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Exploring the potential for agriculture and trade in CIS: Synthesis of findings of the FP7 financed AGRICISTRADE project

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This project has received funding from the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration under Grant Agreement no. 612755

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1. Background, motivation and objectives of the research

The call for this research (published in 2012) is motivated by the expected intensifying trade relations between the European Union (EU) and its Eastern Neighbours as a result of (the then ongoing negotiations on) the establishment of Deep and Comprehensive Free Trade Agreements between the EU, Armenia, Georgia, Moldova and Ukraine, the accession of Russia to the World Trade Organisation (WTO) in 2012 and the creation of a Customs Union between Russia, Belarus and Kazakhstan in 2011. Russia and Ukraine already play an important role at the international cereal markets as exporters. Yet, productivity levels in these countries are far below potential agro-ecological attainable yields and there is a large supply of underutilised or abandoned agricultural land. If these countries could use their agricultural potential, it would have important consequences for their position at international markets as well as for the bilateral trade relations of the EU with these neighbouring countries.

The aim of AGRICISTRADE is to accompany these developments by analysing the potential impact of changing trade relationships of the EU with its Eastern Neighbours and by delivering insights on the potential developments of the food, feed and biomass sectors in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia and Ukraine. With the exception of Ukraine and Georgia, this cluster of countries is an important part of the Commonwealth of Independent States (CIS). [1]

Figure 1: EU's Eastern Neighbours within the AGRICISTRADE project

In 2012, political tension arose between the EU and Russia in the wake of the Ukraine government's Association Agreement with the EU in the first half of the year, whilst relations hit a low as the Ukraine fell into a political crisis. By the summer of 2014, increasing strains between the EU and Russia culminated in the imposition of trade sanctions on Russian imports of EU food products, which are still in place to this day, whilst the ongoing Ukrainian crisis continues to cast a shadow over East-West integration. As a

[1] Commonwealth of Independent States (CIS), established in December 1991, is a regional organization whose participating countries are former Soviet Republics, formed during the breakup of the Soviet Union. Ukraine (since March 2014) and Georgia (since 2008) are no CIS member anymore, yet for the sake of simplicity we keep the indication 'CIS' for all 8 countries we are talking about in this paper.

counterweight to the EU's ENP[2], the Eurasian Customs Union (ECU) formed in 2010 by signatory members Russia, Kazakhstan and Belarus was superseded on the first of January 2015 by the Eurasia Economic Union (EEU); with the aim of further extending regional market integration to both current and former signatory members of the Commonwealth of Independent States (CIS). Indeed, in that same year, EEU membership was extended to Armenia and Kyrgyzstan.

It is in this context that the AGRICISTRADE research project analyses the potential for agricultural development in the CIS and the possible implications of improved use of potentials for EU's trade relations with this cluster of countries. This paper concisely summarises the main findings of the project.

The paper is structured as follows. Section 2 features the agricultural sector and the agricultural policy framework in the CIS. Section 3 looks into future trade potential by estimating the ability of the CIS agri-food sector to compete at international markets. The section presents an estimation of the performance of the agrofood chain in the CIS benchmarked against major EU producers of agri-food products, and evaluates the extent to which CIS markets are integrated with international markets, identifying factors that constrain economic potentials. Section 4 focuses on biophysical factors and identifies existing unused biophysical potentials in CIS countries, i.e. abandoned land and yield potentials. Section 5 explains the toolbox used for generating projections and summarises the key features of the scenarios. Section 6-8 report on the model projected scenario outcomes in terms of CIS' agricultural production, use and trade, followed by qualifications of these outcomes by country experts in section 9. Section 10 concludes.

2. The agricultural sector and policies in the CIS

2.1 Key economic features

Agriculture is an important economic sector in terms of employment in CIS. The sector also contributes significantly to the economic and trade performance of the countries in the region (see Table 1). With the exception of Belarus and Ukraine, all countries have a trade deficit in agricultural and food products. Wheat and cow milk yields show an increasing tendency in several countries, yet levels show a great variation among countries and when compared with EU averages (not shown) these are on the lower end. Significant yield gaps, however, may also point at high production potentials.

The main agricultural sectors in Russia, Ukraine, Kazakhstan and Belarus are cereals, oilseeds, potatoes, sugar beets, meat and dairy production (see Figure 2 for most important crops). Azerbaijan, Armenia, Georgia and Moldova have favourable conditions for vegetables, fruits and cereals, with wine being the most important high-value agricultural product. In the region's meat sector, poultry meat is more important than pig meat, which is more important than beef and veal production, in volume terms.

2.2 Agricultural policy framework in CIS

The analysis of agricultural policy has been given an important emphasis within the project, as agricultural policy is an important driver of agricultural development.

[2] The European Neighbourhood Policy (ENP) framework is proposed to EU's 16 closest neighbours in the east and the south of the Union, regionally divided into the Eastern Partnership and a Euro-Mediterranean Partnership (EUROMED). The Eastern Partnership includes the countries Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

Table 1. Key economic features of the agricultural sector in the CIS

	Average	AM	AZ	BY	GE	KZ	MD	RU	UA
GDP/capita at current prices (USD)	2004-06	1,639	1,700	3,118	1,478	15,230	834	5,476	1,833
	2012-14	3,539	7,567	7,078	3,451	16,915	2,083	13,904	3,863
Agr. share in total GVA (%)	2004-06	n.a.	15.9	9.8	n.a	6.7	19.1	4.7	10.3
	2012-14	21.9[1)]	9.4	9.0[1)]	9.1	4.8	14.4	3.7	9.0
Agr. share in total employment (%)	2004-06	46.4	38.6	11.7	56.7	32.5	37.9	10.0	18.9
	2012-14	36.9	37.2	9.6	51.4	22.9	28.6	7.0	17.4
Agr. Trade balance (mill. USD)	2004-06	-253	-295	-605	-574	-1,142[2)]	-425	-13.0[3)]	1,152
	2012-14	-679	-1,070	1,741	-1,441	-3,901	60	-24.6[3)]	7,389
Wheat yield (t/ha)	2004-06	1.9	2.7	3.1	1.7	1.0	2.6	1.9	2.8
	2012-14	3.0	2.6	3.5	1.6	1.0	2.5	1.8	3.4
Cow's milk yield (kg/cow)	2004-06	2,015	595	3,464	1,043[4)]	1,912	2,605	3,240	3,664
	2012-14	2,204	718	4,446	985	1,808	3,574	3,572	4,434

Source: AGRICISTRADE database (2015). Notes: 1)2014 data, The World Bank; 2) 2005-06 average; 3) OECD data in bn USD; 4) 2006 data. Abbreviations: AM=Armenia; AZ=Azerbaijan; BY=Belarus; GE=Georgia; KZ=Kazakhstan; MD=Moldova; RU=Russia; UA=Ukraine.

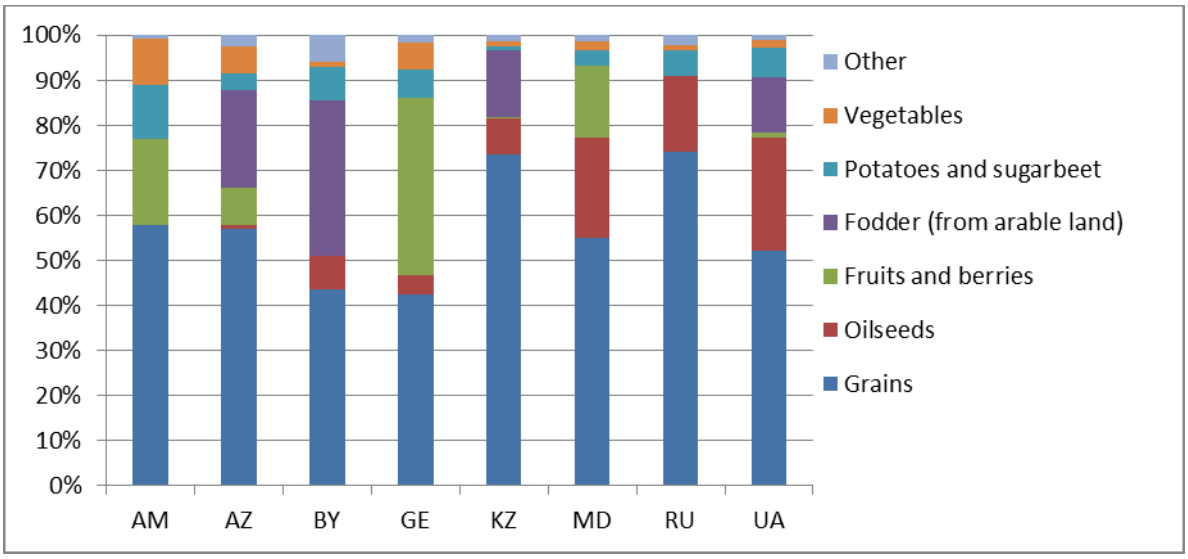

Figure 2: The share of arable area for crop production in 2012, %

Source: AGRICISTRADE database, June 2015; Eurostat, 2015.

Qualitative and quantitative analysis shows that the agricultural policy of CIS 8 has become quite differentiated, manifested in varying numbers of pre-transitional policy patterns still in existence, in different levels of market-price support, in trade policy liberalisation engagement and in the amount of funds available for agricultural policy. Yet, the priorities of agricultural policy exposed in strategic documents are quite similar, with a strong production-oriented character that emphasises food security. There are also other priorities, which indicate the primarily developmental role of agricultural policy, such as increasing competitiveness, productivity and export orientation. Policy priorities may be similar and only vary between countries in their emphasis, yet the choice and volume of individual instruments differ.

The examination of agricultural policy support through market price measures and budgetary support (analysed by grouping measures according to the basic OECD classification) demonstrates that, overall, agricultural producers were generally supported in Armenia, Azerbaijan, Georgia, Kazakhstan and Russia, and taxed in Moldova and Ukraine. In Belarus, overall total support to producers is close to zero.

The aggregate level of support to producers was mainly influenced by market price transfers, even though budgetary support also played quite an important role in most countries. In Russia, budgetary transfers to producers contributed about half of the overall level of support, while in Belarus the relatively high budgetary support more or less set-off the negative price transfers. In the entire region, budgetary transfers to producers are provided exclusively in production-coupled forms of support, mainly input subsidies, and direct payments are also quite important. Figure 3 also indicates that the relative level of total transfers to producers is close to the EU average only in Armenia, Azerbaijan and Georgia; in other countries in the region, support to producers is below the EU level.

