct payments after accession as well as expansion of domestic consumption.

### ***Livestock and dairy production***

Overall **beef production** in CEEC is expected to grow after accession. On a country level, results for Slovenia show negative production trends in production of beef after its accession to EU. This is mainly due to implementation of CAP reform, which resulted in a notably lower direct support in this sector decrease. Elsewhere production growth is recorded, especially significant in Hungary (over 100 percent) and also in Poland and Romania (over 50 percent).

The results indicate that the CEEC in aggregate would produce a modest exportable surplus in the medium term, which would be similar to what was achieved in late 1990s. However, this sector is continuously under pressure due to economic inefficiencies stemming from its poor structure. Beef production is mainly based on dual-purpose cattle breeds mainly used for dairy production. After accession to EU milk quotas were applied in these countries and this imposed constraining effect on breeding herd. Increase in expected milk yield per cow leads to substantial decrease of cow numbers due to relatively low milk yield per cow, which in turn negatively influences on beef production. A lack of quality standards and problems with hygiene requirements at abattoirs adversely affect production and export potential in the majority of countries in Central and Eastern Europe.



Table 2 Results for livestock products and fluid milk in CEEC

	Beef and veal (000 t)		Fluid milk (000 t)		Pork (000 t)		Poultry (000 t)	
	2001	2015	2001	2015	2001	2015	2001	2015
	Production							
Bulgaria	57	58	1253	1275	183	98	105	108
Czech Republic	209	268	2702	2720	584	510	312	367
Estonia	14	13	684	621	34	42	9	18
Hungary	56	116	2136	2166	346	730	466	542
Latvia	17	20	827	797	38	42	8	29
Lithuania	40	44	1730	2019	64	109	30	74
Poland	330	503	11781	11657	2033	2753	378	403
Romania	247	360	3648	3044	575	611	0	0
Slovakia	38	38	1147	1160	153	121	92	128
Slovenia	59	47	539	511	68	60	55	52
CEE Countries	1067	1467	26447	25970	4078	5076	1455	1721
	Net trade							
Bulgaria	-15	-36	-427	-415	-22	-34	-12	-11
Czech Republic	7	101	2097	2058	-5	-140	-1	-7
Estonia	-2	-4	609	539	-4	-6	-14	-18
Hungary	16	71	285	502	82	424	115	127
Latvia	-8	-1	672	658	-24	-24	-35	-20
Lithuania	1	12	515	777	-7	-40	-9	-6
Poland	-30	128	-5	-5	192	818	0	24
Romania	32	62	624	-6	-34	-61	0	0
Slovakia	1	2	840	819	-18	-30	-8	-35
Slovenia	13	7	100	92	-12	-16	7	-1
CEE Countries	15	342	5310	5019	148	891	43	53

These factors limit the potential increase in production in the CEEC beef sector. In some of these countries, the projected increase in production does not represent any real development of the sector, since it merely brings production back up towards the pre-transition level (e.g. in Estonia, Latvia, Lithuania). Beef net trade position of the CEEC has been positive since 2004. For main contributors to net exports of beef (Czech Republic, Poland, Hungary, Romania) outlook results show their relative emerging capacity over time. Several other CEEC would become modest net exporters of beef by the end of the projected period such CEEC may export over 20 percent of its beef by 2015 compared to 1.5 percent in 2001. Generally, the modelling results indicate that accession has a positive effect on CEEC beef

production and on net trade in most CEEC. The respective outlook for Slovenia's beef production and Bulgaria's beef net trade are less optimistic. But gains from EU membership are due to price increases and the provision of additional budgetary support and not their competitive position of this sector before the EU accession.

The introduction of milk quota system under EU accession influences the milk production in CEEC countries to differing degrees, depending on whether or not there is some slack in the reference quantity secured under accession. In general, production changes are small and accession should support the restructuring in the milk sector. Production is lower in 2015 than in 2001 in several countries (Estonia, Latvia, Slovenia, and Romania) suggesting that the milk quota and other market developments will have a constraining effect in these countries. Overall production in 2015 is lower by about only 2 percent relative to the 2001. Poland, Estonia, Latvia, Slovenia, and Romania show the greatest reduction in milk production relative to their production levels in 2001 with Romania topping the list. Other CEEC show positive medium term production trends, whereas in Latvia relative growth of milk production is the greatest. Poland is by far the largest milk producer although much of this is for internal consumption. By contrast, Czech Republic exports most of its milk production. Romania is the greatest CEEC net importer of milk. In the short term some sanitary and quality issues can be expected and over the longer term the competitiveness of the sector in the CEEC may be questionable.