Market-price policies range from heavily controlled markets in Belarus, to almost complete deregulation, mostly in the smaller countries. Russia is somewhere in the middle, while Ukraine and Kazakhstan are closer to the small ones. Import protection is present in all the countries and ranges from modest, mostly in the form of non-tariff barriers (like in Armenia and Moldova), to heavy-duty tariffs and tariff quotas in Russia, Belarus and Kazakhstan. Sometimes there are even bans, culminating in the 2014 Russian food embargo. The Eurasian Customs Union, as well as various Free Trade Agreements and the WTO play an important role in shaping trade policy measures as well as the subsequent trade patterns.

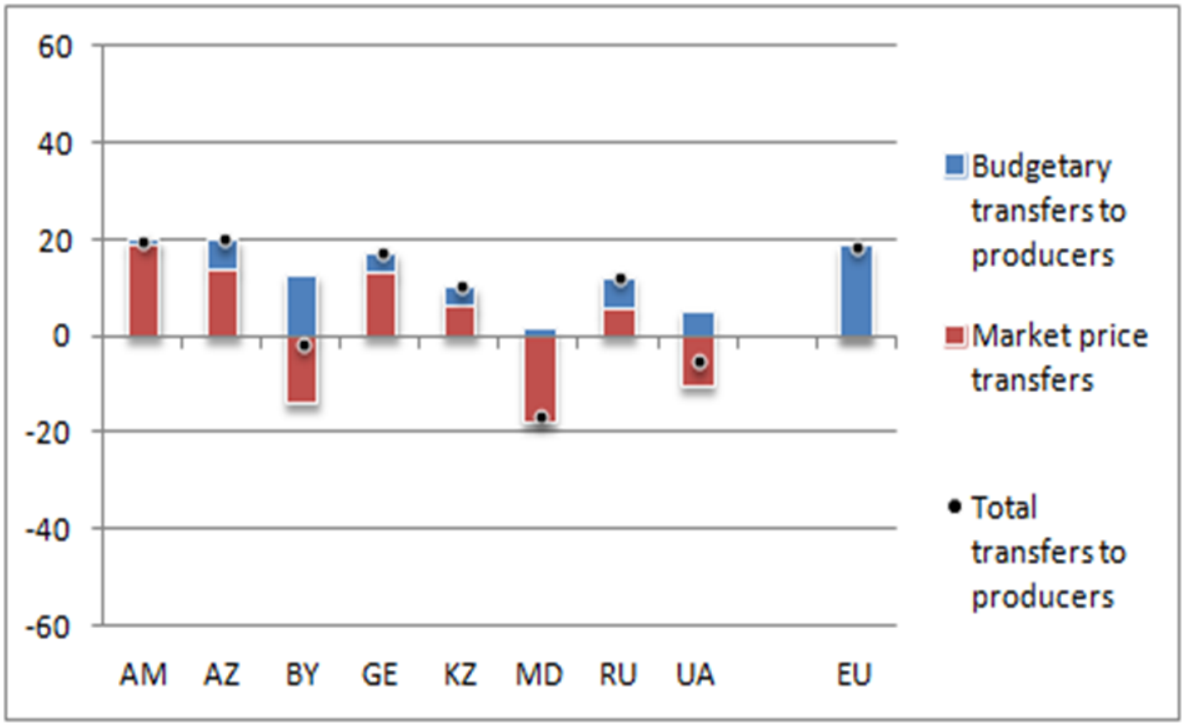

Figure 3: Total support (in % of the total production value in 2011/2012). Abbreviations: see Table 1

3. Agro-food supply chains and market efficiency

3.1 Supply chain competitiveness

Trade opportunities follow from the ability (of companies/sectors/nations) to compete at international markets. Due to a lack of comparable industry specific data, we applied Porter's diamond approach of international competitive advantage to analyse the competitive strength of the agri-food sectors in the four largest EU neighbours – Russia, Ukraine, Belarus and Kazakhstan, accounting for over 90% of total CIS agri-food production value. The performance of the agri-food sectors is quantified by a rich set of performance indicators and captured in a composite index of each of Porter's determinants of competitiveness. The indicators of Porter's determinants of competitiveness have been quantified for nine agri-food sectors and 10 countries (4 from EN and 6 from the EU), hence benchmarking CIS competitiveness against EU countries.

The overall results of the analysis for the whole agri-food sector indicate that agri-food chains in the four Eastern Neighbours have a weak position against EU competitors (Figure 4). Highest scores are on factor conditions and demand conditions, pointing at cheap resources (land and labour) and strong home country demand as major strengths, whereas related/supporting industries are relatively inefficient and the CIS lack 'good governance'. Hence, competitiveness would be enhanced with more efficient processing and distributing chains and by government policies that are more supportive to agri-food sector development. The latter need not be agricultural sector policies per se, but would refer in the first place to policies that help to establish institutional infrastructures that a market driven agricultural system needs.

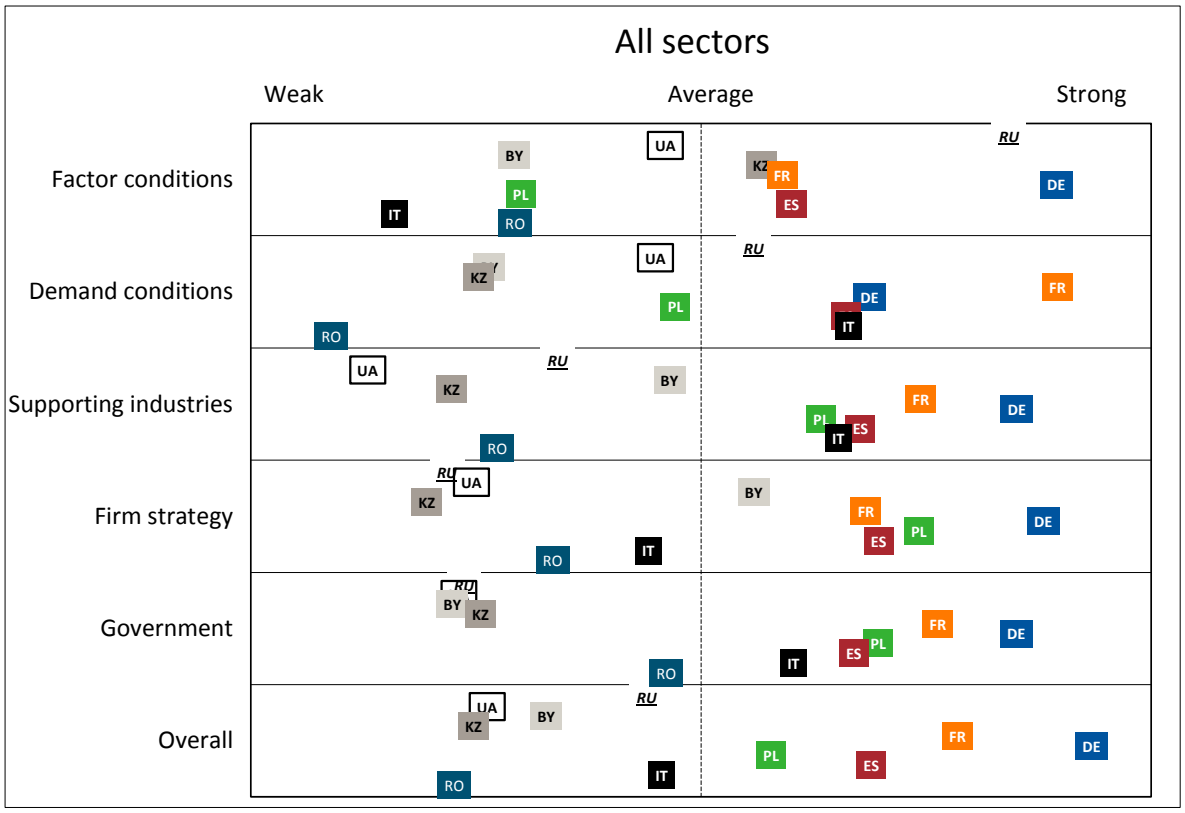

Figure 4: Scores on Porter's diamond determinants for all food sectors (Z-scores of presented countries).

Note: Countries are indicated by the 2 letter country acronym.

3.2 Market integration

One of the reasons why CIS agri-food supply chain might not be competitive is market inefficiency. If markets are functioning well, prices effectively transmit information (about supply costs and consumer preferences) from one end of the marketing system (farmers) to the other end (consumers), and vice versa, where no actor can exploit market power raising prices to his own benefit. Also, an efficient market is well spatially integrated in regional and international markets.

The extent to which selected CIS markets are integrated on the regional level (i.e. among CIS countries) and with selected international markets is investigated under the price transmission approach. Overall, the results indicate strong integration of the selected CIS markets with both reference markets, for particular country/commodities combinations.

Strong regional integration is particularly characteristic for those CIS countries that greatly depend on food import from the region. This is especially the case for wheat markets in Armenia, Azerbaijan and Georgia concerning that they import almost 90 % of wheat from the region (i.e. from Russia, Ukraine and Kazakhstan). Furthermore, the members of the Customs Union (i.e. Belarus, Russia, and Kazakhstan) show strong regional integration when it comes to pork and beef markets.

Integration with international markets is especially strong for those CIS markets that are export oriented, such as wheat markets in Russia and Ukraine. Also, the results indicate strong integration for those CIS markets that greatly depend on import of food outside from the region, such as pork, beef, and milk powder markets of the CIS countries.

3.3 Price transmission along the CIS supply chains

The price transmission results indicate almost complete pass-through of price changes from upstream sectors to downstream sectors of the selected CIS supply chains (blue column bar close to 1 in Figure 5). This is especially the case for the CIS meat supply chains and cheese.

Figure 5: Price transmission along the CIS supply chains (cross-product comparison)

The results of the short-run price adjustments indicate that producer prices adjust much faster to deviations from the long-run equilibrium compared to retail prices (green triangles versus red triangles in Figure 5). By comparing different price adjustments across the CIS countries, the results indicate that the

increase in a country's specialization in certain production reduces the speed at which retail prices adjust towards long-run disequilibrium for about 61%. This result might indicate an oligopolistic behaviour of retailers. Furthermore, the increase in import specialization also decreases the incentives of retailers to adjust their prices.

The country level analysis indicates that retail prices in Armenia, Azerbaijan and Belarus adjust faster to deviations from the long-run equilibrium compared to other selected CIS countries. While for Armenia this can be partially explained by the fact that the processing industry is not strongly developed, the results for Azerbaijan and Belarus are strongly connected with the fact that the respective governments are fast in adjusting retail prices towards price changes on the producer level. On the other side, retail prices in Kazakhstan adjust more slowly towards the long-run disequilibrium compared to other selected CIS countries. In contrast to Azerbaijan and Belarus, the Kazakh government makes the adjustment of retail prices only after several months of successive price increase on producer level. Concerning specific products, the results indicate that the retail prices of all selected products adjust more slowly to deviations from the long-run equilibrium compared to poultry prices (reference price). The main reason might be that poultry production is highly industrialized and conducted by large, vertically integrated enterprises which control the whole process, from production to final consumers.

3.4 Factors affecting CIS market integration and price transmission along the supply chains

Several key factors have been identified that have an impact on CIS market integration and transmission of price changes along the supply chains. First, for the CIS markets characterized by a high level of **market support** the results indicate moderate or even no integration with international markets (e.g. Belarussian wheat market). On the contrary, CIS markets with almost no state support, such as the beef market, are strongly integrated with international markets. Furthermore, sudden changes in CIS **trade policies** (e.g. export bans, export taxes, or export quotas) resulted in significant decrease of market integration and thus the transmission of price changes from international reference markets to domestic markets. This is especially the case for North Caucasus in Russia and Odessa in Ukraine, important CIS regions for wheat trade that are usually strongly integrated with international markets.

Second, strong regional integration of the CIS countries is based on the fact that they mainly trade regionally. Beside the regional **trade flows**, these countries have strong integration with international markets as well. The price **information** coming from the main international markets is used by regional CIS traders as a benchmark for negotiating regional trade. Similar considerations could be used for explaining strong market integration between CIS pork markets with regional and EU markets.

Third, underdeveloped **infrastructure** represents a great obstacle for market integration of many CIS countries. Deficient transport infrastructure, large distances between producing and consuming regions strongly influence the degree of market integration of different regions especially in Russia and Kazakhstan.

Fourth, strengthening trade relations through **trade agreements** significantly contributes to market integration of the CIS countries. The establishment of the Eurasian Customs Union (EACU) facilitates the trade process between Belarus, Russia and Kazakhstan. The results indicate that the EACU members have almost identical regional and international levels of integration (e.g. pork markets). Furthermore, strong market integration with the EU markets might be associated to numerous bilateral trade agreements between the EU and almost all CIS countries.

Fifth, lack of **producers' cooperatives** or **unions** significantly affects the ability of CIS farmers to improve their position within the supply chain end, especially their competitiveness when compared with importers. The results indicate that if the country is specialised in import of certain products, retailers tend to be more reluctant in adjusting their prices according to the price changes at the producer level. Furthermore, the

underdeveloped processing sector in almost all supply chains (for all CIS countries) represents a further obstacle for producers to be strongly integrated within the supply chain.

Finally, rapid **development of the retail sector** plays an important role when it comes to distribution of welfare along the supply chains. The results indicate that retailers in some of the CIS countries are gaining on power when negotiating procurement processes. This is especially the case for the retail sector in Russia when it comes to purchase of pork products. It should be stressed that in some countries the respective government is indirectly allowing retailers to increase their power by regulating retail prices. This is especially the case for Belarus, Azerbaijan and Kazakhstan.

3.5 Institutional environment

For identifying the main obstacles to trade of agro-food products in the CIS countries we have conducted a survey in 2016. The survey was conducted in all 6 CIS countries (all 8 but Belarus and Moldova) accounting for about 60 enterprises involved in trade of grain, meat, and dairy products. The main aim was to obtain more information on firms' characteristics, obstacles when doing their business operations, and food standards.

The survey results presented in Figure 6 indicate that the three main obstacles for agro-food trading firm's operation in CIS countries are customs regulations, necessary certificates, and the implementation of tax regulations.

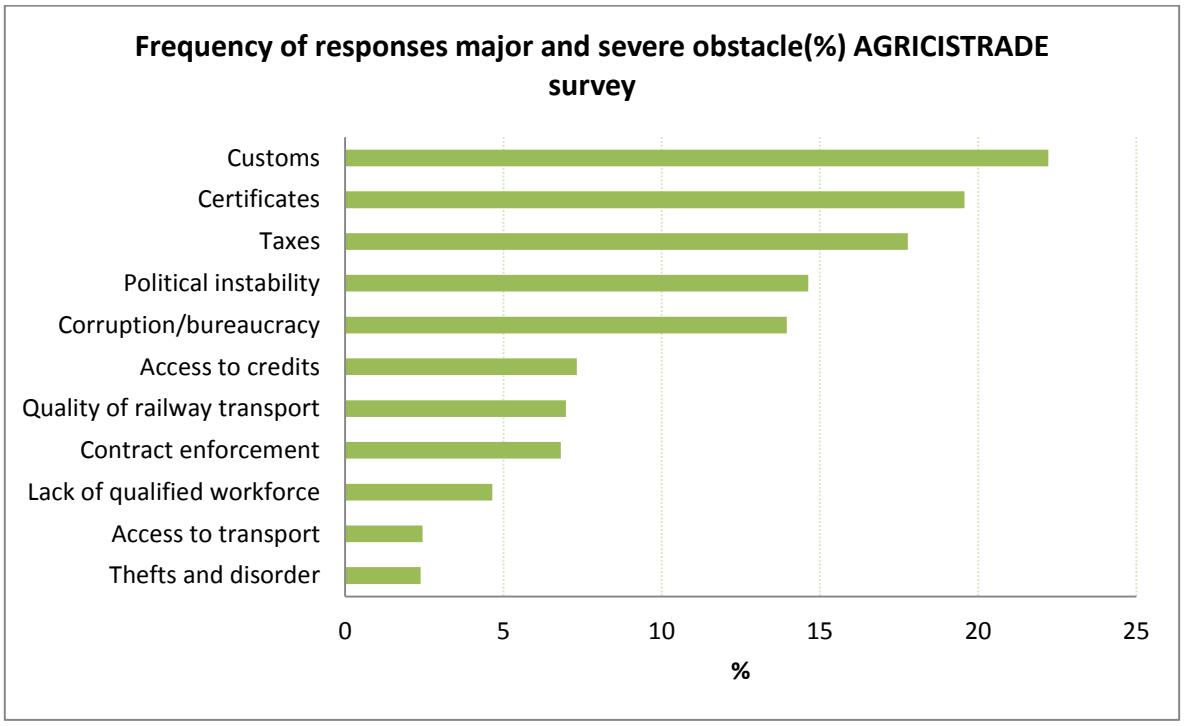

Figure 6: Main obstacles for firms in agro-food trade in CIS countries

Results obtained in the AGRICISTRADE survey are very similar to the results obtained in the survey of the World Bank (BEEPS survey) conducted in 2012/2013. The main difference is that the BEEPS survey was focused on food manufacturing and retail companies of the CIS countries.

4. Crop production potentials

Relatively large untapped agricultural potentials exist in countries of the former Soviet Union. During the 1990s, after the collapse of the Soviet Union, the agricultural sector was suddenly faced with increasing international competition, while at the same time subsides were drastically reduced and productivity declined. These developments lead to high abandonment rates of agricultural land and comparatively low yields in former Soviet countries.

To raise the unused agricultural potentials of former Soviet countries, higher investments in the physical infrastructure, particularly in storing and transportation capacities, are required. Improvements in the institutional environment (land market regulations, property rights, insurance system) could increase private investments. Furthermore, improved education systems, more agricultural research and development activities, and better access to financial resources would be supportive.

In order to explore production potentials we analyse the impacts of different investment scenarios for Russia and Ukraine. Under the assumption, that investment and development obstacles - as described above - are removed, we calculate the potential agricultural production of Russia and Ukraine. Thereby, a comprehensive view on the global agricultural sector is provided, taking economic as well as bio-physical constraints and relations into account. To this end, we firstly identify existing unused bio-physical potentials (i.e., abandoned land and yield potentials) in former Soviet countries – as presented in this section - and secondly integrate these data in the global economic agricultural sector model GLOBIOM (results of the economic assessment are presented in section 7).

The amount of existing abandoned land in former Soviet countries is estimated on a 300 m resolution level, integrating different land cover maps as well as official statistical data on land use (Figure 7). For Russia and Ukraine, a total of 31.2 and 2.6 Mio ha are estimated, respectively.

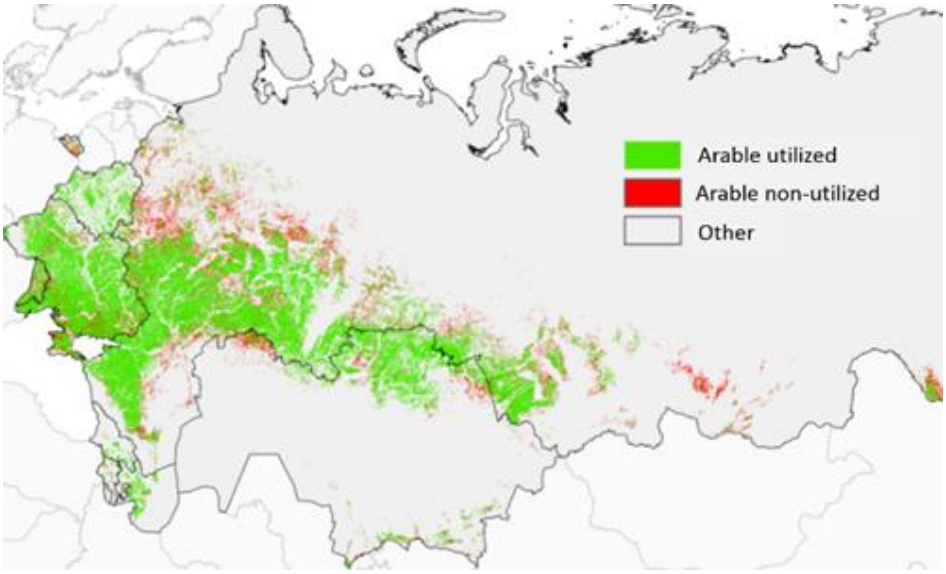

Figure 7: Land use map (entire CIS region).