The results suggest modest growth in CEEC **pig meat production**. Only Poland, Hungary and Lithuania exhibit relative increases in production that are worthy of note. Of those, the first two production levels are substantial and therefore these increases effect overall CEEC production to a substantial extent. Overall, the pig meat net trade position would improve six folds. Hungary and Poland remain the only net exporters of pork whereas others CEEC not only net importers but they are also lowering its pork production. Several reasons can be advanced for the modest growth in overall production. Many producers are relatively small in scale and the conversion of feed into meat tends to be inefficient, which in turn results in a lower quality of the resulting carcasses. The burden of raising standards in the meat production and distribution chain to meet hygiene regulations for export also hinders growth in some countries. It will take time for the CEEC to remedy this situation, thus the view that a contraction in production seems likely in some countries in the short term. However, in some countries a potential increase in production is projected either due to a low level of existing production (e.g. Hungary) or due to increased pig meat demand caused by increasing income level of consumers (e.g. Romania). Further investigation of some of these affects remains necessary. Poland and Hungary would improve net trade position in pig meat. Both are likely to find increased export opportunities for its pig meat in the EU15. Countries remain net importers of pig meat throughout the projection

period. Accession brings more competitiveness threats where domestic pig production has problems addressing quality and price issues.

The outlook for **broiler production** across the CEEC shows steady growth for most of the countries modelled. Production growth in Hungary allows it to remain a net exporter of broiler meat despite its increased domestic consumption. This growth of net exports in Hungary and Poland reflects the benefit of capital investment and restructuring which has been made. Overall, the sector should become more competitive and this should facilitate increased production in a number of CEEC. An important factor, which will benefit the sector, is the increasing demand from consumers for white meat. There is a significant growth of domestic use in the Baltic States and Slovakia. The increase rate in the Baltic States is particularly strong, even though production in these countries is not substantial. Surprisingly, broiler production in Slovenia declines and the sector is no longer a net exporter of broiler meats.

#### 4. CONCLUSION

The outlook indicates that farmers in CEEC will gain with EU accession due to higher prices and budgetary support. In most of the agricultural sectors real benefits appear when we compare projections with recent production levels. Nevertheless, when we compare these projected results with historical production levels achieved in the late 1980s and early 1990s the improvements appear to smaller extent. Accession gives rise to orientation in crop production where the CEEC become an important net exporter, especially for soft wheat, maize and some oilseeds. Bulgaria and Romania would become the most important CEEC' sunflower producer, Romania and Hungary the greatest maize producer. The latter also being the most important maize exporter. Poland would produce most of the soft wheat, followed by Romania and Hungary. The overall CEEC' export of oilseeds will be relatively low according to the overall CEEC production level.

A livestock production in CEEC would also benefit from the EU accession, among which beef and pork sectors would benefit the most due to higher post accession prices. Introduction of milk quotas would cause more limited production growth in dairy sector as being part of EU than they probably would if CEEC stay outside EU. These preliminary results remain subject to further investigation in order to improve the modelling structure and to engage country experts in order to review the output of these models. The methodology that has been developed to incorporate decoupled payments should be extended. However, the potential for analysis of relevant policy issues (Commodity outlook, WTO, further reform of the CAP) is clear.

The significant variations in projected outcomes for commodity production at country level are interesting both from a research and a policy perspective. These results, which are model based, may challenge those already available from other sources (EC, OECD). The scope of this paper does not allow a detailed discussion of specific country level results, but a crude summary would indicate that the most positive growth trends would occur in the Baltic States, Slovakia, Poland and Hungary. Romania and Bulgaria would increase their crop production and there would also be some improvements in their meat production.

It is quite uncertain how quality differences and sanitary requirements will effect the development of the sectors. Quality and sanitary divergences may persist into the future or there may be convergence in a relatively short period of time. The rate of progress in this area may affect the outcome for several sectors in CEEC agriculture in the medium term after accession. This uncertainty may additionally affect the projected path for some CEEC agriculture sectors.

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