Spatially explicit yield potentials for major staple crops in former Soviet countries are estimated with the process based crop model EPIC. Figure 8 shows yields of the main crops in Russia and Ukraine. Current yields are based on FAO figures while the Potentials represent the maximum achievable yields if all potentials are used i.e. without a constraint on fertilizers but still with the current share of irrigated area. Since yield potentials are a theoretical concept and it has been observed that yields hardly exceed 80% of their estimated potential yields, the presented potentials in Figure 8 only represent 80% of the estimated bio-physical potentials.

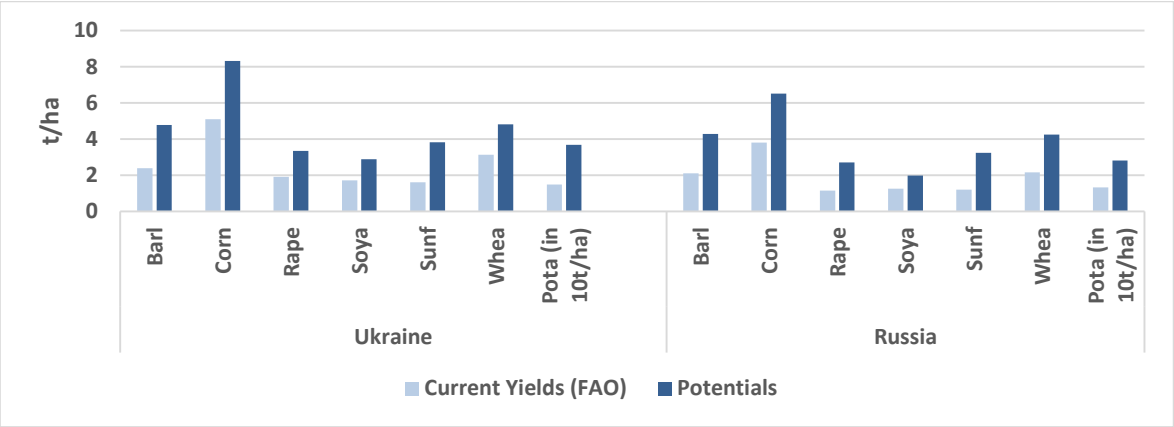

Figure 8: Current and potential yields in Russia and Ukraine.

5. Toolbox for generating model projections and Scenario narratives

5.1 Toolbox

This project has developed a toolbox for generating medium term projections up to 2030 on agricultural and biomass potential and trade based on the models GLOBIOM, MAGNET and AGMEMOD. Besides a separate use of the models, the models can be used jointly to analyse crop potentials and trade policy changes. With the help of the newly developed model junction linkage tool (MOJITO), the three models are linked through mapping of mnemonics, harmonization of exogenous variables and exchange of data.

The three models all capture agricultural production and markets but from different perspectives. Indeed, each model comprises different aspects with respect to agriculture – e.g. trade, soil properties, and detailed representation of the sector – which are lacking or underrepresented in the other models. AGMEMOD's strength is the richness of presentation of agricultural products and processing activities, while GLOBIOM's strength is the land use allocation taking bio-physical data into account. MAGNET's strength is the interaction between the agri-food sectors and the rest of the economy as well as the representation of bilateral trade, and hence is able to model the effects of different trade agreements between countries. In order to combine the strength of each model, we link them through the exchange of data; for instance AGMEMOD receives data on yield and land conversion from GLOBIOM as well as export and import changes from MAGNET. The outcome gives the best insights of future possible developments even though the results per model differ.

Details of these scenarios are presented in the sub-section below, on Scenario narratives. Then, in section 6, 7 and 8 we summarise outcomes of market and trade policy scenarios in comparison with a baseline. Due to its relative strength of representing agricultural markets and products in detail, we present AGMEMOD results of the scenarios, focusing on the impact on the cereals, oilseeds and meat markets in Russia and Ukraine in section 6. In section 7, we show output of GLOBIOM. In section 8, we show outcomes of trade policy scenarios using MAGNET, focusing on the impacts of different trade arrangements on agricultural activities within the overall economies.

5.2 Scenario narratives

The baseline or reference scenario is a business-as-usual scenario that assumes past trends will continue in the future and no new major policies are introduced. Trends in the four exogenous drivers (GDP growth, population growth, consumer preferences and agri-technology) are extrapolated. In the policy area, for the

EU this implies a full implementation of the reformed CAP to which has been decided in 2013. EU import tariffs at the external border are assumed to remain at current levels for third countries, and DCFTAs agreed with Ukraine, Georgia and Moldova are in force from January 1, 2015 onwards (implying zero bilateral tariffs). Current agricultural and trade policies in CIS countries remain in place, except for the fact that the Russian import ban on a set of EU agricultural products is expected to have been lifted in 2017. Regional trade links are further enhanced by the Eurasian Economic Union (EEU), comprising of Armenia, Belarus, Kazakhstan and Russia.[3]

In our technology scenario (Tech), institutional changes and increased public investments in the agricultural sectors of Russia and Ukraine result in advantageous developments such as better access to fertilizer, reduced credit constraints in the agricultural sector, increasing quality of agricultural education and better infrastructure. These developments eventually lead to better management practices, increased yields and thus, a reduction of the yield gaps between current and potential yields. Enhanced institutions guarantee the acknowledgement of land property rights and ensure a stable business environment.

To characterise a progressive stance with respect to increased trade co-operation, a 'Deeper Integration' (DI) scenario is designed. In practise, this scenario further reduces DCFTA-EU and intra-EEU trade facilitation costs by ten percentage points compared with the baseline. Furthermore, it is envisaged that Russia's relations with the West improve, characterised by increased trade integration between the EEU and EU regions through trade facilitation cost and tariff cost reductions; as well as lower tariffs on EEU-rest of the world trade.

The 'Liberalisation' (LB) scenario takes this vision of trade integration to a higher level, by envisaging a utopian vision of multilateral trade co-operation. More specifically, this scenario contemplates all of the trade shocks included within the Deeper Integration scenario, but further extends the remit of trade access to all countries in the world through tariff and NTM trade costs reductions.

Finally, the 'Trade Blocks' (TB) scenario assumes that Russia takes a much more introspective approach to foreign trade policy. Thus, tariffs and NTM related costs of foreign trade with the EEU customs union are raised in both periods of the simulation experiment between 2015 and 2030.

Scenarios in summary:

- Baseline: continuation of trends and existing policies
- Technology scenario (Tech): investment and institutional development
- Deeper integration (DI): increased cooperation between EU and EEU results in lower trade costs
- Liberalisation (LB): lower trade barriers at a global scale
- Trade blocs (TB): a world of trade blocs, more trade barriers between EU and EEU

6. Market Developments in Russia and Ukraine

Russian cereal harvests have been on a record level the last four years (see figure 9). In the baseline a moderate growth of cereal production is projected with an average annual growth rate of 1% for all grains and between 2017 and 2030. The projections assume average weather conditions and hence show results based on average yields that could be achieved. Note that actual future developments will have fluctuations. For the specific grains, the development is diverse: corn production growth by 48% from 2017 to 2030, while wheat and barley only grow by 9% and 15%, respectively. The growth of corn production is

[3] Kyrgyzstan is member since August 2015, but is not subject to our research.

due to an area expansion as well as yield growth. However, overall cereal area decreases by 2.9 mln ha from 2017 to 2030. This results in area decreases compensated by yield increases for all other cereals.

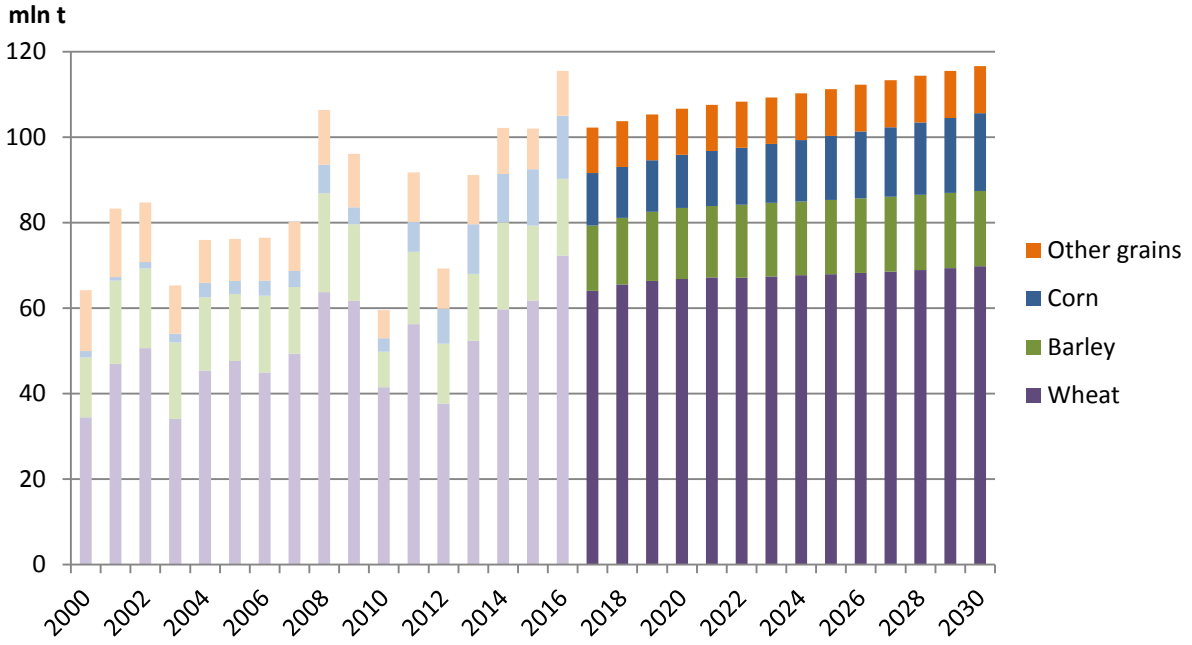

Figure 9: Russian cereal production in the baseline, 2000-2016 historical data, 2017-2030 projections.

Source: AGMEMOD database and own projections.

In the baseline, domestic use of cereals shows an upward trend from 2017 to 2030 (see figure 10). This is triggered by an increased demand for feed from the livestock sectors. Additionally, corn is used to a larger extend in the feed ration so that its use growth by 87% from 2017 to 2030.

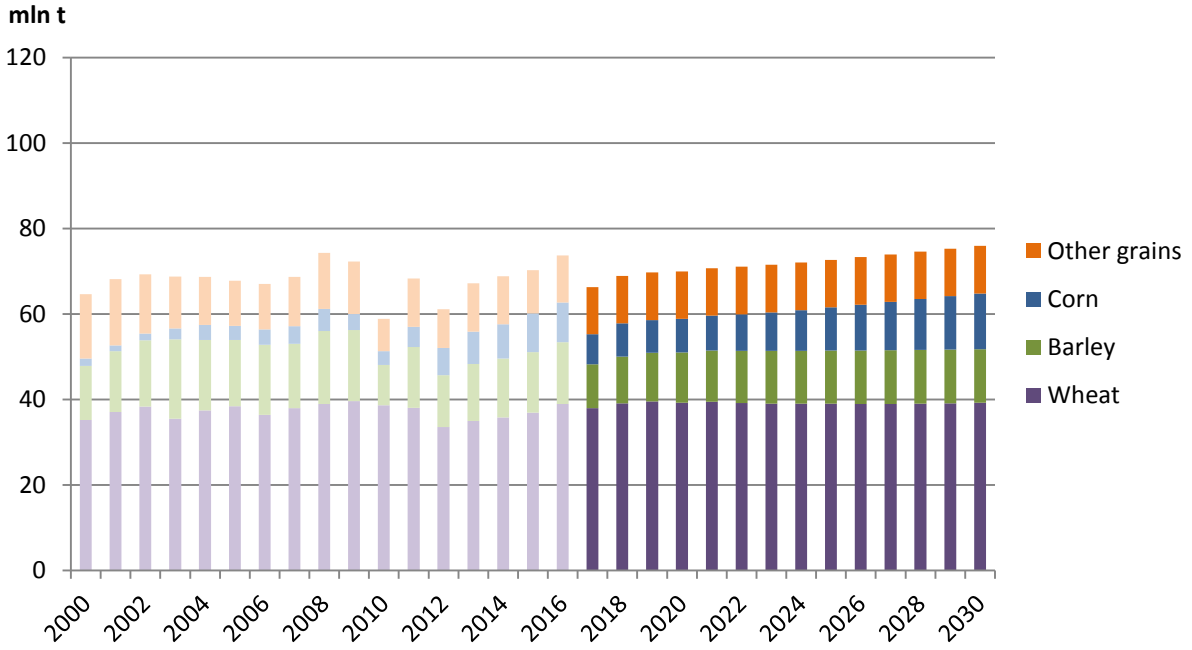

Figure 10: Russian cereal domestic use in the baseline, 2000-2016 historical data, 2017-2030 projections.

Source: AGMEMOD database and own projections.

As production and consumption, cereal exports also increase over the projected period. However, the steep historical increase is not continued in the projection period (see figure 11). Wheat shows the highest

growth with an increase of 20% from 2017 to 2030. Russia exported around one third of its cereals production in 2015, with wheat, barley and corn having a share of 40%, 25% and 35%, respectively.

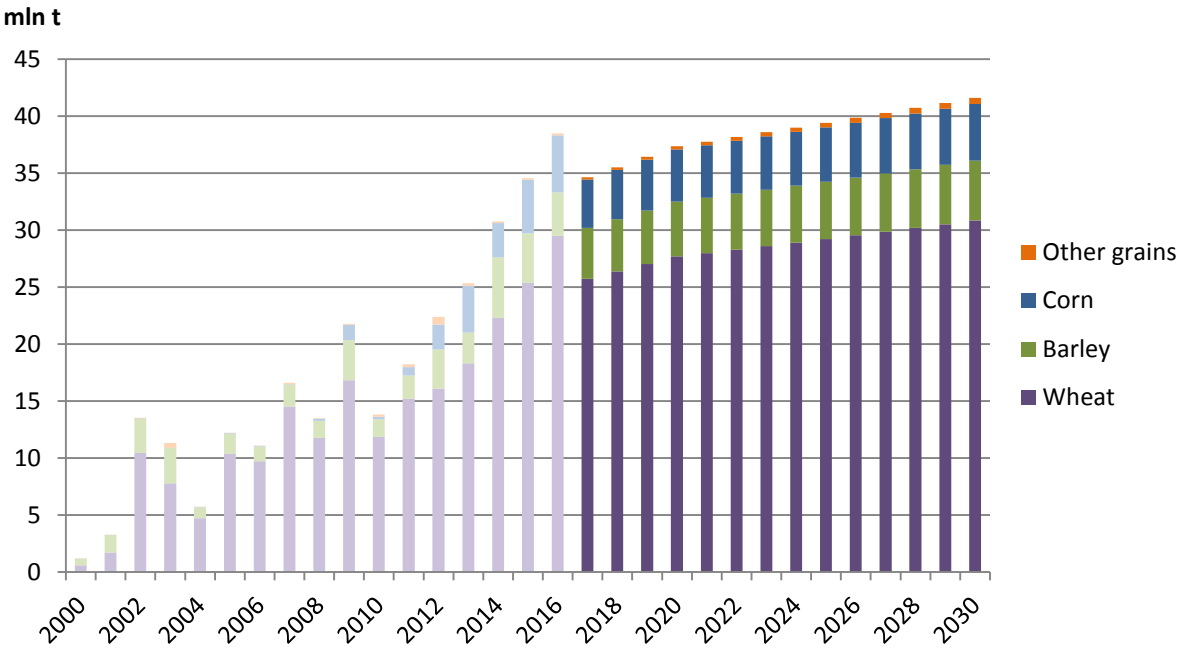

Figure 11: Russian cereal exports in the baseline, 2000-2016 historical data, 2017-2030 projections.

Source: AGMEMOD database and own projections.

The oilseeds sector in Russia is small with a production of 14 mln t in 2016 compared to the cereal sector with 116 mln t. However, its growth was much larger in the past and is also expected to continue in the projection period (see figure 12). Oilseed area expands by 2.3 mln ha from 2017 to 2030 with sunflowers, soybeans and rapeseed expanding by 1.3 mln ha, 0.8 mln ha and 0.2 mln ha, respectively. Additionally, yield growth of 23%, 28% and 26% are projected from 2017 to 2030 for sunflower, soybeans and rapeseed, respectively.

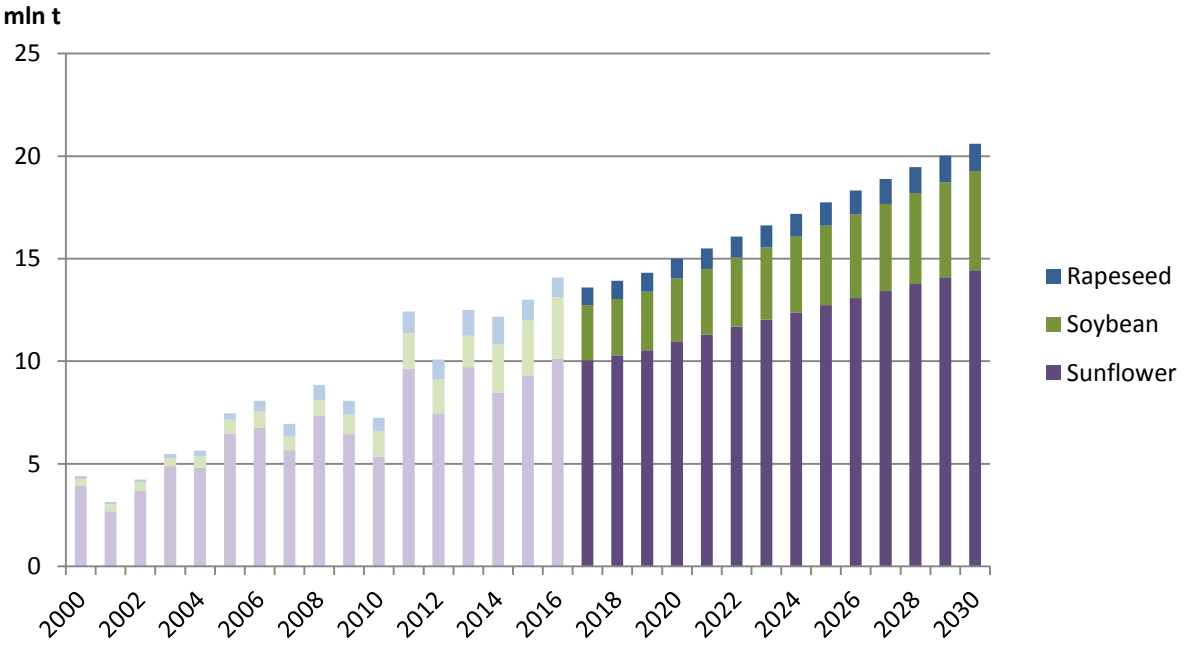

Figure 12: Russian oilseed production in the baseline, 2000-2016 historical data, 2017-2030 projections.

Source: AGMEMOD database and own projections.

The majority of the oilseeds are domestically processed into oils and meals. Only small amounts are traded with Russia being a net importer of soybeans of 1.7 mln mt in 2015 which does only slightly change till 2030 to 1.8 mln mt. Sunflower meal is exported to a large extend, 32% of total production in 2016 and rising to 49% in 2030, while rapeseed and soybean meal are used more domestically. Since 2007, Russia is a net exporter of vegetable oil and steadily growing. This continues in the projection period as production growth by annually 3% on average while consumption only growth by 1.7%.

From 2005 to 2015, the poultry and pork production grew steadily at an average annual rate of 12.6% and 7%, respectively. In 2015, production of pork and poultry was 3.1 mln t and 4.5 mln t, respectively. This large production growth was accompanied by an increase in consumption of annually 5% and 6% for pork and poultry, respectively. As a result, imports started falling from 2009 onward and even small amount were exported from 2007 onwards. For the projection period from 2016 to 2030, annual growth rates of 0.4% for pork and 2.3% of poultry production are below historical developments. Also consumption increase is below the historically observed values. Contrary to the pork and poultry sector, the beef sector historically declined and does so in the projection period as well.

In contrast to Russia, the Ukraine expands its cereal production more than its oilseed sector. The largest expansion occurs for corn which increases by 20.8 mln t from 2016 to 2030 to 53.7 mln t. Historically, grain exports have grown fast e.g. triplicated from 2005 to 2015. However, in the projection period this growth slows down toward an annual average growth rate of 1.4% and more is used domestically to feed the growing livestock sector.

The Ukrainian oilseed sector is larger than the Russian with a production of 17 mln t in 2015 and growing to 22.4 mln t in 2030 with sunflowers having the largest share in production. Sunflowers are processed domestically, while 76% in 2015 (81% in 2030) of rapeseed and 56% in 2015 (42% in 2030) of soybean production were exported as raw product. 4 mln t of sunflower oil or 88% of sunflower oil production was exported in 2015. This amount rises to 6 mln t or 91% of sunflower oil production in 2030. Sunflower meal is also mainly exported 91% and 96% of total production in 2015 and 2030, respectively. Ukraine turns from a soybean meal net exporter to a soybean meal net importer in 2023 in order to satisfy the feed demand.

Ukraine produced 2.4 mln t of meat in 2015 of which most is poultry, followed by pork and beef. Historically, the pork and poultry sector grew strongly, however less than in Russia. This trend continues in the projection period with Ukraine producing 3.3 mln t in 2030. Consumption growth with production as trade does nearly not change. Ukraine was and stays a small net importer of pork and a net exporter of beef. In 2013, Ukraine became a net exporter of poultry.

Table 2 shows the results of the technology scenario for 2030, for comparison the results for the baseline are also shown. In the technology (Tech) scenario, crop production generally increases. However, production of some crops decreases, e.g. barley in Russia and wheat in Ukraine, because these crops are less competitive and hence less area is attributed to them by the farmers. Most of the increased production is consumed domestically but exports increase as well.

The deeper integration (DI) scenario does not show large differences in production in general. The most striking observation is the increase of pork and poultry imports in Russia combined with an increased consumption level. The DI scenario is also run with MAGNET separately and these results are presented in the next section.

Table 2: Results of the baseline and the technology (Tech) scenario for 2030 in mln t.

PROD = production, CONS = consumption, IMP = imports, EXP = exports. Source: own projections

		Russia				Ukraine			
		PROD	CONS	IMP	EXP	PROD	CONS	IMP	EXP
Baseline	Wheat	69.8	39.2	0.6	30.8	28.4	16.0	0.0	12.4
	Barley	17.6	12.5	0.2	5.2	13.7	9.2	0.0	4.5
	Corn	18.2	13.1	0.1	5.0	53.7	32.0	0.1	21.8
	Sunflower	14.4	14.5	0.1	0.1	15.6	15.5	0.0	0.1
	Soybean	4.8	6.6	2.2	0.4	5.1	2.9	0.0	2.1
	Rapeseed	1.3	1.3	0.0	0.1	1.8	0.3	0.0	1.5
	Beef	1.3	1.8	0.6	0.0	0.4	0.4	0.0	0.0
	Pork	3.6	4.2	0.7	0.0	0.9	1.1	0.2	0.0
	Poultry	6.4	7.0	0.7	0.1	1.9	1.9	0.1	0.1
Tech	Wheat	88.9	54.3	0.6	34.6	21.8	9.2	0.0	12.6
	Barley	16.0	10.7	0.2	5.5	14.0	9.3	0.0	4.7
	Corn	28.6	23.0	0.1	5.2	60.5	37.9	0.1	22.6
	Sunflower	22.3	22.3	0.1	0.1	19.5	19.5	0.0	0.1
	Soybean	4.6	6.2	2.1	0.4	6.9	4.7	0.0	2.2
	Rapeseed	1.2	1.2	0.0	0.1	2.9	0.4	0.0	2.5
	Beef	1.3	1.8	0.6	0.0	0.4	0.4	0.0	0.0
	Pork	3.6	4.2	0.7	0.0	0.9	1.1	0.2	0.0
	Poultry	6.4	7.0	0.7	0.1	1.9	1.9	0.1	0.1

Source: AGMEMOD database and own projections.

7. Development of Yields

With the GLOBIOM model, scenarios are run, reflecting different investment and institutional development efforts. To this end, abandoned land is made available and new “high-input” production systems are implemented in the economic model GLOBIOM for Russia and Ukraine, based on the in Section 4 presented estimated agricultural potentials. These scenarios are compared to a reference scenario which reflects future developments without these additional efforts until 2030 – the so-called baseline (see also section on ‘Scenario narratives’ above).

In our Investment scenario (i.e., availability of high-input crop production systems and cheaper access to idle land), we observe less land use for crop production in Ukraine and Russia in 2030 compared to the reference scenario. The intensification of agricultural production has a land saving effect. Due to higher yields, demand can be satisfied with the utilization of less land.

In the same scenario, a better infrastructure and an improved institutional setting also enable a cheaper re-cultivation of abandoned cropland. The decrease of total cropland and a simultaneously occurring re-cultivation shows that some parts of the cropland under production in the baseline is substituted with re-cultivated abandoned land, once the institutional environment changes and more investment emerges in the Russian and Ukrainian agricultural sectors. This development indicates that some of the currently abandoned land has a good agro-environmental quality with comparably lower production cost and that less productive land in other parts of the countries would fall out of production, instead.

Impacts on cereal production are presented in Figure 13. Cereal production in Russia and Ukraine increases substantially in the investment scenario compared to the baseline. The strong increase in cereal production

largely translates into additional exports. Similar developments can be observed for other crops, such as oilseeds (not presented here).

Our results suggest that the full bio-physical production potentials in Russia and Ukraine are substantial, however, they are only partly utilized under market conditions, even in an improved institutional environment. The impact of high-input crop production systems and cheaper cropland re-cultivation options depends on market prices, production costs and trade options.

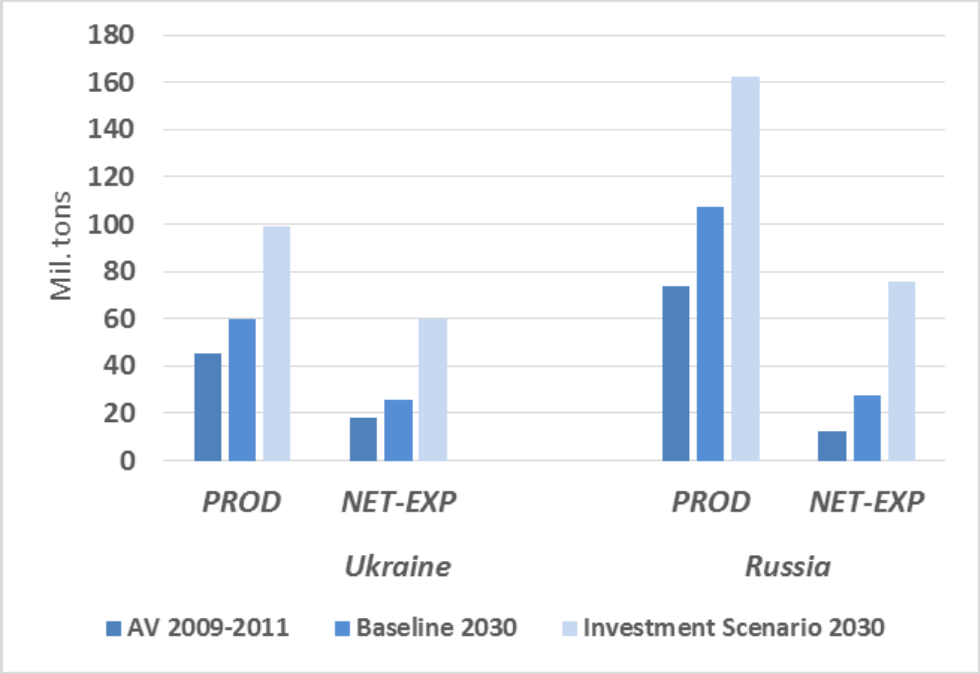

Figure 13: Cereal production and trade in 2009-2011 (average), Baseline 2030 and Investment scenario 2030.

8. Economy-wide impact of deeper trade integration

Applying MAGNET, a computable general equilibrium (CGE) model based on the Global Trade Analysis Project (GTAP) database, the AGRICISTRADE project also quantitatively assesses impacts of different trade arrangements on agri-food activities within the economies of the Commonwealth of Independent States (CIS). A contemporary baseline scenario is designed to accommodate key structural, trade pattern and policy changes, whilst a plausible set of merchandise trade non-tariff measure (NTM) *ad valorem* equivalents (AVEs), in tandem with the tariff rate AVEs from GTAP, are used to implement (*inter alia*) envisaged trade arrangements in the form of three hub-and-spoke Deep and Comprehensive Free Trade Agreements (DCFTAs) between Georgia, Moldova and Ukraine and the EU, as well as the creation of the Eurasian Economic Union (EEU) between Russia, Belarus and Kazakhstan, subsequently extended to include Armenia and Kyrgyzstan.[4]

As expected, the baseline structural supply side (productivity growth, capital and labour stocks) and demand side (endowment income and population) drivers typically dominate agri-food market trends, although trade policy is still found to have an important impact. In the DCFTA region, with the exception of 'other meat' where the Ukraine is a large net importer from the EU, the DCFTA deal has a beneficial impact for all agri-food activities, whilst the largest trade balance improvements occur in the grains, oilseeds, sugar and (especially) vegetable oils and fats sectors (Table 3). In macro-economic terms (macro growth and

[4] This study does not include Kyrgyzstan in the EEU since the GTAP regional disaggregation does not support this country.

income per capita) the DCFTA deal also contributes 14 percentage points of growth to the DCFTA region (Table 3). On the other hand, the formation of an EEU has surprisingly muted impacts on EEU region market trends in both agri-food and non agri-food markets, which it is suggested, relates to already low levels of trade intensity between EEU signatory members. Furthermore, trade integration in the CIS region as a whole is not found to be strong since neither the DCFTA nor the EEU trade agreements carry significant trade diversion effects within the entire CIS region.

Table 3: Production volume and Trade Balance volume changes in CIS regions according to baseline projections (% changes) (2015-2030)

	Production volumes by region (%)				Trade balance by region (€millions)			
	DCFTA	**EEU**	**RoCIS**	**EU28**	**DCFTA**	**EEU**	**RoCIS**	**EU28**
Agri-Food	17.4	8.3	24.0	8.1	989	5,289	-6,370	47,403
due to DCFTA	*9.3*	*-0.1*	*-0.1*	*0.0*	*1,716*	*69*	*21*	-1,723
due to EEU	*0.1*	*-0.4*	*0.0*	*-0.1*	*-28*	*-825*	*-15*	96
By sectors:								
Grains	12.3	10.1	13.4	12.3	437	636	-417	4,526
Oilseeds	18.5	16.2	13.1	5.1	115	-54	-22	862
Horticulture	4.0	2.1	13.8	5.4	-218	18	-2,287	290
Ruminants	12.7	13.8	27.3	15.7	20	-15	-1,402	1,314
Pigs & poultry	6.5	5.1	65.2	9.2	-16	22	-12	-131
Dairy	5.9	5.4	-3.9	5.9	-40	505	-547	6,297
Sugar	32.7	10.3	25.6	3.0	149	232	-23	331
Cattle meat	4.4	5.8	5.8	10.1	-161	585	-239	3,061
Other meat	-13.3	3.5	51.5	8.1	-131	-26	-24	4,931
Veg. oils & fats	118.7	31.0	30.8	3.5	1,536	1,136	-142	109
Bev & tobacco	28.8	11.7	58.6	9.5	-301	244	-295	13,438
Non-Food	57.5	25.9	81.0	25.1	-12,823	58,220	23,983	599,676
due to DCFTA	*15.7*	*0.0*	*0.0*	*0.0*	*5,699*	*-1,019*	*653*	-13,117
due to EEU	*0.6*	*0.8*	*-0.1*	*0.0*	*671*	*-9,850*	*-358*	-4,259
Macro growth	70.9	29.6	105.1	32.5	-	-	-	-
due to DCFTA	*14.0*	*0.0*	*-0.1*	*0.0*	-	-	-	-
due to EEU	*0.8*	*0.7*	*0.1*	*0.0*	-	-	-	-

Notes: The EEU region includes Armenia, Belarus, Kazakhstan and Russia. The DCFTA region includes Georgia, Moldova and Ukraine. The RoCIS includes the rest of the former Soviet Union. The column 'DCFTA' and 'EEU' refer to the region, the rows 'due to DCFTA' and 'due to EEU' refer to the DCFTA and EEU trade agreement, respectively. Source: MAGNET database and own projections.

In the Deep Integration (DI) and Liberalisation (LB) scenarios, deeper mutual cuts in NTMs with the EU generate further trade led macro growth gains for the DCFTA region (2.6% and 3.2%, respectively; see table 4). Similarly, with trade facilitation cost reductions through deeper NTM cuts on intra-EEU trade and new NTM cuts on EEU-EU trade routes, the EEU also exhibits improved macro growth. In both regions, real growth is accompanied by improvements in real per capita income. In the EU, macro improvements are moderate, due to the relative small share of the DCFTA and EEU regions within its trade portfolio.

In the trade blocs (TB) scenario, macroeconomic growth in the EEU is stifled (-0.3%). With the majority of merchandise trade between the CIS regions already facing a zero tariff, the rise in existing EEU tariffs on third countries provides both the DCFTA and RoCIS regions with relatively improved market access to the EEU. In turn, this generates moderate improvements in both their macroeconomic growth (0.9% and 0.1%,

respectively) and per capita real incomes (0.7% and 0.1%, respectively). With reduced market access to the EEU (especially Russia), the EU28 faces a negligible loss in macro growth and per capita incomes.

Table 4: Economic growth and welfare changes (2015-2030, € millions) compared with the baseline

	DCFTA			EEU			RoCIS			EU28		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**	**DI**	**LB**	**TB**	**DI**	**LB**	**TB**
Real GDP (%)	2.6	3.2	0.9	6.1	6.0	-0.3	0.9	1.1	0.1	0.4	0.4	-0.0
Income per capita (%)	0.7	1.0	0.7	4.7	4.6	-0.7	-4.0	-3.9	0.1	1.0	1.2	-0.0

Source: MAGNET database and own projections.

Table 5 shows the relative impacts on production in the three CIS aggregate regions according to each trade policy scenario. The greater opening of markets under the EU-DCFTA in the DI and LB scenarios brings unambiguous trade led gains for agri-food and non-agri-food production in the DCFTA region. In the agriculture and food sectors, there is a notable rise in 'vegetable oils and fats' production due to significant rises in Ukrainian exports to the EU (not shown). In the DI scenario, relative production also improves in dairy, sugar and, to a lesser extent, cattle meat sectors. On the other hand, there are further production deteriorations in 'other meat' as Ukrainian imports from the EU rise further. Comparing with the DI scenario, the LB scenario reveals a structural shift in primary resource usage toward non agri-food activity in the DCFTA economy. This is partly due to the changing pattern of trade opportunities associated with additional multilateral tariff reductions, but also as a result of even larger improvements in per capita real incomes leading consumers to purchase relatively more non agri-food products. In the TB scenario, DCFTA region agri-food and non agri-food activity expands slightly, whilst other (pig and poultry) meat production increases nearly 9%. Further investigation reveals this is because of relative rise in Russian imports of 'other meat' originating from the Ukraine.

In both the DI and LB scenarios, EEU region agri-food and non agri-food production contract, despite rises in real macro growth. The rise in real income is largely driven by Russian oil exports, which exacerbates Russia's dependency on non-oil commodities. As a result, greater import substitution negatively affects non-oil production in both Russia and (as a result) the EEU composite region. In the TB scenario, both agri-food and non agri-food output in the EEU increases marginally.

Deeper trade integration initiatives under the auspices of the DCFTA and EEU agreements have an especially detrimental impact on relative agri-food output in the RoCIS region. On the other hand, the apparent reallocation of available resources into non agri-food activities leads to an output volume improvement of approximately one percent in both DI and LIB scenarios. In the TB scenario, output volume changes are moderate, except for sugar, where an increase of over 10% is recorded.[5]

For the EU28, under the DI scenario, the net impact of tariff reductions on EEU-EU trade and additional NTM reductions with the DCFTA region is to further accelerate the baseline trend of economic restructuring toward non agri-food activities. In the LB scenario, additional multilateral market access provides EU producers in dairy, 'other meat' and beverages sectors with opportunities to expand, which slows the relative contraction of the EU agri-food industry when comparing with the DI scenario. The TB scenario produces very little impact for the EU28 since the EEU market represents a very small share of the EU's overall export trade.

The relative changes in the trade balances (in constant prices) for each trade scenario are presented in Table 6. In the DCFTA region, the DI and LB scenarios generate very moderate improvements in the trade balance; largely due to vegetable oils and fats exports from the Ukraine, although greater trade openness

[5] Deeper inspection shows this is due to trade driven production increases in Azerbaijan.

with the EU, rising real incomes and multilateral import tariff reductions (LB scenario) promote faster import growth in many agri-food and (composite) non agri-food activities.

Table 5: Production volume (% change) (2015-2030) compared with the baseline

	DCFTA			EEU		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	0.1	1.5	-0.3	-1.1	-1.6	0.3
Oilseeds	-1.2	-1.6	-0.7	-2.3	-2.8	2.2
Horticulture	-0.2	0.1	0.4	-4.1	-4.1	2.3
Ruminants	0.0	-1.3	0.1	-0.5	-0.6	0.9
Pig & poultry	-0.8	1.0	0.8	-5.1	-5.6	2.6
Dairy	1.4	-0.1	0.4	-3.0	-3.5	0.6
Sugar	3.8	-4.3	0.2	-3.8	-4.4	2.7
Cattle meat	0.9	-2.1	0.6	-2.8	-2.9	1.2
Other meat	-8.9	8.8	8.8	-18.6	-21.5	8.1
Veg.oils&fats	25.2	20.8	-1.0	2.0	-0.1	1.4
Bev. & tobacco	0.2	-0.4	1.2	-3.0	-3.2	1.2
Agri-Food	1.3	0.9	0.6	-2.4	-2.9	0.3
Non-Food	2.5	3.4	0.8	-1.2	-1.2	0.0
	RoCIS			**EU28**		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	1.5	1.6	-0.6	-0.8	-0.1	0.1
Oilseeds	-0.8	-0.2	0.5	-1.9	-2.5	0.0
Horticulture	-0.6	-0.6	0.3	-0.6	-1.6	-0.1
Ruminants	-0.2	-0.1	0.1	-0.9	-3.1	0.0
Pig & poultry	-0.2	-0.8	0.0	-0.6	0.9	-0.1
Dairy	0.7	-0.2	-0.1	-1.0	1.5	-0.1
Sugar	-3.7	-3.6	10.2	-2.4	-7.6	0.0
Cattle meat	0.7	-4.1	-0.2	-1.0	-6.8	0.0
Other meat	2.5	-3.5	-0.6	-0.7	1.0	-0.1
Veg.oils&fats	1.6	2.1	-0.3	-4.4	-3.7	0.3
Bev. & tobacco	-2.5	-3.6	0.7	-0.9	0.1	0.0
Agri-Food	-0.1	-0.6	0.1	-1.0	-0.3	0.0
Non-Food	0.8	0.9	0.1	0.3	0.3	0.0

Source: MAGNET database and own projections.

In the EEU region, Russian led import increases lead to trade deteriorations in the DI, with notable trade deteriorations in meat and dairy sectors. In the LB scenario, additional multilateral tariff reductions exacerbate the trade balance trends in the EEU region.

In the RoCIS region, the reallocation of (cheaper) primary factors into non-food production in the DI and LB scenarios generates an improvement in the non-food trade balance, whilst falling per capita incomes stifle import demands leading to trade balance improvements in most activities.

As expected, an isolationist EEU policy of raising tariff barriers in the TB scenario leads to a trade balance improvement for the EEU region. In the DCFTA and RoCIS regions, relatively improved market access to the EEU benefits exports, although this is mitigated by increases in real incomes which promote greater internal demand and imports. In the DCFTA region, the agri-food trade balance improvement reflects the improvements in the 'other meat' (from the Ukraine) and beverages and tobacco sectors.

In the EU28, there is trade balance deterioration in both the DI and LB scenarios. On the one hand, relative agri-food production falls reduce exports, whilst increases in per capita incomes promote additional internal- and import demand, particularly in the non agri-food sectors. In the LB scenario, export driven market opportunities for EU28 dairy, 'other meat' and beverages and tobacco producers improve the trade balances by €3,065 million, €1,924 million and €2,306 million, respectively, with the result that the relative EU28 agri-food trade balance improves €1,824 million in this scenario. The impact of the TB scenario in the EU is negligible, reflecting the loss of exports to the EEU market and the slight reduction of EU28 imports due to marginal falls in per capita real incomes.

Table 6: Trade Balance volume changes at 2015 world prices (2015-2030, million euros) compared with the baseline

	DCFTA			EEU		
	DI	LB	TB	DI	LB	TB
Grains	10	59	-20	63	4	-79
Oilseeds	-37	-34	-18	-22	-7	17
Horticulture	-22	2	-2	-77	-54	90
Ruminants	-4	-7	-1	-4	-2	0
Pig & poultry	0	-3	-2	15	25	-1
Dairy	20	-22	7	-400	-527	35
Sugar	13	-39	0	-73	-83	88
Cattle meat	-28	-55	1	-412	-452	154
Other meat	-57	30	34	-1,536	-1,790	536
Veg.oils&fats	344	277	-20	-258	-301	227
Bev&tobacco	-61	-66	27	-349	-360	138
Agri-Food	38	2	47	-2,639	-3,224	372
Non-Food	-1,445	-981	-268	-61,775	-59,055	12,863
	RoCIS			**EU28**		
	DI	**LB**	**TB**	**DI**	**LB**	**TB**
Grains	27	28	-13	-230	-3	74
Oilseeds	3	3	-1	266	274	2
Horticulture	6	-4	-4	-18	-704	-51
Ruminants	10	4	-15	-42	299	8
Pig & poultry	3	0	-2	-53	-61	3
Dairy	15	26	-3	-537	3,065	-88
Sugar	-2	-1	7	-225	-1,035	8
Cattle meat	6	-23	-2	-263	-4,245	-9
Other meat	7	-3	-1	-30	1,924	-142
Veg.oils&fats	4	4	-1	-775	-773	49
Bev&tobacco	16	6	5	-379	2,306	-70
Agri-Food	107	44	-30	-3,669	1,824	209
Non-Food	1,384	1,492	4	-130,623	-189,680	-187

Source: MAGNET database and own projections.

In conclusion: Examining the impacts of different trade futures by comparing to the baseline reveals two clear pathways. Firstly, there are two scenarios where greater reductions in tariff and NTM costs are envisaged (i.e., 'Deeper Integration' (DI), 'Liberalisation' (LB)). Both scenarios bring relative benefits for both the DCFTA and EEU regions in terms of higher real macroeconomic growth and real per capita incomes. Importantly, agri-food production and trade in the DCFTA region benefit from even deeper integration with the EU. On the other hand, whilst the DCFTA gains appear to be spread relatively more evenly across Georgia, Moldova and the Ukraine, in the EEU region, the majority of the relative benefits from DI and LB scenarios accrue to the Russian economy. In Russia, agri-food production falls whilst significant increases in oil production and exports arising from further falls in behind-the-border trade costs leaves the Russian (and subsequently the EEU) economy more dependent on agri-food imports. In addition, relative Russian investment rises in response to the expansion in the oil industry.

Secondly, a more isolationist trade policy approach by the EEU is characteristic of the 'Trade Blocs' (TB) scenario. With greater tariff protection, EEU region agri-food production increases compared with the baseline, although with a now absent investment effect, relative Russian (and EEU) macro growth and per capita real income falls moderately. As the DCFTA and RoCIS regions now enjoy relatively improved EEU market access, both regions experience modest improvements in their agri-food output. The welfare and growth impact for the EU28 is, as expected, negative although negligible.

9. Qualifications of model outcomes by country experts

Country experts were asked to give their opinion about the key project outputs, especially commenting on the model projection outcomes with a reference to the drivers and need to reach the agricultural sector potentials in their country. The main issues raised are briefly summarised below.

A rapid increase of **productivity increases** in the short to medium term might not be feasible due to the (still) high number of small scale farmers in most countries, that generally lack (and have difficulty in accessing) financial means for productivity increasing investments. Next, human capital is generally assessed to be poor and a factor hampering agricultural development. The agricultural knowledge and innovation system, comprising of science and education institutions (universities and vocational training) has still features of pre-transitional structures and do not seemed to be targeted at present-day challenges of the sector. Moreover, agriculture is not appealing to the younger generation, hampering the inflow of young farmers with up-to-date farming skills and open to modern technology. These aspects are expected to restraint productivity growth in the region. At the same time, in Russia, Ukraine and several other CIS, huge agri-holdings (combining primary agricultural activities with processing and trading) are run by investors from outside the agri-food sector. Such companies generally use modern technology, show good performances and can compete internationally, as examples show in the poultry sector (e.g. Ukraine).

Ineffective and unstable **government policies** are mentioned as an important limiting factor in the sector's efforts to use untapped potential. Public services like infrastructure facilities (roads, railways etc.) are important for efficient logistics of perishable food, but are often in a poor state. Land market policy is impeding scaling-up of the sector's fragmented structure (e.g. Ukraine, Kazakhstan, Georgia) reducing the efficient use of this production means. Agricultural policy support is implemented by a broad range of instruments (subsidies, tax-exemptions, direct payments, import levies, export subsidies, export bans) and are subject to frequent changes in level and scope, although countries do have an agricultural strategy on paper. Yet, the main problem is that agricultural support policy choices are not based on their contribution to improve the sector's competitiveness but largely build on lobbying from stakeholders (either the sector, traders or others). This adds to uncertainty with regard to future agricultural support policies.

Macroeconomic stability is an important driver of income growth, which on its turn is a vital factor for creating market opportunities for agricultural and food products. Recent macroeconomic trends show significant fluctuations in GDP growth. Part of that is attributable to global events (e.g. economic and financial crisis of 2008), but also domestic policies (e.g. austerity policy, exchange rate policy) and political instability (e.g. Ukraine and Georgia) also contribute to sluggish macroeconomic growth patterns. A stable macroeconomic development is a pre-requisite for each country building an agricultural development strategy that aims at using its agricultural untapped potential to the benefit of its population's welfare.

10. Conclusions

The AGRICISTRADE project has improved our understanding of the agri-food sector performance in the context of relevant policy measures at stake in the 8 countries covered. A consolidated and rich data base, country based research by local experts plus an in-depth inventory of policy measures have provided the basic framework for analyses of current and future agricultural and trade developments in these 8 countries.

Vast amounts of abandoned land and significant yield gaps suggest large unused agricultural potentials in the region. Causes of untapped potentials are many, with (a combination of) biophysical, economic and institutional factors hampering development. Abandoned land may be remote and face poor agro-environmental conditions, while low yields are due to limitations in management skills, water and fertilisers application. To un-tap potentials requires investments in (yield enhancing) input use, machinery, sheds, storage and in access to education, knowledge, finance, functioning land markets, property right protection and other institutions that a market-driven agricultural system needs. Government policies are not always conducive to improved efficiency and competitiveness of the sector, and all CIS score relative poor on 'good governance', a crucial factor for a country's business development. Moreover, in most sectors – except for poultry – farmers are poorly integrated in the supply chain, due to an underdeveloped processing sector in almost all supply chains in all CIS. The latter explains why the sector generates relatively little value added and exports mainly raw commodities (such as grains and oilseeds).

Market outlook projections under the baseline scenario show that Russia and Ukraine will produce, process, consume and export more cereals and oilseeds in the future. Additionally, imports of meat decrease due to domestic -poultry and pork meat- production increase. The most important driver of production growth is yield growth, even though moderate technological progress is assumed. Yields and productivity levels can be increased but to achieve those investments in technology, education and institutions are required.

The market and trade scenarios designed in this project show the benefits of reducing trade facilitation costs to both the DCFTA and EEA region. Gains are generated by most agri-food sectors, but as the economy-wide analysis shows, the non-food sector would benefit even more. Much of the sector and macroeconomic benefits would decline in case of an isolationist EEU policy. This shows the overall advantages of having more open trade relations between the EU and its Eastern Neighbours, and among the countries in the CIS region.

For the EU28, under the DI scenario, the net impact of tariff reductions on EEU-EU trade and additional NTM reductions with the DCFTA region is to further accelerate the baseline trend of economic restructuring toward non agri-food activities. In the LB scenario, additional multilateral market access provides EU producers in dairy, 'other meat' and beverages sectors with opportunities to expand production and exports, which slows the relative contraction of the EU agri-food industry when comparing with the DI scenario. The TB scenario produces very little impact for the EU28 since the EEU market represents a very small share of the EU's overall trade.

CIS country experts' qualifications of project results may give rise to a range of policy recommendations aiming at more efficient use of agricultural resources in their countries. Most obviously, policy suggestions target at increasing land and labour productivity, as improved productivity levels would contribute to enhanced competitiveness of and higher incomes in the sector. As all CIS experts point at human capital being a crucial yet failing factor in agricultural development, major attention should be spend to public/private investments in the agricultural knowledge and innovation system (AKIS). This could be an area in which East-West cooperation could be made more profound.

The Agricistrade project

"Exploring potential for agricultural and biomass trade with the EU"

The on-going negotiations on Deep and Comprehensive Free Trade Agreements between the EU, Armenia, Georgia, Moldova and Ukraine, the accession of Russia to the World Trade Organisation in 2012 and the establishment of a Customs Union between Russia, Belarus and Kazakhstan in 2011 are expected to boost trade relations between the European Union and its Eastern Neighbors.

The aim of *AGRICISTRADE* is to accompany these developments by analyzing the potential impact of these trade agreements and by delivering insights on the potential developments of the food, feed and biomass sectors in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia and Ukraine.

AGRICISTRADE contributes to the analysis of the present situation, the potentials and the projection of future agri-food developments. This project will improve the understanding of present agricultural and food processing sectors in the Commonwealth of Independent States' (CIS) by collecting and evaluating statistical data and related policies.

Based on its multidisciplinary expertise the *AGRICISTRADE* consortium investigates agro-ecological, socio-economic and institutional bottlenecks to exploit the agricultural potentials in CIS and shows the implications of policy interventions for development perspectives of a number of selected supply chains.

AGRICISTRADE improves existing biophysical and economic modeling tools enhancing their empirical base and regional representation, and develops a framework for assessing agricultural production and demand potentials in CIS. Modeling tools will be used to quantify and analyze the impact of market developments, technology and policy scenarios on CIS agricultural production, demand and trade, specifically addressing the implications of these scenarios for EU' agri-food sector.

The project results contribute to a fact-based and well-informed dialogue among EU policy makers on possible impacts of a DCFTA on CIS agricultural development potentials.

To learn more about the project, please visit:

http://www.agricistrade.eu/